

REFERENCE SERIES

21st Century
ANTHROPOLOGY
A Reference Handbook



Volume 1 & 2

Edited by

H. James Birx

21st Century
ANTHROPOLOGY
A Reference Handbook

Light will be thrown on the origin of man and his history.

—Charles Darwin (1859)
On the Origin of Species, Chapter XV

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Edited by

H. James Birx

Canisius College and State University of New York at Geneseo



Los Angeles | London | New Delhi
Singapore | Washington DC

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For information:



SAGE Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

SAGE Publications Ltd.
1 Oliver's Yard
55 City Road
London EC1Y 1SP
United Kingdom

SAGE Publications India Pvt. Ltd.
B 1/1 Mohan Cooperative Industrial Area
Mathura Road, New Delhi 110 044
India

SAGE Publications Asia-Pacific Pte. Ltd.
33 Pekin Street #02-01
Far East Square
Singapore 048763

Printed in Mexico

Library of Congress Cataloging-in-Publication Data

21st century anthropology: a reference handbook / editor, H. James Birx.

2 v., p. cm.

Includes bibliographical references and index.

ISBN 978-1-4129-5738-0 (pbk.)

1. Anthropology—Handbooks, manuals, etc. I. Birx, H. James.

GN25.A144 2010

301—dc22

2009052453

10 11 12 13 14 10 9 8 7 6 5 4 3 2 1

<i>Publisher:</i>	Rolf A. Janke
<i>Acquisitions Editor:</i>	Jim Brace-Thompson
<i>Reference Systems Manager:</i>	Leticia Gutierrez
<i>Reference Systems Coordinator:</i>	Laura Notton
<i>Production Editor:</i>	Carla Freeman
<i>Copy Editors:</i>	Gretchen Treadwell, Patricia Sutton, Cate Huisman
<i>Typesetter:</i>	C&M Digitals (P) Ltd.
<i>Proofreaders:</i>	Scott Oney, Victoria Reed-Castro, Theresa Kay
<i>Indexer:</i>	Julie Grayson
<i>Cover Designer:</i>	Ravi Balasuriya
<i>Marketing Manager:</i>	Amberlyn McKay

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PREFACE

Since its emergence as a discipline in the middle of the 19th century, anthropology has focused on the study of humankind in terms of science and reason, as well as logical speculation. Within a comprehensive and interdisciplinary framework, anthropology aims for a better understanding of and proper appreciation for the place of our species within earth history and organic development. As such, the scientific theory of biological evolution has been indispensable for giving meaning and purpose to the awesome range of empirical facts and conceptual insights that now constitute the rich content of present-day anthropology. Furthermore, cross-cultural studies emphasize the vast differences among human groups from the perspectives of material culture, social behavior, languages, and worldviews.

Because of its holistic orientation, the anthropological quest includes four major but interrelated divisions of concentration: biological anthropology, archaeology, sociocultural anthropology, and linguistics. These four divisions represent many specific areas of academic interest and scholarly research, each area with its own unique topics and methods of inquiry. Early anthropologists sought not only to document human evolution, but also to record the cultural differences of other societies. They also speculated on the origin and history of human societies, cultures, and languages. Furthermore, early anthropologists benefited from and contributed to other special sciences, from geology and paleontology to sociology and psychology. To their advantage, anthropologists have remained open to the scientific discoveries in modern biology, for example, the DNA molecule, and the critical ideas in recent philosophy (e.g., the Marxist approach to solving social problems).

Following the pivotal writings on evolution by Charles Darwin (1809–1882), the early anthropologists took time and change seriously. They speculated on the origin and history of our species and its relationship to the other primates, especially the great apes. Sir Edward Burnett Tylor wrote *Primitive Culture* (1871), extending the framework of organic evolution to include the historical development of human societies and their cultures. In the early 1890s, Eugene Dubois discovered a *Homo erectus* specimen at the

Trinil site on the island of Java. Among others, these two events contributed to the emergence of anthropology as an academic discipline in its own right.

Throughout the 20th century, scientific research remained a major concern for anthropologists. The discovery of Machu Picchu by Hiram Bingham in 1911 and the tomb of Tutankhamen by Howard Carter in 1922 brought worldwide attention to archaeology. Later, at Columbia University, the writings of Ruth Benedict, Franz Boas, and Margaret Mead offered a cross-cultural perspective on human biology, language, thought, and behavior.

In 1959, in central East Africa, the discovery of a *Zinjanthropus boisei* skull at Olduvai Gorge in Tanzania by paleoarchaeologist Mary D. Leakey and the study of wild mountain gorillas in their natural habitats on the slopes of the Virunga volcanoes by zoologist George B. Schaller helped to usher in modern biological anthropology. And then there was the crucial extension of genetic research to the study of our own species in order to understand and appreciate the human animal within the wider framework of primate evolution.

Today, after about 150 years, the discipline of anthropology is as active and relevant as ever. Incorporating the ongoing advances in science and technology, specialists in anthropology find no lack of engaging topics for scholarly research. There is the challenge and need to study and protect endangered nonhuman primates, to continuously search for fossil hominid specimens and hominid-made stone artifacts, and to comprehend the many complex relationships between our biocultural species and its dynamic environment. Moreover, anthropologists have been very instrumental in increasing human tolerance for the biological variations and cultural differences that exist within the hundreds of societies that comprise our global species. As a new research area, applied anthropology strives to be relevant in this civilized but converging world (e.g., the emergence of forensic anthropology and biomedical anthropology).

The 102 chapters in this two-volume *21st Century Anthropology: A Reference Handbook* attest to the many research topics being investigated by current anthropologists and related scholars in science and philosophy. Each

of the 15 general categories offers not only the most recent empirical facts and explanatory concepts in the topics treated, but also those new areas that require further scientific research and philosophical reflection. And there are always new models, methods, theories, discoveries, and perspectives that will emerge in the ongoing development of anthropology throughout the coming decades.

Within these pages, one will explore many varied but fascinating topics (e.g., from the concept of culture, ancient civilizations, and human ecology to paleopathology, twin studies, and terrorism). It is hoped that the 102 intriguing subjects, which make up this reference handbook, will both enlighten and inspire some readers to join the ongoing anthropological quest.

Acknowledgments

At Sage Reference, I especially appreciate that its vice president and publisher, Rolf A. Janke, had recommended that I edit the two-volume *21st Century Anthropology: A Reference Handbook*. Furthermore, I am deeply grateful to developmental editors Sara Tauber and Sanford Robinson for providing excellent guidance during the long and arduous evolution of this extensive and unique project.

I also benefitted from the meticulous attention given to all the details of this comprehensive work through the expertise of production editor Carla Freeman and the copy editors Gretchen Treadwell, Patricia Sutton, and Cate Huisman.

In particular, I am very appreciative of Ravi Balasuriya for his outstanding artistic contribution in designing the striking cover for this two-volume set.

Moreover, I am deeply indebted to managing editor Sylvia S. Bigler at Canisius College, whose attentive focus on helping me to review these 102 chapters was an invaluable aid in the preparation of this reference handbook for publication. Without her professional administrative assistance and persistent moral support, the conception and completion of this project would not have been possible.

Furthermore, these editorial board members have been most helpful during the preparation of this two-volume set: Robert Bollt, Paul F. Brown, Patricia N. Chrosniak,

Irina Jovan Deretic, Jeffrey H. Schwartz, and Stefan Lorenz Sorgner.

The range and depth of these challenging but exciting topics clearly attest to the ongoing significance of and interest in the research so necessary for the comprehensive discipline of modern anthropology. It is with heartfelt thanks that I acknowledge the contributing authors for their scholarly chapters. The following writers were especially helpful in providing several entries or an essential contribution for this academic work: Ignacio Arenillas, José Antonio Arz, Les Beldo, Robert Bollt, James Pleger Bonanno, Cris Campbell, Irina Jovan Deretic, Isabelle M. Flemming, Michael Joseph Francisconi, Robert Bates Graber, Britteny M. Howell, Joachim Klose, Ramdas Lamb, Kathleen Nadeau, Neil P. O'Donnell, Jeffrey H. Schwartz, Hans Otto Seitschek, Stefan Lorenz Sorgner, Ryan J. Trubits, Robert M. Worley, and Vidisha Barua Worley.

Over the years, these individuals have offered encouragement and provided inspiration: Stefan Artmann, Pat Bobrowski, Brandin Robert Clark, Joshua Gerald Clark, Benjamin J. Cooper, Brian C. Crotzer, Christopher C. Dahl, Marvin Farber, Maximilian Flierler, Deanna L. Garwol, Edward G. Garwol III, Edward G. Garwol IV, Shirley A. Garwol, Debra G. Hill, Pamela Rae Huteson, Susanne Des Jardins, Albertha F. Kelley, Leonid A. Khinkis, Margaret M. Kraatz, Oliver W. Lembcke, David Alexander Lukaszek, Lawrence J. Minet, Dianne Marie Murphy, Rajko R. Pavlicic, Rev. Edmund G. Ryan, Maximilian Luitpold Schreck, Richard Albert Stein, Mark James Thompson, and Beatrix Vogel.

During the past 7 years, opera and film have sustained me during the daunting task of editing and contributing to 10 volumes for Sage Publications. I remain thankful for the music of Richard Wagner and Giacomo Puccini, as well as the performances of Pernell Roberts and Mario Lanza.

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Dr. Birx has been a visiting scholar at the University of Cambridge and twice at Harvard University. He has written more than 400 academic publications, including authoring 6 books and editing 14 other volumes, receiving awards for both his *Theories of Evolution* and the five-volume *Encyclopedia of Anthropology* (2006), and critical acclaim for his three-volume *Encyclopedia of Time* (2009).

Dr. Birx has lectured extensively at renowned institutions and prestigious universities around the globe, from Australia

to Russia. In 2010, he will give invited presentations at Alfa University, Aristotle University of Thessaloniki, University of Athens, University of the Aegean, University of Belgrade, University of Chicago, University of Munich (LMU), University of Oxford, and for the Nietzsche-Forum Munich. He will also be a scholar in residence at the State University of New York at Geneseo and then a distinguished visiting professor at the University of Belgrade for its faculty of philosophy.

Dr. Birx has been fascinated with anthropology since childhood, when he first learned about wild mountain gorillas and different human cultures. Over the years, he has visited numerous zoos, museums, and anthropological sites from Egypt, England, and Germany to Hawai'i, Mexico, and Peru. Of particular importance was his research in craniometry at the Orchid site ossuary in Canada, and in paleoanthropology at the Koobi Fora site in Kenya, Africa. His professional listings include *Who's Who in the World*.

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semantic systems that constructs a general framework for describing and explaining the origin and dynamics of complex adaptive systems.

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Robert Bollt (1971–2010) was an archaeologist who specialized in ancient Polynesia. He obtained his PhD from the University of Hawai'i at Manoa in 2005. Recently he had concentrated on the Austral Islands in East Polynesia, where he found and excavated the archipelago's earliest known site to date. The results of this work are published in the monograph *Peva: The Archaeology of an Austral Island Settlement* (2008). He also excavated sites in Hawai'i and the Marquesas. His primary interests included Polynesian material culture and patterns of long-distance exchange among islands, determined by using geochemical sourcing analyses to trace stone tools to their geological source of origin. He also enjoyed experimental archaeology, especially stone tool-making. Additional interests included Polynesian subsistence strategies, faunal analysis, human-environment relations, sociopolitical transformation, and warfare.

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Jacob R. Hickman is a doctoral candidate at the University of Chicago in the Department of Comparative Human Development, where he specializes in psychological anthropology and cultural psychology. Jacob investigates the psychological and cultural dynamics of migration, resettlement, and social change in general. His current work constitutes a comparative ethnography of personhood and morality in Hmong communities that have resettled to the United States and Thailand from Laos. He has also published research on the changing health concepts among Hmong in Alaska (“‘Is It the Spirit or the Body?’ Syncretism of Health Beliefs Among Hmong Immigrants to Alaska,” *NAPA Bulletin*, 2007; and “Treating Hmong Children in America: Two Case Studies,” in *The Child: An Encyclopedic Companion*, 2009) and the dynamics of ethnic identity in Western Highland Guatemala (“Inverse Typology and Ethnic Identity: An Analysis of Inverse Image Theory in Two Guatemalan Communities,” *The Journal of the Utah Academy*, 2003).

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PART I

BIOLOGICAL ANTHROPOLOGY

BIOLOGICAL ANTHROPOLOGY

H. JAMES BIRX

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Anthropology is the scientific study of humankind (Birx, 2006a). It strives for a comprehensive understanding of and proper appreciation for our species within the earth's history. As such, anthropology is grounded in the empirical facts of the special sciences and the logical argumentation of critical thought. Furthermore, scientific evidence is supplemented with rational speculation, especially when facts are lacking. Ongoing advances in science and technology continuously add new information to the growing discipline of anthropology, thereby strengthening some concepts and hypotheses, while modifying or dismissing others.

Besides incorporating the scientific method, anthropologists view the natural history of humankind within an evolutionary framework (Fortey, 1998; Hublin, 2006; Mayr, 2001). Our species is seen as a product of organic evolution in general, and primate history in particular. The human species is related to apes, monkeys, and prosimians. Both fossils and genes substantiate the biological and historical unity of primates in terms of the factual theory of organic evolution (Coyne, 2009; Ridley, 2004).

Biological anthropologists (Kennedy, 2009) use the comparative method in order to understand and appreciate the evolutionary relationships among primate fossils, as well as living species. They compare and contrast fossil skeletons (especially jaws and teeth), DNA molecules, and morphologies (both anatomy and physiology), as well as

psychological and behavioral patterns. A convergence of facts and concepts clearly shows that the human animal is closely related to the four great apes, or *pongids* (orangutan, gorilla, chimpanzee, and bonobo).

This anthropological quest is both intradisciplinary and interdisciplinary. Specialists in the discipline work together to achieve a comprehensive and coherent view of our human species; for example, biological anthropologists work closely with prehistoric archaeologists at a fossil hominid site, while sociocultural anthropologists work closely with anthropological linguists in studying other societies with different cultures (particularly nonliterate peoples with a "primitive" technology). One goal is to derive meaningful concepts and generalizations from the vast range of empirical evidence (Fuentes, 2007).

More and more, as naturalists and humanists, anthropologists are multidisciplinary in their approach. They strive to be relevant in the modern world. Consequently, one speaks of applied anthropology (e.g., forensic anthropology and biomedical anthropology). Anthropological knowledge adds to human enlightenment, particularly in terms of increasing tolerance for human biological and sociocultural differences. In the discipline of anthropology, teaching and research go hand in hand; that is, biological anthropologists aim for a clearer view of humankind that concerns its evolutionary past, present convergence on the earth, and future possibilities (perhaps its migration beyond our planet and even outside this solar system).

Biological anthropologists focus on the organic evidence of primates (e.g., their fossils, skeletons, teeth, genetic makeup, and physical characteristics, as well as psychological and social behavior patterns). They present this evidence in a comprehensive and intelligible manner, while searching for meaningful concepts and generalizations about primate evolution in general, and our species in particular.

The German naturalist Johann Friedrich Blumenbach (1752–1840) is considered to be the father of biological anthropology (previously known as physical anthropology) because he focused on studying the human variations in those biological characteristics that manifest themselves within a population and among populations. Although the academic discipline of anthropology did not yet exist, his pioneering research paved the way for the later, intensive studies of our species and the other primates—from comparative paleoanthropology to comparative genetics.

Charles Darwin (1809–1882) was a major influence on the emergence of biological anthropology. As presented in his two major works, *On the Origin of Species* (1859) and *The Descent of Man* (1871), his theory of evolution suggested that much light would be shed on the history of life-forms and the nature of our own species (Darwin, 1859, 1871). The origin and development of humankind, as well as its evolutionary relationships to the other primates, now became the subject matter for scientific inquiry. No longer was our species viewed as being isolated from other life-forms or organic history. As such, the discipline of anthropology dedicated itself to rigorously studying humankind in terms of science and reason (Bollt, 2009).

As biological anthropologists, early naturalists worked alone in their search for fossil hominid specimens. Usually, outside funding was not available and significant findings were often dismissed by the scientific community. However, as more evidence was discovered, the theory of human evolution was taken seriously. Since the middle of the 20th century, paleoanthropologists have stressed a multidisciplinary approach (both intradisciplinary and interdisciplinary) in their research (Wolpoff, 1999). As a result, at a fossil hominid site, a scientific team of international specialists may include chemists, geologists, paleobotanists, paleozoologists, prehistoric archaeologists, photographers, and artists. Specialists also work with paleoanthropologists in museums and laboratories. Some biological anthropologists specialize in primate-behavior studies or primate-genetics research (including twin studies, as well as growth and development research). Today, thanks in part to anthropologists, there is a growing awareness of the critical relationship between our species and the natural environment, both inorganic and organic. Academic books (Angeloni, Parker, & Arenson, 2009; Haviland, Walrath, Prins, & McBride, 2008; Park, 2010; Relethford, 2010; Stanford, Allen, & Antón, 2009), professional journals, museum exhibits, college and university courses, and educational programs in the mass media are making the scientific evidence in biological anthropology available to a widening

audience of teachers and students, as well as the interested public. The presentation of facts, concepts, hypotheses, and perspectives is very helpful in discrediting racism and promoting evolution.

Evolutionary Framework

The idea of evolution neither originated with the thoughts of Charles Darwin nor had its final formulation in his scientific writings; as such, one may speak of the evolution of evolution from an early concept in antiquity to its present status as a brute fact of the modern worldview (Birn, 1984, 1991b).

Pre-Socratic Speculations

During the pre-Socratic Age, several early philosophers as natural cosmologists anticipated the evolutionary framework in their rational speculations on the nature of things. Rejecting legends and myths, as well as personal opinions and religious beliefs, these critical thinkers emphasized deriving explanatory concepts by rigorously reflecting on their own experiences within nature and the use of reason. Although they were neither scientists nor evolutionists, their answers to general questions about this universe did establish a dynamic worldview that paved the way for further discoveries in the future development of the special sciences, from geology and paleontology to biology and anthropology.

Among the pre-Socratic thinkers, Thales claimed that life first appeared in water; for him, water is the fundamental substance of this cosmos. He argued that, over time, aquatic organisms changed and eventually there were life-forms that could adapt to and survive on dry land. It is reassuring that Thales, as the first Western philosopher, had glimpsed the biological significance of change throughout planetary time. In his rational speculations, he had grasped both the fluidity of life and the unity of this universe.

Extending this vision, Thales's student Anaximander held that, in the development of life-forms from water to land, lineage leading to the human animal had once passed through a fishlike stage of development. It is tempting to refer to this pre-Socratic thinker as the father of comparative morphology; one may imagine Anaximander comparing the innards of a dead fish with those of a human corpse, and consequently being very impressed with the similarities (rather than with the differences).

Reflecting on the flux of reality, the naturalist metaphysician Heraclitus argued that change is the quintessential characteristic of this universe. Looking for order in this dynamic world, he further claimed that all changes in nature are cyclical. As a result, for Heraclitus, there is the endless repetition of day and night, life and death, the four seasons of the year, and even the cosmos itself. For later naturalists to accept the evolutionary framework, it was necessary for them to take both time and change seriously.

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Of particular importance was Xenophanes, who recognized both the organic and historical significance of fossils as the remains of once-living but often different organisms related to the living life-forms of today. The fossil record is crucial, in that it provides empirical evidence to substantiate the fact of organic evolution. Despite our present knowledge of genetic variations, it would be difficult to convince many people of the truth of organic evolution if no fossil evidence had ever been discovered. However, the more paleontologists search, the more fossils they find (including paleoanthropologists discovering fossil hominid specimens).

Lastly, Empedocles even offered an explanation (although a bizarre one) for the origin of organisms. He speculated that in the past, the surface of the earth had been covered by free-floating organs of different sizes and shapes; they haphazardly came together, forming organisms (some, of course, were monstrosities). Those organisms that could adapt to the environment survived and reproduced, while the monstrosities perished. What is implicit in this explanation are the basic ideas that constituted the evolutionary framework of both Charles Darwin and Alfred Russel Wallace: multiplicity, variation, adaptation, survival, and reproduction or extinction. Unfortunately, with irony, the proto-evolutionary ideas of these five pre-Socratic thinkers were squelched by the greatest thinker of ancient Greece—Aristotle.

Aristotle

Aristotle was the “father of biology,” including comparative studies in embryology, morphology, and taxonomy. His encyclopedic interests ranged from cosmology and meteorology to botany and zoology. Aristotle assumed that the human mind is capable of discerning a natural design within the mixed species on this planet. He referred to this terrestrial order as the great chain of being, or ladder of nature. For him, each species is eternally fixed in nature, each type of organism occupying a special place in the great chain of nature depending upon its degree of complexity and sensitivity or intelligence. This hierarchical ladder ranged from the simplest mineral at its bottom to the rational human at its apex. Since Aristotle dismissed both the creation and extinction of species, as well as the appearance of new ones, he was not an evolutionist (although he was interested in the development of individual organisms). Because many thinkers gave priority to the fixed Aristotelian worldview, a serious evolutionary framework did not emerge until the scientific writings of Charles Darwin and Alfred Russel Wallace over 2,000 years later.

Before Darwin

Challenging the fixed Aristotelian worldview, the Roman philosopher and poet Lucretius presented a dynamic interpretation of both the earth’s history and the material universe. In his groundbreaking work *On the*

Nature of Things, he argued that our planet itself has created plants and animals, and even outlined the sociocultural development of our own species from cave-inhabiting early creatures to the citizens of the Roman empire. Furthermore, Lucretius boldly held that life-forms (including intelligent beings) inhabit planets elsewhere in the cosmos. His ideas paved the way for a naturalistic study of humans within nature.

During the Italian Renaissance, the artist and visionary Leonardo da Vinci recognized the biological and historical significance of fossils as the remains of once-living but usually different species—in fact, he had found these fossils in the top rock strata of the Alps. Moreover, his dynamic view of the earth’s history in terms of geology argued that the age of our planet must be at least 200,000 years (an astonishing claim in the eyes of his contemporaries). Furthermore, Leonardo’s study of the human body foreshadowed serious comparative-anatomy research.

In 1735, Carolus Linnaeus fathered modern taxonomy. He recognized the close similarities among the human animal and the apes, monkeys, and lemurs. Consequently, he placed all of these forms in the primate order. Although he was not an evolutionist, Linnaeus discovered that species are capable of producing varieties of themselves (an example of microevolution).

Decades later, as a result of taking the implications of geology and paleontology seriously, Jean-Baptiste de Lamarck wrote the first serious book on organic evolution. In his *Philosophy of Zoology* (1809), he argued that species are mutable and have changed throughout organic history. Without a testable explanatory mechanism or sufficient empirical evidence, Lamarck was unable to convince other naturalists that life-forms had evolved throughout geological time. Ironically, however, Lamarck’s book appeared exactly 50 years before the publication of Charles Darwin’s *On the Origin of Species* (1859).

With its emphasis on science, reason, and a historical perspective that took both time and change seriously, the Age of Enlightenment established an intellectual atmosphere that allowed for the emergence of three important earth sciences: historical geology, comparative paleontology, and prehistoric archaeology. Ongoing advances in biology (especially embryology, morphology, and taxonomy) and extensive travels by curious naturalists (e.g., Haeckel, Humboldt, Huxley, and Lyell) provided overwhelming scientific evidence and convincing rational argumentation for the vast age of this planet, the evolution of life-forms, and the great antiquity of our own species. Clearly, rocks and fossils and artifacts did not support a strict and literal interpretation of the biblical story of creation as presented in the book of Genesis in the Holy Bible. It was now necessary for some ingenious naturalist to bring all of these facts and concepts together in a comprehensive and intelligible view of life on earth in terms of biological evolution. Unintentionally, this task fell to the young geobiologist Charles Darwin (Birn, 2009).

Charles Darwin

Three major events contributed to Darwin's developing his scientific theory of organic evolution: his unique experiences as a naturalist aboard the HMS *Beagle* during its 5-year circumnavigation of the world in the Southern Hemisphere (1831–1836), his reading Charles Lyell's three-volume work *Principles of Geology* (1830–1833), and his later fortuitous reading in 1837 of Thomas Robert Malthus's *An Essay on the Principle of Population* (1798).

For Darwin, the convergence of evidence from geology, paleontology, and biology (as well as the implications of both biogeography and variations in organisms) argued for the pervasive mutability of species throughout immense periods of the earth's history within a naturalist framework. Of particular significance, he offered natural selection as the primary mechanism to explain biological evolution. Darwin's scientific facts and rational arguments for his evolution theory were first presented in *On the Origin of Species* (1859). However, at that time, the sensitive naturalist did not yet extend his theory of evolution to include the human animal.

In his *The Descent of Man* (1871), Darwin now seriously considered the evolutionary implications for understanding and appreciating the place of our own species within natural history. He argued that, biologically, the human animal is closest to the three great apes known to science at that time (orangutan, gorilla, and chimpanzee), with which it shares a common ancestral group whose fossils would be found in Africa. Furthermore, as had Huxley in England and Haeckel in Germany, Darwin even claimed that our species differs merely in degree, rather than in kind, from these three great apes. As such, his ideas were a major contribution to the emergence of biological anthropology. Even so, the resultant creation-evolution controversy still continued as an ongoing debate between biblical fundamentalists and scientific evolutionists. Today, the religious position is grounded in the alleged argument for intelligent design.

Although convinced of the veracity of his evolution theory, Darwin was still perplexed by four questions (among others): What is the true age of planet earth? Why is the fossil record so incomplete? How are organic variations inherited from generation to generation? Can slow biological evolution account for the emergence of the complex human eye? Throughout the following decades, ongoing advances in science and technology (especially in dating techniques and computers) would help to answer these four questions in favor of the evolution theory and a naturalist viewpoint.

After Darwin

The discipline of anthropology emerged during the middle of the 19th century. Greatly inspired by the writings of Charles Darwin, several naturalists were very interested in

extending the evolutionary framework to include our own species. In general, early biological anthropologists were eager both to find fossil evidence to substantiate human evolution and to compare the morphology of living primates in order to demonstrate the remarkable similarities among lemurs, monkeys, apes, and the human animal. In particular, some biological anthropologists extended taxonomy to include a racial classification of human groups in terms of different physical characteristics. (Rigorous primate-behavior studies and primate-genetics research would not appear until the middle of the 20th century.) Although conflicting interpretations of evolution were offered by naturalists, and even though anthropologists could not agree on the number of human races, there was no doubt that our species was both the product of organic evolution and closely related to the great apes, especially the chimpanzee.

During the succeeding decades, biological anthropologists would specialize in areas ranging from paleoanthropology and primatology to forensic anthropology and biomedical anthropology. The theory of evolution offers a comprehensive and intelligible framework in which both the physical characteristics of the human animal and its place within natural history made sense in terms of science and reason. Today, one may speak of the biological unity of *Homo sapiens sapiens* in terms of the DNA molecule.

Science of Genetics

As the father of biology, Aristotle was interested in the embryological and morphological development of organisms. He held that a female contributes the matter and a male contributes the form to an embryo, which then develops according to an innate, preestablished goal within the embryo itself (a movement from potentiality to actuality). However, Aristotle was not an evolutionist, since he held to the eternal fixity of all species within his assumed static hierarchy of planetary existence that ranged from simple minerals to complex animals. This worldview dominated Western thought until the persuasive scientific theory of evolutionist Charles Darwin.

The monk Johann Gregor Mendel discovered the basic principles of inheritance as a result of his rigorous, long-term experiments with the common garden pea plant *Pisum*. A particulate theory of inheritance was presented in his monograph *Experiments in Plant Hybridization* (1866), in which he not only distinguished between dominant and recessive characteristics for the same trait, but also presented the principles of segregation and independent assortment. Unknown to himself and the scientific community, which did not understand or appreciate the far-reaching significance of his pioneering discoveries, Mendel had established an empirical foundation for the science of genetics.

In 1900, building upon Mendel's findings, Hugo DeVries both discovered the phenomenon of incomplete dominance

and presented his mutation theory. Within several decades, evolutionists realized that, taken together, genetic variation and natural selection form the explanatory foundation of organic evolution. Thus emerged neo-Darwinism, or the so-called synthetic theory of biological evolution, with its focus on dynamic populations or gene pools.

If naturalist Charles Darwin had given to biological anthropology the factual theory of organic evolution, then James Watson and Francis Crick (along with Maurice Wilkins and Rosalind Franklin) gave to it a genetic foundation by discovering a working model for the DNA molecule, the so-called code of life or language of heredity (Watson, 2003). Since 1953, this groundbreaking discovery has had awesome consequences for understanding and appreciating life-forms, from a bacterium to the human animal. The DNA molecule gives undeniable evidence for the historical continuity and chemical unity of all life-forms on planet earth. In particular, it now clearly links our species with the four great apes or pongids: orangutan, gorilla, chimpanzee, and bonobo.

The DNA molecule has the structure of a double helix with six parts: a phosphate group, the sugar deoxyribose, and four bases (adenine, thymine, guanine, and cytosine). Changes to the sequence of bases, or nucleotides, in the genome may result in changes in the phenotype or biological expressions of an organism. Mutations may be major or minor, and of positive, neutral, or negative value for the organism in terms of its adaptation to and survival in a dynamic environment. Successful reproduction will pass on the altered hereditary information to the gene pool of the next generation. Therefore, one may hold that the members of a population represent differential reproduction. Over time, a species may produce a variety of itself, and this variety may eventually become a new species; further evolution may result in the emergence of higher taxonomic groups, such as new families, orders, or classes of organisms. Nevertheless, within the sweep of organic evolution, a very sobering fact is that the extinction of species is the rule rather than the exception.

The next step for naturalists and biological anthropologists was to extend the science of genetics to comprehend the evolution of populations (gene pools) in terms of both changes in gene frequencies and the appearances of mutations within dynamic environments, as well as natural and social selection (Hartl & Clark, 2006; Wells, 2002). Such studies shed significant light on biological variations in human populations, consequently challenging earlier anthropological views on race and racism (Mielke, Konigsberg, & Relethford, 2006).

In the early decades of the 20th century, anthropologists could not agree on either the number of alleged distinct races that comprise our human species or the criterion or criteria to be used in determining the assumed number of human races; the number of races ranged from 3 to over 200 (obviously, the methodology was faulty). Unfortunately, however, the concept of human race was extended by some

anthropologists to justify racism, resulting in a racial hierarchy from inferior groups to superior groups (Birx, 2003; Wolpoff & Caspari, 1997). Nevertheless, as a result of understanding and appreciating human variations in terms of the DNA molecule and dynamic populations, modern biological anthropologists now speak of the genetic unity of *Homo sapiens sapiens*, with organic differences being scientifically meaningful only below the subspecies level of classification. Human differences in blood groups, skin pigmentations, and morphological types are significant only in terms of adaptive genetic variations from gene pool to gene pool. The biological anthropologist Ashley Montagu (1905–1999) was instrumental in discrediting race and racism, while advocating the evolutionary framework (Montagu, 1997). Today, it is stressed that humans manifest cultural differences that are far greater than their biological differences. Of particular interest are ongoing twin studies, which are hoped to shed more light on the influences that both biology and culture have on determining the physical and social differences among human beings.

The mapping of the human genome, in order to discover which gene or genes determine specific characteristics or traits, has made possible the genetic engineering of the DNA molecule (Ridley, 2000; Scherer, 2008). Of course, such research holds both awesome promises and foreboding perils for the future existence and evolution of our species. In particular, ongoing stem cell research may eliminate hereditary diseases and even improve the human organism. As with any new science, there is (at first) widespread apprehension and the possible abuse of such powers. Even so, one may argue that the long-range benefits of genetic engineering and stem cell research far outweigh any short-range problems, given common ethical guidelines and rational value judgments to prevent the misuse of scientific research and its application.

Today, one may even speak of emerging teleology. As the use of and advances in both nanotechnology and genetic engineering increase, our species will more and more be able to guide the once-random process of organic evolution, including directing human evolution for chosen goals on planet earth and elsewhere. If the human gene pool departs significantly from its present makeup, then one may anticipate (in the remote future) the emergence of a new species, *Homo futurensis*.

Hominid Evolution

Biological anthropologists as paleoanthropologists compare and contrast fossil bones and teeth in order to discern whether a specimen is pongid-like or hominid-like, and where it most likely should be placed within the long and complex evolutionary history of hominoids (Anderson, 2005; Arsuga & Martínez, 2006; Birx, 1988; Cela-Conde & Ayala, 2007; Tattersall, 1993). Dental features, as well as the cranium and innominate bone, greatly help to determine

how close an apelike specimen is to the emergence of our own species. Modern computers and improved dating techniques significantly aid paleoanthropologists in constructing viable models depicting human evolution in light of the growing fossil record, as well as genetic research information when it is available. Furthermore, fossil and genetic evidence sets limits to probable models for human evolution in particular, and primate evolution in general.

For early biological anthropologists, the theory of evolution implied that our own species has an evolutionary past that links it to the fossil apes of about 7 to 5 million years ago. Thus, it is not surprising that some early naturalists wanted to discover the so-called “missing link” among those fossil hominoid specimens that are ancestral to both the living apes and the human animal of today. However, a debate emerged as to whether this evolutionary link would be found in Africa or in Asia. Inspired by the writings of Charles Darwin in England and Ernst Haeckel in Germany, the Dutch naturalist Eugene Dubois decided to leave Europe for Indonesia, where he was convinced that his research would unearth a fossil form midway between apes and humans. In the early 1890s, with incredible luck, Dubois actually did find a hominid specimen that he classified as *Pithecanthropus erectus* or erect ape-man (now relegated to the long *Homo erectus* stage of hominid evolution); it was found at the Trinil site on the island of Java. Skeletal features revealed that this fossil specimen was an early hominid dated from at least 500,000 years ago. Darwin would have been delighted with this discovery, but he himself had favored Africa as the cradle of human evolution, since the gorillas and chimpanzees (two of our closest evolutionary cousins) still inhabit this continent.

Eugene Dubois’s success inspired other naturalists to search for more fossil hominid evidence in Java. Subsequently, several decades later, G. H. R. von Koenigswald found an even earlier fossil hominid at the Djetis site, which he referred to as *Pithecanthropus robustus* (now also relegated to *Homo erectus*).

In 1924, anatomist Raymond A. Dart analyzed a fossil skull that had been fortuitously found at the Taung site in the Transvaal area of South Africa. He correctly determined that it was a hominid child over 1 million years old. It represented the australopithecine group of fossil hominids that existed for several million years. This discovery of *Australopithecus africanus* from Taung suggested that Darwin had been correct in maintaining that fossil apelike forms in Africa (not in Asia) had given rise to those hominids that are ancestral to our species. This incredible discovery inspired other naturalists to continue the search for fossil apes and fossil hominids in Africa. Even so, more evidence for human evolution was next found at the Zhoukoudian site near Beijing, China, due to the ongoing research of Davidson Black and Franz Weidenrich (including Pierre Teilhard de Chardin, among others). The specimens represented

Sinanthropus pekinensis, a form of *Homo erectus* that lived about 350,000 years ago.

Later, with steadfast determination, the anthropologist Louis S. B. Leakey was convinced that the earliest fossil hominids would, in fact, be found in central East Africa. In 1959, after searching for 30 years, his second wife Mary found the cranium of *Zinjanthropus boisei* at Olduvai Gorge in Tanzania—a 1.75-million-year-old specimen. Although the cranium was that of the first fossil hominid ever found in central East Africa, it nevertheless represents a side branch that became extinct (as several other forms did) during the early evolution of hominid species.

In 1961, Louis S. B. Leakey himself found the skull of *Homo habilis* at Olduvai Gorge. This specimen was 1.9 million years old, and associated with the Oldowan pebble-tool culture. *Homo habilis* not only stood erect and walked upright with a bipedal gait, but also made simple stone implements. Unlike other hominid forms that became extinct, this bigger-brained and culture-making species gave rise to *Homo erectus*, the next phase of hominization. The astonishing success of the Leakey family, including both Richard E. F. Leakey (who also found a *Homo habilis* skull, but at Koobi Fora) and later Meave Leakey in Kenya, encouraged other biological anthropologists to search for hominid fossil specimens elsewhere in central East Africa (Morell, 1995).

During the 1970s and 1980s, three other major discoveries were made: the Lucy skeleton found by Donald C. Johanson and his team at the Hadar site in the Afar Triangle of Ethiopia (Johanson & Edey, 1981; Johanson & Shreeve, 1989; Johanson & Wong, 2009), the human Laetoli footprints found at a site in Tanzania by Mary Leakey and her team, and the *Homo erectus* skeleton found by Richard Leakey and his team on the western shore of Lake Turkana in Kenya. By the 1990s, there was no doubt that Africa had played the major role in the origin and early evolution of hominid species (Leakey & Lewin, 1992). More recent fossil specimens make it clear that many different hominid forms once occupied Africa during the past 4.5 million years. To date, the fossil australopithecine complex is represented by at least eight hominid species: *aethiopicus*, *afarensis*, *africanus*, *anamensis*, *boisei*, *garhi*, *robustus*, and *sediba*. No doubt, in the coming years, more incredible fossil hominid specimens will be discovered in both Africa and Asia.

One remaining puzzle in human evolution is the “sudden” extinction of the Neanderthal people and the remarkable success of their contemporaries, the Cro-Magnon people (Sauer & Deak, 2007; Tattersall & Schwartz, 2000). A probable explanation for the Neanderthal extinction is that they could not compete with the far more intelligent Cro-Magnon people, who most likely had a more complex language and certainly an advanced material culture (including stone and bone carvings, as well as exquisite cave murals). New findings and ongoing research may answer questions concerning the biosocial relationship between these two groups of early *Homo sapiens*. For now,

one fact is certain: The Cro-Magnon people gave rise to the modern human being as *Homo sapiens sapiens*.

Actually, there is no common consensus among paleoanthropologists concerning the classification of fossil hominid specimens. Some paleoanthropologists argue that skeletal differences represent numerous species, and perhaps even distinct genera. Other paleoanthropologists place different skeletons into the same species, or maintain that they merely represent sexual dimorphism. Nevertheless, three generalizations seem true: (1) Hominid evolution has taken place over 4 million years; (2) fossil hominid specimens represent many species that became extinct; and (3) evidence shows that sustained bipedality preceded Paleolithic culture, which preceded the modern cranial capacity. No doubt, present models for and interpretations of hominid evolution will be modified in light of future discoveries.

Primate Taxonomy

In the footsteps of Aristotle and Linnaeus, modern taxonomists are interested in classifying living primates into groups that reflect both their similarities and evolutionary relationships. However, besides relying upon comparative studies in embryology and morphology, modern taxonomists also use computer technology and research information from comparative genetics. In general, primates are characterized by a large brain, great intelligence and memory, an emphasis on vision (rather than smell), grasping hands and remarkable motor-sensory coordination, and complex psychosocial behavior. These special features were slowly acquired over millions of years as adaptive characteristics to enhance survival—and therefore reproduction—in the trees. Only the human species spends its entire lifetime on the ground.

There is no common consensus among modern taxonomists concerning the classification of the primates. However, most biological anthropologists agree that six major groups comprise the living primates of today: prosimians, New World monkeys, Old World monkeys, lesser apes, great apes, and our own species (Campbell, Fuentes, Mackinnon, Panger, & Bearder, 2007; Rowe, 1996).

The earliest group of primates to emerge was the diversified, arboreal prosimians. Living representatives include the tree shrews, lorises, tarsiers, and lemurs. Although they once inhabited the trees in both hemispheres, all prosimians are now found only in Africa and Asia. The classification of tree shrews as primates is debatable, but this is to be expected since they represent an evolutionary link between the earlier ground-dwelling insectivores and the later tree-dwelling prosimians. Nevertheless, the tree shrews show an emphasis on vision and motor-sensory coordination, as well as grasping digits and a comparatively large brain.

Monkeys evolved out of the prosimians in both hemispheres. Thus, a distinction is made between the New

World monkeys of the Western Hemisphere and the Old World monkeys of the Eastern Hemisphere.

New World monkeys are arboreal and divided into two groups: one group consists of the small marmosets and tamarins, while the other group includes the larger monkeys, such as the spider monkey and the howler monkey. Old World monkeys are very diversified, with some representatives spending considerable time on the ground, such as the baboons. Biological anthropologists are particularly interested in studying the behavior patterns of the terrestrial baboons, since these largest of the monkeys inhabit open woodlands and grassy savannahs when on the ground. Consequently, baboon behavior may shed light on the social behavior of our earliest ancestors, the proto-hominids, who became successful in adapting to life on the ground in terms of biological characteristics and behavior patterns. Other Old World monkeys include the mandrill, drill, gelada, colobus, and vervet of Africa; the langurs of India; and the macaques of Asia (e.g., the rhesus monkey). Larger, more intelligent, and far better adapted to arboreal habitats, the monkeys dominated the trees in both hemispheres and nearly brought the prosimians to extinction.

The apes are placed into two groups: the lesser apes or hylobates, and the great apes or pongids. They are larger and more intelligent than the monkeys. The hylobates include the gibbon and siamang. The pongids include the orangutan, gorilla, chimpanzee, and bonobo. Fossil and living apes are found only in the Eastern Hemisphere, where they evolved from some earlier Old World monkeys. Evolutionary relationships among the fossil and living primates are determined by genotypic and phenotypic similarities. However, interpretations of the evidence vary among paleoanthropologists and primatologists. One intriguing question remains: Which of the four pongids is closest to our own species? Many biological anthropologists maintain that the human animal is closest to the chimpanzee (Diamond, 1992) and bonobo. Yet, there are a few naturalists who argue that *Homo sapiens* is actually closest to the orangutan (Schwartz, 2005). Although fossil ape specimens are rare, future discoveries may shed more light on the evolution of early hominids from even earlier fossil pongids.

Primate Behavior

Since the writings of Huxley, Haeckel, and Darwin himself, evolutionary naturalists recognize the biological similarities among the primates: They all have large eyes, flexible digits, a complex brain, and great motor-sensory coordination. Over millions of years, primates adapted successfully to life in the trees. They not only adapted to their arboreal habitats in terms of physical characteristics, but also in terms of social behaviors (Fleagle, 1998; Jolly, 1985; Strier, 2007). Our own species is particularly similar to the four great apes: orangutan, gorilla, chimpanzee, and bonobo (McGrew, Marchant, & Toshisada, 1996). With the

acceptance of evolution, it is not surprising that in the middle of the 20th century, some biological anthropologists began to study wild primates in their natural habitats. In general, the more complex the physical features of a primate species, the more complex is its behavior patterns. The prosimians exhibit simpler social structures than the monkeys, while the six apes (especially the four pongids) manifest the most complex behavior patterns outside our own species.

Prosimians

In the Eastern Hemisphere, prosimian behavior is reflected in the solitary tree shrews, pair-bonded adult lorises and tarsiers, and the lemurs of Madagascar that are monogamous or live in small social groups with female dominance. The ring-tailed lemur (*Lemur catta*) communicate through sounds, smells, and body movements (e.g., social grooming). Their behavior patterns are social adaptations to life on the ground, enhancing survival and therefore reproduction.

Monkeys

New World monkeys are arboreal and live in small social groups. The red howler monkey (*Alouatta seniculus*) eats fruits and leaves, defends a home range, and communicates through loud howls. Also important is cebid-behavior research on the spider monkey and woolly monkey of South America.

Among the Old World monkeys, of particular importance is the common baboon (*Papio anubis*) in Africa (Smuts, 1985; Strum, 1987). On the ground, a baboon troupe is headed by the dominant adult alpha male. Since these baboons are often terrestrial during the day, in the open woodlands and on the grassy savannahs, their social behavior may give biological anthropologists a glimpse into the group behavior of the early hominids, who adapted to and evolved in similar environments. However, there are some primatologists who speculate that early hominid behavior may have been closer to the social behavior of living chimpanzees and bonobos. Significant behavior research continues on the terrestrial langurs and macaques of Asia.

Apes

The two lesser apes, or hylobates, are the gibbon (e.g., *Hylobates lar*) and the larger siamang (*Symphalangus syndactylus*). They are found only in the tropical rainforests of Southeast Asia, where they have adapted very successfully to life in the trees. Gibbon behavior varies from adult male/female pair bonding to small social groups. Gibbons actively defend a territory through loud sounds and aggressive displays, which warn off intruding groups.

It was to be expected that some primatologists would focus their research on studying the behavior of the great

apes. Most important are past and ongoing close-range, long-term observations of the pongids in their natural environments.

Inspired by paleoanthropologist Louis S. B. Leakey, three female primatologists established the rigorous study of wild apes in their natural habitats: Biruté Galdikas, Dian Fossey, and Jane Goodall. Their steadfast and pioneering observations resulted in remarkable discoveries concerning the behavior patterns of the three pongids. These social findings supplemented the biological evidence that already supported the close evolutionary link between the great apes and our species.

In their natural habitats, wild orangutans (*Pongo pygmaeus*) live only on the islands of Borneo and Sumatra in Indonesia. Galdikas devoted her research to observing the orangutans on the island of Borneo (Galdikas, 1996, 2005). Her close-range, long-term observations of this pongid have added greatly to understanding and appreciating this great ape of Asia. She not only focused on their behavior patterns, but also prepared orphaned infants for their return to the tropical rainforests. In doing so, her devotion to studying and caring for orangutans has helped to ensure their survival, while also informing the world that this great ape needs to be protected from both human harm and the threat of extinction. Unfortunately, orangutans are now facing extinction due to the encroachment of human civilization, especially because it causes the deforestation of their environment and disrupts their behavior. Furthermore, adult orangutans are killed in order to capture their infants; subsequently, these young orangutans often die in captivity.

Adult orangutans are primarily loners, living in trees and surviving primarily on fruits and leaves. There is no complex social behavior. Nevertheless, orangutans are intelligent. Unfortunately, in captivity, where they are removed from an active life in the trees, orangutans are prone to boredom and obesity; placing them in natural settings therefore improves their health and extends their longevity. Fortunately, for biological anthropology, Galdikas continues her efforts to understand and appreciate this “red ape” of the primate world. Following in her footsteps, other primatologists will devote their efforts to studying this pongid in order to save this endangered great ape from vanishing completely.

The largest ape ever discovered is *Gigantopithecus* from fossil sites in China, India, and Vietnam. It existed from the Miocene epoch to about 500,000 years ago, but is now known only from its massive jaws and huge teeth (especially its premolars and molars). In part, the extinction of *Gigantopithecus* may have been due to the evolutionary success of a competitor, *Homo erectus*. Evidence suggests that, astonishingly, this fossil pongid might have stood over 9 feet tall and could have weighed at least 500 pounds. Future research may discover a skeleton of this astonishingly huge ape, which is related to the living orangutan through primate evolution.

The gorilla is the largest of the four great apes, and the two isolated subspecies are found living only in the forested areas of equatorial Africa. In the footsteps of zoologist George B. Schaller, Dian Fossey dedicated her research to studying the wild mountain gorilla (*Gorilla gorilla beringei*) on the slopes of the Virunga volcanoes in central East Africa (Fossey, 1983). Not content with merely observing them from the safety of trees, she was the first primatologist to actually make contact with this large pongid. Her efforts were rewarded with surprising findings that demolished the traditional view of the gorilla as a dangerous and ferocious ape. In fact, Fossey discovered that the gorilla is actually a shy, gentle, intelligent but introverted pongid.

Gorillas are very intelligent and live in small social groups, each dominated by an adult silverback male who determines when the group members will move, eat, or rest. There are also loner adult males. Gorillas eat fruits and leaves, and fear few predators (except human poachers with weapons). Unfortunately, the natural range and population of wild gorillas are diminishing due to the ongoing encroachment of human settlements.

For about 50 years, Jane Goodall has devoted her efforts to studying the wild chimpanzee or common chimpanzee (*Pan troglodytes*) at the Gombe Stream National Park near Lake Tanganyika in central Africa (Goodall, 1986, 2000). She has made significant discoveries about the social behavior of this very humanlike great ape. Chimpanzees are very intelligent, are both arboreal and terrestrial, systematically make and use simple tools, and are capable of learning and communicating through symbols. They exhibit both intriguing and disturbing behavior patterns. Chimpanzees are aggressive, promiscuous, live in loosely structured and constantly changing social groups, and are capable of killing both their own infants and adults.

Chimpanzees communicate through distinct sounds, body movements, facial expressions, and social grooming. One remarkable discovery is that they modify twigs in order to “fish” ants and termites from their mounds, adding these insects to their diet. Chimpanzees crack open nuts using rocks or branches, and also use a bone pick to extract bone marrow. They also hunt and kill monkeys, adding meat to their otherwise usual diet of fruits, nuts, seeds, and leaves. One particular activity is especially interesting: adult males will participate in a so-called “rain dance” during a thunderstorm.

Since 1929, scientists have known about the chimpanzee-like bonobo (*Pan paniscus*) or the so-called pygmy chimpanzee. Nevertheless, only during the past two decades have a few biological anthropologists studied the wild bonobos in the forests of Zaire in central Africa (de Waal & Lanting, 1997). Although they frequently walk on their knuckles, bonobos are capable of walking upright for short distances; they are taller and thinner than the common chimpanzee. Bonobos eat fruits, plants, and monkeys. There is strong bonding among adult females, and social

groups may even be dominated by them. The social behavior of this peaceful pongid is grounded in “make love, not war” (in sharp contrast to the sometimes vicious behavior of the common chimpanzee). Sexual activity is pervasive among bonobos, strengthening group interactions and diminishing social tensions. Like chimpanzees, bonobos share about 98% of their DNA with the human animal.

Several primatologists have focused their research on ape communication studies; for example, Francine Patterson has taught two lowland gorillas American Sign Language. However, her success and similar work by other biological anthropologists have come under sharp criticism by scientists who claim that the great apes are merely mimicking the behavior of their teachers. Even so, anthropological research has revealed that pongids have greater mental ability than is suggested by merely observing their social behavior in natural habitats.

Forensic Anthropology

Since the middle of the 20th century, the discipline of anthropology has striven to be relevant in terms of solving problems in the modern world. One area of applied anthropology is forensic anthropology (Birn, 2002; Komar & Buikstra, 2008), which has increased greatly in its popularity during the last 10 years. An outgrowth of biological anthropology, forensic anthropology focuses on the skeleton of our own species. As such, forensic anthropologists analyze and describe a human skeleton in order to determine the biological characteristics of a human corpse and, ideally, to make a positive identification of the deceased individual.

All human beings belong to the same genus, the same species, and the same subspecies: *Homo sapiens sapiens*. Consequently, each human individual is a biological variation on a common theme, that common theme being the genetic unity of humankind. Biological anthropologists specialize in understanding and appreciating our species in terms of primate evolution and human variation. The detailed study of a skeleton is crucial to forensic inquiry (Schwartz, 2007). The human skeleton has 206 bones, ranging from the large femur to the three small ear bones or ossicles (Birn, 1991a); the glaring similarity among the hominid and pongid skeletons, of both living and fossil species, is convincing evidence for human evolution and our common ancestry with the great apes. Osteological and dental remains help the forensic anthropologist determine the age, gender, height, weight, health, and ethnic background of an individual. Such studies may also reveal anomalies, mutations, and the results of past diseases and injuries. However, when present, other biological evidence may also determine the cause or manner of death, as well as help to identify suspects. Yet, in some cases, a positive identification is never achieved.

Furthermore, forensic anthropologists help to reconstruct a death scene. Forensic inquiry may determine that

the death of an individual is due to murder, accident, suicide, or a natural cause; in some cases, the cause of death may remain unknown.

Forensic anthropologists use methods that have emerged in the history of biological anthropology and prehistoric archaeology (e.g., in the methods they use for the careful investigation of a death scene). Today, data banks of human bones and genetic fingerprints are now available for comparative studies, as well as the use of modern computers. Additional information comes from the DNA molecule, serology, entomology, toxicology, and ballistics (among other areas of specialty).

Forensic anthropologists may study such diverse subjects as Neanderthal fossil remains, the 5,200-year-old Iceman (named Ötzi) from the Alps, mummies from ancient Egypt (e.g., the remains of King Tut) and the Incas of Peru, and individuals from bogs, war grave sites, and recent catastrophes. Likewise, forensic scientists help to reconstruct both a death scene and the face of a human corpse. However, only human remains from the past 50 years have legal significance; in these cases, the forensic anthropologist may be an expert witness at a trial.

Conclusion and Future Directions

The discipline of biological anthropology continues to shed light on the origin, evolution, and diversity of our own species, as well as its relationship to other primates (both fossil and living forms). Each year, new discoveries in paleoanthropology add more empirical evidence that enhances our understanding of and appreciation for hominid evolution. No doubt, over the coming decades, other exciting findings will be made in both Africa and Asia. Ongoing discoveries of fossil specimens will likely help to explain the emergence of both bipedality and our modern cranial capacity. As such, the present model of hominid evolution will be modified in order to accommodate all the new facts and concepts. Likewise, more nonhominid fossil specimens will be found, shedding new light on the evolution of primates throughout the Cenozoic era.

Ongoing advances in genetics and psychology will clarify the biological, social, and evolutionary relationships among the primates. Findings from continued primate behavior studies, both in captivity and in the wild, will help to narrow the gap between the human animal and the great apes, especially in terms of language acquisition (Bickerton, 2010) and the making of stone implements. One urgent need is to protect the nonhuman primates from the threat of extinction. It is deeply regrettable that the four pongids (orangutan, gorilla, chimpanzee, and bonobo) are now vanishing animals primarily because of the encroachment of human civilization. It would be a tragedy if these wonderful species became extinct. Of course, there is a need to protect all the primates. It is also important that future biological anthropologists continue to research the

relationship between humans and apes in terms of the origin and transmission of infectious diseases within ever-changing environments.

Human growth and development research, especially twin studies, will help clarify the dynamic relationship between biology and culture, discrediting unfounded racial classification systems and overcoming their resultant entrenched racism. And there is also a need to examine the influence of culture and the environment on the human gene pool and the biological variations that emerge from external changes in the natural world.

Of course, the ongoing teaching of both biological anthropology and the evolutionary framework is quintessential for the spread of rational thought and scientific evidence necessary for a proper interpretation of our human species within natural history. Consequently, research in biological anthropology needs to remain open to new facts, concepts, hypotheses, and perspectives.

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HOMINID DESCRIPTIONS

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The hominids are included in the superfamily Hominoidea, which groups together humans, great apes (chimpanzees, bonobos, gorillas, and orangutans), lesser apes (gibbons and siamangs), and all the fossil relatives (e.g., *Oreopithecus*, *Sivapithecus*, *Dryopithecus*, and *Australopithecus*). Formerly, the hominoids were divided into hominids (humans) and pongids (great and lesser apes), the last ones of which were later subdivided in pongidae (chimpanzees, bonobos, gorillas, and orangutans) and hylobatidae (gibbons and siamangs). For this reason, the term “hominid” has been traditionally restricted to humans and their extinct relatives (i.e., those fossil taxa belonging to the human phylogenetic lineage). This definition is commonly used even by many anthropologists. However, taxa strictly grouping in hominids are not only humans, but also chimpanzees and gorillas, which form the family Hominidae. The original meaning of the *hominid* term referred only to the modern meaning of tribe Hominini (i.e., *Homo sapiens* and other extinct species closely related to humans). In spite of the fact that the terms *hominin*, *hominid*, and *hominoid* are different, Hominini has been considered preferable to describe in this chapter the species of our own evolutionary lineage (tribe Hominina). Fossil (and modern) monkeys and apes (including chimpanzees, bonobos, gorillas, and orangutans) are described in the section “Fossil Primates.”

Description of Modern Humans: *Homo sapiens sapiens*

The only living species of the family Hominini is *Homo sapiens sapiens*. Some taxonomists also include in this group the chimpanzees (*Pan*), subdividing them into two subgroups (Panina and Hominina). Nevertheless, others consider that chimpanzees and humans must be separated into two groups (Panini and Hominini, respectively), and this is the classification used here. Our species, which was defined as *Homo sapiens* by Carolus Linnaeus in 1758, is characterized by a highly developed brain and capable of complex language, abstract reasoning, and full consciousness of its thoughts, sensations, perceptions, emotions, and self-awareness. Its intelligence allows it to explain and manipulate natural phenomena through philosophy, science, art, and religion. Members of this species are capable of building fires, cooking their food, clothing themselves, and developing numerous complex technologies, including space exploration.

Homo sapiens belongs to the genus *Homo*, tribe Hominini, subfamily Homininae, family Hominidae, superfamily Hominoidea, infraorder Catarrhini, group anthropoidea or simiiformes, suborder Haplorhini, and order primates. Physically humans tend to be weaker than other similarly sized apes, as gorillas or chimpanzees. Just like apes,

H. sapiens has clear sexual dimorphism. The average height in adult humans is 1.40 to 1.80 m in males and 1.30 to 1.70 m in females, and the average weight is 60 to 80 kg in males and 45 to 65 kg in females, although it varies significantly from place to place. *H. sapiens* has a rounded and large neurocranium, a small and vertical face, a prominent vertical forehead, and an orthognatic face (straight jaw, vertical and flat face), although with slightly protruding jaws. The foramen magnum is placed directly underneath the skull, and brain capacity is 1,250 to 1,850 cm³ with 1,350 cm³ the average. Humans have proportionately shorter palates and much smaller teeth than other hominids and are the only extant primates to have short canine teeth. The dorsal spine is curved (S-shaped), and the foot bones have lost their mobility. Although humans are relatively hairless compared with other hominids, they have notable hair on the top of the head, underarms, and pubic area. The color of their skin and hair is determined by the presence of pigments called melanin, with skin varying from very dark brown to very pale pink, and hair varying from preponderantly black to blond or red.

Genetically, humans are characterized by 23 pairs of chromosomes. Their gestation period is 9 months, and their life span is approximately 84 years for females and 78 years for males in the developed world. The individuals mature sexually at 12 to 15 years, developing physically until 18 years in females and 21 years in males. They are infants from 0 to 3 years, children from 3 to 7 years, juveniles from 7 to 12 years, and adolescents from 12 to 18 years. Humans are omnivorous, capable of consuming both animal meat and vegetation. Their technology has allowed them to colonize all the ecosystems and adapt to all climates, including hostile environments such as Antarctica and outer space. Unlike other apes, humans are capable of fully bipedal locomotion, moving by means of their two posterior limbs and leaving their arms for manipulating objects through their hands. They have opposable thumbs, a character shared with all hominids.

From Linnaeus on, *H. sapiens* has been traditionally subdivided in terms of races or ethnic groups based on visible traits (especially height, skin color, cranial or facial features, and hair texture). Formerly, some dared to subdivide *H. sapiens* into subspecies, such as *H. sapiens afer* (for negroids as paleocongid, sudanid, nilotid [nilotes], and bantid [bantus] races), *H. sapiens europaicus* (for caucasoids as nordic, mediterranean, alpine, baltic, ladogan, dinaric, armenid, arabid, turanid, dravidic, and iranoafgan races), *H. sapiens asiaticus* (for mongoloids as nordsiberian, uralian [mongols], oriental, Indonesian, tungid [inuits], ainuid, and Amerindian races), and *H. sapiens australasicus* (for australoids as australian-tasmanian, melanesian, veddoid, and negrito races), and also *H. sapiens khoisanii* (for capoids as khoid and sanid races [khoikhoi and khoisans]), *H. sapiens pygmaeus* (for the bambutoid race [pygmies]), *H. sapiens aethiopicus*

(for the aethiopic race), and *H. sapiens americanus* (for Amerindians). Nevertheless, for scientific as well as social and political reasons, the conception of human race is often controversial. Recent genetic evidence has definitively questioned this taxonomic categorization. The total human genetic variations are approximately 0.5%, of which 85% can be found within any given population, 7% among populations within a race, and only 8% among various races. Human genetic sequences are therefore remarkably homogeneous compared with other species. Much of the genetic variation is found in the regions of the genome affected by the environment, mainly in genes affecting physical appearance, such as skin color. Today, most scientists who study human genotypic and phenotypic variations use concepts such as populations or clinal gradation. The race definitions are imprecise and arbitrary, and generally derived from customs, resulting in many exceptions and much gradation. Therefore, the gradual changes of phenotype in humans over a geographical area only allow us to subdivide *H. sapiens* into gene clines and populations, not into subspecies or races, as is possible in other species.

Description of Fossil Hominins

Through DNA comparison, geneticists consider that humans (*Homo*, tribe Hominini) and chimpanzees (*Pan*, tribe Panini) diverged in evolution 5.5 to 6.5 million years ago. It is noticeable that while very few fossil species related to chimpanzees have been identified, a significant number of fossil species of the human evolutionary lineage have been recognized. This is likely because organic materials fossilize better in savannah-type environments (where our ancestors preferably lived) than in forest environments (where the ancestors of the great apes preferably lived). According to known evidence to date, the tribe Hominini includes seven genera, six of which are fossil (*Sahelanthropus*, *Orrorin*, *Ardipithecus*, *Australopithecus*, *Paranthropus*, and *Kenyanthropus*) and the seventh of which (*Homo*) has only one living species, ours. For a better and more ordinate description, they have been grouped into primitive hominin fossil species (*Sahelanthropus*, *Orrorin*, and *Ardipithecus*), australopithecines (*Australopithecus* and relatives), ancestral habilis humans (*Homo habilis* and relatives), erectine humans (*Homo erectus* and relatives), archaic sapiens humans (*Homo heidelbergensis* and relatives), and modern fossil *Homo sapiens*.

Primitive Fossil Species

Three fossil genera have been included in this group and represent our most primitive relatives: *Sahelanthropus*, *Orrorin*, and *Ardipithecus*. Although the first two (*Sahelanthropus* and *Orrorin*) have been provisionally assigned to our Hominini evolutionary lineage, they may be

ancestors of chimpanzees as well as humans. They therefore belong to the basal group of both tribes Panini and Hominini, and perhaps should be taxonomically separated in other different tribes. Very few fossil remains of these taxa have been found, but they have allowed paleoanthropologists to partially cover the information gap in the hominid fossil record between 5 and 10 million years ago.

The genus *Sahelanthropus* includes only one known species discovered in Chad (central Africa): *Sahelanthropus tchadensis*, so the genus characteristics have been analyzed based on the fossil remains of the species: a nearly complete cranium and a number of fragmentary lower jaws and teeth. It is the oldest discovered hominin, dated at between 7.4 and 6 million years old (late Miocene). Its brain capacity is only 340 to 370 cm³ in volume and similar to that of modern chimpanzees. It has an elongated skull, far-set eyes, a supraorbital ridge, and a vertical face. Although it is yet unknown whether *S. tchadensis* was bipedal, some paleoanthropologists suggest this due to the fossils of its foramen magnum (a hole at the base of the skull over the spinal column). *Sahelanthropus* could represent a common ancestor of humans and chimpanzees, since most molecular-clock analyses indicate both species (*Homo* and *Pan*) diverged 5.5 to 6.5 million years ago (1 to 2 million years after *S. tchadensis*). Other possibilities are that *S. tchadensis* was the ancestor of chimpanzees or gorillas—or simply related to humans, chimpanzees, and gorillas, but the ancestor of neither. In any case, this taxon is very related to the common ancestor of all hominids, and it is therefore a very interesting fossil. Even if *S. tchadensis* was a proto-gorilla or a protochimpanzee, this taxon would not lose its significance, since few chimpanzee or gorilla ancestors have been found in Africa.

The genus *Orrorin* also includes an only-known species discovered in Kenya (central East Africa): *Orrorin tugenensis*. The genus characteristics have been analyzed with the fragmentary fossils (arm and thigh bones, lower jaws and teeth) of that species. *O. tugenensis* is considered the second-oldest known hominid ancestor, and it could be related to the ancestral-human lineage or even be a direct human ancestor. It has been dated between 5.6 and 6.2 million years old (late Miocene), and its discovery is important because it could be an early bipedal hominin. The characteristics of its femur and humerus suggest that *O. tugenensis* was skilled at tree climbing but not at brachiation, and could have been able to walk upright bipedally. Its size was similar to the modern chimpanzee, at about 1.40 m tall. Its teeth indicate that its diet was mostly fruits and vegetables, with occasional meat. *Orrorin* lived in the dry evergreen forest environment of Africa, not on the savannah, as many hypotheses on human evolution had assumed. This fact could indicate that the origin of bipedalism occurred in an arboreal precursor living in a forest and not a quadrupedal ancestor living in an open savannah. Our oldest ancestors, such as *O. tugenensis*, could have been able to move bipedally over branches with

the vertebral column oriented vertically, such as orangutans do today, using their arms for balance and keeping their legs straight. This adaptation moved them away from our closer extant relatives (chimpanzees and gorillas), which are more adapted to tree climbing and to quadrupedal locomotion while on the ground.

The genus *Ardipithecus* is a hominine genus that lived during the Miocene-Pliocene transition in central East Africa (Ethiopia), between approximately 3.8 and 6 million years ago. Most paleoanthropologists consider it an ancestor of *Australopithecus* because of a likeness in teeth. Its species was the size of modern chimpanzees, and the structure of its toes and the position of the foramen magnum suggest that it walked upright bipedally. Since it lived in shady forests and not on savannahs, the hypothesis on the origin of bipedalism in an arboreal precursor acquires new evidential support. Two species of *Ardipithecus* are known: *Ardipithecus ramidus* and *Ardipithecus kadabba*, although both were initially described as a subspecies of *A. ramidus*.

Ardipithecus kadabba is the older of the two *Ardipithecus* species and lived between 5.2 and 5.8 million years ago, during the Miocene-Pliocene transition. Its canine teeth show primitive features shared with *Sahelanthropus* and *Orrorin*, distinguishing them from more recent human lineages. Some paleoanthropologists argue that the presence of a canine cutting complex in this species, which is present in modern chimpanzees but not in *A. ramidus* and recent humans, indicates a need for relocation in hominid-evolutionary history, and it is reasonable to infer that this species was a primitive hominine lineage which was lost but very close to the most recent common ancestor of *Homo* and *Pan*.

On the contrary, the other species, *Ardipithecus ramidus*, is clearly related to the human lineage. It was initially dated between 3 and 4.4 million years old, but it could have lived as far back as 5.8 million years. Its teeth are intermediate between *Ardipithecus kadabba* and *Australopithecus afarensis*. Members of this species were bipedal and forest dwellers, and about 1.15 to 1.20 m tall and 25 to 30 kg in weight.

Australopithecines

The Australopithecines together form those extinct hominines that have been sometimes included in the genus *Australopithecus*. Today, the australopithecines are subdivided to three genera: *Australopithecus*, *Paranthropus*, and *Kenyanthropus*. Some taxonomists consider that *Australopithecus* and *Paranthropus* belong to a single genus, *Australopithecus*, although most prefer to distinguish between both australopithecine groups. Some paleoanthropologists have defined a new taxon to group them: tribe Australopithecini, separating them from the tribe Hominini that would include only *Homo*, and perhaps *Kenyanthropus*.

The genus *Australopithecus*, first described by Raymond A. Dart in 1925, is made up of the gracile australopithecines,

which shared several traits with the modern great apes and humans, although it is closely related to the genus *Homo*. They lived in eastern and northern Africa between 4.2 and 2 million years ago. They are considered the ancestors of the genus *Homo*, and include, for the first time, a clear bipedal hominine. The species of *Australopithecus* displays a remarkable sexual dimorphism, being that males are larger than females. The sexual dimorphism in the lumbar spine, seen for the first time in *Australopithecus*, has been considered an evolutionary adaptation of females to better bear a lumbar load during pregnancy, something that was not necessary in nonbipedal primates. *Australopithecus* has five known fossil species: *Australopithecus anamensis*, *Australopithecus afarensis*, *Australopithecus africanus*, *Australopithecus bahrelghazali*, and *Australopithecus garhi*.

Australopithecus anamensis lived during the early Pliocene between approximately 3.9 and 4.2 million years ago in eastern Africa (around Kenya and Ethiopia). Its fossils (including cranial fragments, upper and lower jaws, teeth, and parts of arm and leg bones) still resemble those of common chimpanzees (mainly the jaws), but their teeth are much more similar to those of humans. It is believed that *A. anamensis* was primarily a tree-climbing species and arboreal dweller—a behavior retained from the early hominine. Nevertheless, it is known that members of this species walked upright bipedally, and probable that lived in a more open environment. Its dentition indicates that its diet was exclusively herbivorous and frugivorous. This species shares many traits (teeth and jaws) with *Ardipithecus ramidus*, which may be its direct ancestor, but the arm and leg bones are already more similar to those of humans.

Australopithecus afarensis is a gracile australopithecine that lived between 2.9 and 4.2 million years ago (late Pliocene) in eastern Africa (around Kenya and Ethiopia). It had a considerable sexual dimorphism in size, being that adult males were 1.45 to 1.55 m in height and 45 to 70 kg in weight, but adult females were 1.05 to 1.15 m in height and 25 to 40 kg in weight. *A. afarensis* had a brain capacity of 380 to 540 cm³ (470 cm³ on average), and its face was prognathic (the mandible protruded farther than the maxilla). Its canines and molars were still relatively larger than those of modern humans, but they were very reduced when compared with the common chimpanzees and other apes. Its postcranial skeleton (mainly its pelvis) strongly indicates that it was bipedal, although it was probably partly arboreal and tree climbing. Some consider that *A. afarensis* was almost exclusively bipedal, since its feet features made it difficult if not impossible to grasp branches with the hind limbs. Footprints associated with *A. afarensis* showing bipedal locomotion have been found at Laetoli in Tanzania. However, its diet was frugivorous, so its arboreal activity was likely great. Its capacity to transmit sounds would not be greater than that of the current chimpanzees. It is considered to be an ancestor of *Australopithecus africanus* and the genus *Paranthropus*, and its own more direct ancestor is *A. anamensis*.

A species closely related to *A. afarensis* is *Australopithecus bahrelghazali*, an enigmatic fossil since it is the only gracile australopithecine found in central Africa (concretely in Chad). The only found fossil (mandible fragment and teeth) belongs to an individual dated at 3.6 million years old, but it is probable that the species lived between 3 and 4 million years ago in the late Pliocene.

Australopithecus africanus is the most famous gracile australopithecine. It lived between 2.5 and 3.3 million years ago in southern and eastern Africa. *A. africanus* shares many traits with the older *A. afarensis*, but its fossils indicate that it was significantly more like modern humans. It was sexually dimorphic, being that adult males were 1.35 to 1.45 m in height and 40 to 60 kg in weight, and adult females were 1.1 to 1.2 m in height and 25 to 30 kg in weight. Its skull was higher and more rounded and the face was less prognathic (flat and vertical) and shorter than its ancestors. Its teeth were also smaller, with smaller canines than those in other hominoids such as chimpanzees. The brain capacity of *A. africanus* was 410 to 520 cm³ (455 cm³ on average). Its cranium resembled that of the chimpanzee, but it shared human similarities in its teeth, eye orbits, and most importantly, foramen magnum, which indicates a humanlike posture. The discovery of *A. africanus* allowed paleoanthropologists to show that a large cranial capacity had succeeded bipedal locomotion in the human evolutionary timeline. It was considered to be a direct ancestor of *Homo*, although others believe *A. africanus* did not have descendants or evolved into *Paranthropus* instead of into *Homo*. Stone tools have not been found associated with *A. africanus*, which indicates that its intelligence was still very limited.

Australopithecus garhi is a gracile australopithecine whose fossils were found in Ethiopia in rocks of 2.5 million years ago. It probably lived between 2 and 3 million years ago. Its cranium and face were very similar to *A. afarensis* and *A. africanus*, although its molar and premolar teeth had some similarities with those of *Paranthropus*, since they are larger than those of the other gracile australopithecines. The brain capacity of *A. garhi* was about 450 cm³ on average, similar to other australopithecines. It was considered to be the missing link between the genus *Australopithecus* and the genus *Homo*, although it is believed that it was only a competitor species to the true ancestral species of *Homo* and therefore not a direct human ancestor. However, 2.5- or 2.6-million-year-old stone artifacts (closely resembling Oldowan technology) were discovered together with *A. garhi* fossils, indicating the first tools are older than the appearance of the genus *Homo*, which was not previously believed. If this is confirmed, then *A. garhi* (and *Australopithecus*) was the first toolmaker, relegating *H. habilis* (and *Homo*) to second place.

The genus *Paranthropus* (Broom, 1938) groups the robust australopithecines that lived between 1.1 and 2.7 million years ago, and it includes three known species: *Paranthropus aethiopicus*, *Paranthropus boisei*, and

Paranthropus robustus. They were bipedal hominine that descended from gracile *Australopithecus*. They were very well-muscled australopithecines, with a more massively craniodental build, and tended to have a gorilla-like sagittal crest on the cranium which anchored massive temporalis muscles of mastication. *Paranthropus* coexisted and shared a habitat with some *Homo* species, such as *H. habilis*, *H. ergaster*, and even *H. erectus*. Its brain capacity was larger than that of the gracile australopithecines, and stone tools have been found associated with *Paranthropus* fossils. However, there is considerable debate whether or not those tools were made by them or by contemporaneous *Homo*, so the true *Paranthropus* intelligence is still under debate. They represent a hominine evolutionary branch distinctly diverging from the human lineage.

Paranthropus aethiopicus was a robust australopithecine that lived in eastern Africa (Kenya) between 2.2 and 2.7 million years ago (transition between Pliocene and Pleistocene). It is therefore the earliest example of *Paranthropus* and shares many primitive traits with *A. afarensis*. For this reason, *P. aethiopicus* is considered to be a direct descendant of *A. afarensis* and the ancestor of the other robust australopithecines. It had a prognathic face (but flatter than other hominins) and a large sagittal crest. The cranial capacity of *P. aethiopicus* was approximately 410 cm³ on average. This species lived in a mixed savannah and woodland environment, probably in a more arid habitat than gracile australopithecines, and had a strictly herbivorous diet.

Paranthropus boisei (originally called *Zinjanthropus boisei*) is the most famous and largest robust australopithecine. They lived in eastern Africa (Tanzania, Kenya, Ethiopia, and eastern Congo) between 1.2 and 2.6 million years ago (early Pleistocene). Like the other australopithecines, they exhibited great sexual dimorphism, with adult males being 1.35 to 1.45 m in height and 55 to 80 kg in weight, and adult females being 1.05 to 1.15 m in height and 35 to 45 kg in weight. The skull was prognathic, with a vertical, long, and broad face; a robust mandible; and a pronounced sagittal crest. Curiously, the shape of their foramen magnum is more similar to *Homo* than that of the other australopithecines. The brain capacity of *P. boisei* was 500 to 550 cm³ (520 cm³ on average). Their cranial characteristics are indicative of a herbivorous diet consisting of hard or tough foods (tubers, nuts, and seeds).

Paranthropus robustus is the other well-known robust australopithecine that lived in southern Africa (South Africa) between 1.2 and 2 million years ago (early Pleistocene). Adult males were 1.2 to 1.3 m in height and 45 to 70 kg in weight, and adult females were 1 to 1.10 m in height and 35 to 45 kg in weight, indicating major sexual dimorphism. Its cranium was characterized by a heavy chewing apparatus (pronounced sagittal crest, and large jaws and jaw muscles), and teeth (molars extremely robust, and molarized premolars) that were well adapted to serve in the dry savannah environment. The cranial capacity of *P. robustus* was approximately 450 to 530 cm³ (500 cm³ on average).

Finally, the australopithecines also include a genus called *Kenyanthropus*, of which only one species is known: *Kenyanthropus platyops*. It lived in eastern Africa (Kenya) between 3.2 and 3.5 million years ago, although some paleoanthropologists consider that it might have lived up to 2 million years ago. *K. platyops* had a small brain capacity, but it also had high cheekbones and a flat face that relates it closely with the human lineage. This species has been considered to be the missing link between *Australopithecus* and *Homo*, since it has intermediate characteristics between the typical gracile australopithecines and typical humans. Concretely, its traits are intermediate between *Australopithecus afarensis* and *Homo rudolfensis*, relegating *Australopithecus africanus* to a second place in human-evolution history. However, this fossil is very problematic, since it is so distorted by matrix-filled cracks that meaningful morphologic traits are next to impossible to assess with confidence.

Ancestral Humans: *Homo habilis*

Paleoanthropologists have always considered that the appearance of *Homo* coincides with the first evidence of stone tools (Oldowan industry) at the beginning of the Lower Palaeolithic, 2.5 million years ago. However, it is not clear that ancestral humans invented these first tools since this lithic industry has been associated with more primitive australopithecines (*Australopithecus garhi*). Three ancestral human species have been found: *Homo habilis*, *Homo rudolfensis*, and *Homo georgicus*.

Homo habilis is a primitive human that lived in eastern and southern Africa (Tanzania, Kenya, Ethiopia, eastern Congo, and South Africa) between 1.6 and 2.2 million years ago (early Pleistocene). *H. habilis* was short, with adult males being 1.15 to 1.25 m in height and 35 to 50 kg in weight, and adult females being 0.95 to 1.05 m in height and 30 to 35 kg in weight. It had long arms compared with modern humans, but it also had a clear reduction in the prognathism of its face (which was broad and vertical), suggesting its close relationship to modern humans. Its foot bones show less mobility than its predecessors. Its cranium was more rounded with wide-set eyes, and its foramen magnum was placed in a more central position than in the other australopithecines. The cranial capacity of *H. habilis* was 590 to 680 cm³ (650 cm³ on average). *H. habilis* fossils are often accompanied by primitive Oldowan stone tools. The intelligence and social organization of *H. habilis* was probably more sophisticated than in the other australopithecines or chimpanzees. For a long time, it was considered the first species of *Homo* to appear, descending from a species of australopithecine (perhaps from *A. africanus* or from another unknown species related to *A. afarensis*). However, this honor could be snatched away by *H. rudolfensis*, not so much by age as by taxonomic interpretation. It is also believed to be the ancestor of the more sophisticated

Homo ergaster, but there is strong debate over whether or not *H. habilis* is a direct human ancestor. Its small size, likeness to australopithecines in body morphology, and primitive attributes (e.g., narrow birth canal and legs longer than arms) have led some paleoanthropologists to propose excluding *habilis* from the genus *Homo* and, instead, including it in the genus *Australopithecus*, naming *Australopithecus habilis*.

Homo rudolfensis is an ancestral human, originally considered to be a member of *H. habilis*, which lived in eastern Africa (Kenya and Malawi) between 1.9 and 2.4 million years ago (late Pleistocene). It has remarkable differences with respect to *H. habilis*, with a flatter face (vertical, long, and broad), wider molar and premolar teeth, and more complex roots and crowns. Adult males were probably 1.30 to 1.40 m in height and 40 to 50 kg in weight, and adult females were 1.10 to 1.20 m in height and 30 to 40 kg in weight. The cranial capacity of *H. rudolfensis* was probably 550 to 750 cm³ (650 cm³ on average), and, like *H. habilis*, its fossils are associated with primitive Lower Palaeolithic stone tools. According to its fossil record, it may be the oldest species of the genus *Homo*. Nevertheless, as in the case of *H. habilis*, there is debate over whether or not *H. rudolfensis* belongs to the genus *Homo* (some paleoanthropologists include this species in the genus *Kenyanthropus*), and over which one of these is the more probable ancestor of the later human species, or if it was some third species yet to be discovered. It has been suggested that *H. rudolfensis* evolved from *Kenyanthropus platyops*, while *H. habilis* seems to have evolved from *Australopithecus garhi*, raising debate on the real taxonomic position of both species and which is the evolutionary lineage that ended in the modern human.

Homo georgicus is an ancestral human species that lived in the Caucasus region (Georgia) 1.8 million years ago, according to the fossils known to date. Initially it was considered to belong to *Homo ergaster*, but size and morphological differences led paleoanthropologists to consider defining a new species, apparently more primitive than this one. It is the most primitive hominine species discovered outside of Africa. This species presents a strong sexual dimorphism. It is thought that adult males were 1.40 to 1.50 m in height and 45 to 55 kg in weight, and adult females 1.10 to 1.20 m in height and 30 to 40 kg in weight. Its skull was similar to *Homo ergaster*, but with a smaller face and more prognathic. The cranial capacity of *H. georgicus* was 600 to 680 cm³ (650 cm³ on average). They probably were capable of making tools, and some specialists have proposed that the Acheulean industry existing 1.4 to 1.6 million years ago in Israel is theirs. They ate animal meat, which was important for their survival during the winter season. *H. georgicus* has been considered a human group descended from *H. habilis*, which probably evolved in Africa and was capable of emigrating to Eurasia. This species may be the ancestor of two later species: African

Homo ergaster and Asian *Homo erectus*. Nevertheless, its taxonomic position is still debatable.

Ancestral Humans: *Homo erectus*

Many paleoanthropologists include the diverse species considered ancestral humans (i.e., the human type intermediate between ancestral *habilis* humans and modern *sapiens* humans) as belonging to a single species: *Homo erectus*. However, most prefer to distinguish at least two species: the African *Homo ergaster* and the Asian *Homo erectus*. This discussion concerning the taxonomy of this human group is still open, depending on whether *H. erectus* is considered a geographically widespread species found in Africa, Asia, and even Europe, or considered an exclusively Asian lineage that evolved from the less cranially derived African *H. ergaster*. In addition, two other very derived species have been proposed: *Homo soloensis* and *Homo floresiensis*, and they deserve special mention.

Homo erectus and its relatives were the first early human species able to constitute hunter-gatherer societies, procuring plants and hunting animals from the wild, without significant recourse to the domestication of either. They used more diverse and sophisticated stone tools than their predecessors, first using the Oldowan industry and later the Acheulean industry from 1.65 million years ago. More important, they were the first humans to make creative use of fire. Moreover, they may have communicated with a protolanguage much more developed than the basic communications used by chimpanzees, but without the developed structure of the modern human language. Their brain capacity generally coincides with the more sophisticated tools found together with its fossils and with the type of societies that they formed.

Homo ergaster is considered the African *Homo erectus*, but its morphological characteristics suggest that it be considered a new species. It lived in eastern and southern Africa (Ethiopia, Kenya, Tanzania, and South Africa) between 1.4 and 1.9 million years ago (early Pleistocene). It had a more reduced sexual dimorphism than the previous hominine. Adult males were approximately 1.8 to 1.9 m in height and 75 to 90 kg in weight, and adult females were 1.7 to 1.8 m in height and 60 to 70 kg in weight. The body proportions (longer legs and shorter arms) of *H. ergaster* were, for the first time, similar to those of modern humans. It had a smaller and more orthognathic face, a more rounded cranium, and a smaller dental arch. The cranial capacity of *H. ergaster* was 700 to 850 cm³ (800 cm³ on average). They made various tool types, such as hand axes and cleavers, belonging to the Acheulean industry 1.6 million years ago. Moreover, evidence (such as charred animal bones, fossils, and traces of camps) suggests that they made use of fire. It is believed that *H. ergaster* is a descendant of ancestral humans, such as *H. habilis* or *H. rudolfensis*.

Lately, *Homo erectus* has been considered an exclusively Asian species that lived between 0.2 and 1.8 million years ago (late and middle Pleistocene). Since it is the most successful and long-lived species of the *Homo* genus, it is generally thought to have a considerable number of subspecies. Although physical characteristics must therefore be described for each subspecies, *H. erectus* was characterized (on average) by a sexual dimorphism slightly greater than that in modern humans, adult males being approximately 1.60 to 1.70 m in height and 60 to 70 kg in weight, and adult females being 1.50 to 1.60 m in height and 45 to 55 kg in weight. Its face was almost orthognatic, with minimal jaw projection. It also had a long and low skull with a pronounced supraorbital ridge. The cranial capacity of *H. erectus* was between 750 and 1,250 cm³ (950 cm³ on average), or even more, although this depended on the particular subspecies.

The first fossils of this species were found in the central part of the island of Java (Indonesia) and called *Pithecanthropus erectus*. Later, other similar fossils were found in China near Beijing and called *Sinanthropus pekinensis*. Today, some paleoanthropologists subdivide *H. erectus* into two great informal groups: Indonesian pithecanthropines and Chinese sinanthropines. Only one pithecanthropine subspecies has been considered [*Homo erectus erectus*], while five subspecies are suggested for the sinanthropine group: [*Homo erectus wushanensis*, *Homo erectus yuanmouensis*, *Homo erectus lantianensis*, *Homo erectus hexianensis*, and *Homo erectus pekinensis*].

The oldest *H. erectus* specimens are found among the sinanthropines, the oldest of them being the Wushan Man (*H. e. wushanensis*) discovered in Longgupo (Chongqing, China), which lived at least 1.8 million years ago. The second-oldest member of the sinanthropines is the Yuanmou Man (*H. e. yuanmouensis*) identified in Yuanmou (Yunan, China), whose fossils are associated with stone tools, pieces of charred animal bones, and ash from campfires; they probably lived 1 to 1.7 million years ago. These oldest sinanthropines had a brain capacity of approximately 750 to 990 cm³ (870 cm³ on average) and an estimated stature of about 1.60 to 1.70 m in males. Members of *H. e. lantianensis*, popularly known as the Lantian Man, were found in Lantian (Shaanxi, China), and probably in Gongwangling (near Lantian), though these were promoted to a subspecies (*Homo erectus gongwanglingensis*); they lived between 0.4 and 1 million years ago. This last group probably also includes sinanthropine fossils found in Yunxian (Hubei, China)—sometimes considered to be another different subspecies (*Homo erectus yunxianensis*) and dated as living between 0.4 and 0.7 million years ago. The brain capacity of this intermediate erectine group varied between 800 and 1,200 cm³ (1,000 cm³ on average). Another sinanthropine subspecies is *Homo erectus hexianensis*, which was discovered in Hexian (Anhui, China); it was dated at 250,000 to 300,000 years old, and its brain capacity was 1,025 cm³. Finally, fossils of *H. e. pekinensis*, originally called

Sinanthropus pekinensis, were found at Zhoukoudian (near Beijing, China), associated with stone tools and evidence of the use of fire, and dated between 460,000 and 230,000 years old; their brain capacity was already 900 to 1,250 cm³ (1,100 cm³ on average), and males had an estimated stature of about 1.55 to 1.65 m.

Homo erectus erectus included pithecanthropines that lived on the island of Java (Indonesia) between 0.7 and 1.6 million years ago. Their brain capacity was 800 to 950 cm³ (900 cm³ on average). The most famous of them is Java Man of Trinil (eastern Java), initially called *Pithecanthropus erectus*, who lived between 0.7 and 0.9 million years ago. The oldest members of this group were found in Sangiran (central Java), and initially called *Meganthropus palaeojavanicus* due to their supposed—but unfounded—giant size; they lived between 0.9 and 1.6 million years ago. Many paleoanthropologists considered this specimen an old subspecies of *erectus* (i.e., *Homo erectus palaeojavanicus*), and others even considered it to be a new species.

The last pithecanthropines awakened strong controversy over their real taxonomic position and their relationship with the evolutionary history of modern humans. Generally, they are regarded as a subspecies of *H. erectus* and named as *Homo erectus soloensis*, informally javanthropines. They are an anomalous pithecanthropine due to their age and characteristics. While most subspecies of *Homo erectus* disappeared according to the fossil record roughly 250,000 years ago, they persisted up until 30,000 years ago. Some of them reached a cranial capacity of more than 1,400 cm³, and their culture was unusually advanced. They are the largest of the pithecanthropines, adult males being approximately 1.75 to 1.85 m in height and 70 to 80 kg in weight, and adult females being 1.6 to 1.7 m in height and 55 to 65 kg in weight. These individuals were first considered as a subspecies of *Homo sapiens* and thought to be the ancestors of the modern aboriginal Australians. Today, some paleoanthropologists separate this anomalous group into a new species, *Homo soloensis*, considered as the culmination of the Asian erectine lineage. The first fossil remains come from the Ngandong-Solo River (Java, Indonesia) and were originally nicknamed Solo Man, classified as *Javanthropus soloensis*, and dated at only 50,000 to 25,000 years old. In the same region, other similar and more complete human fossils were found, including individuals with a brain capacity of 1,050 to 1,250 cm³ and dated at 300,000 to 100,000 years (they were classified as the subspecies *Homo erectus ngandongensis*). Populations of similar humans have been found throughout southeastern Asia (China, Vietnam), and even in India, Jordan, and Australia. In China, the most famous fossils of this probable species were found in Dali (Shaanxi, China), known initially as Dali Man and *Homo daliensis*, and in Jinniushan (Liaoning, China). These human fossils were dated between 300,000 and 200,000 years old. Their supraorbital ridge was less robust and this cranium

more rounded than the oldest pithecanthropines, with a brain capacity of 1,100 to 1,250 cm³. They could belong to the oldest group of this species, and could be included as a subspecies: *Homo soloensis daliensis*. Most controversial are the remains of similar “javanthropines” found in Narmada (Hathnora, India), dated from 150,000 to 200,000 years old and with a brain capacity of 1,150 to 1,420 cm³; they have been considered another subspecies of *erectus* (*Homo erectus narmadensis*) but seem to belong to this human group. Most problematic are the relationships of javanthropines with the 50,000- to 60,000-year-old human fossils found in Malakunanja and Nauwalabila (northern Australia). Interesting is the question related to the origin of *Homo soloensis*. Its last specimens seem to have coexisted with *Homo sapiens* in southeastern Asia. Many paleoanthropologists find strong relationships between this group and European *H. heidelbergensis*, and consider that they are in fact *H. heidelbergensis* or another archaic human relative that migrated to Asia, replacing the older *H. erectus*.

A lot more problematic is the last group of humans related to erectine humans: *Homo floresiensis*. It is possibly a new species remarkable for its small body and brain capacity with respect to other humans, and its survival until very recent times. A complete subfossil skeleton of *Homo floresiensis*, nicknamed “Hobbit” for its minute size, was found on the island of Flores (Indonesia) and dated to be only 18,000 years old. Other diminutive individuals, who have been identified and associated with small stone tools, lived between 13,000 and 94,000 years ago. There are suspicions that this small human species may have survived longer in other parts of Flores to become the source of the Ebu Gogo stories, told among the local people, in which small, hairy, language-poor humanoid creatures dwelled in caves on the island (similarly, on the nearby island of Sumatra, there is notice of another small mythological humanoid known as Orang Pendek). They were 1.05 to 1.10 m in height, and probably 25 to 30 kg in weight, considerably shorter than the physically smallest populations of modern humans such as pygmies and negritos (1.35–1.55 m). They also had small brains, with a cranial capacity of 380 cm³, lower than in chimpanzees and in primitive australopithecines. Despite this, their remains are associated with sophisticated stone tools of the Upper Palaeolithic, indicating an advanced behavior. The origin and nature of this human group is a controversial issue today within the scientific community. Some anthropologists have suggested that these individuals were microcephalic modern humans or affected by endemic cretinism. Others have related *H. floresiensis* to primitive gracile australopithecines (as *A. afarensis*), not previously thought to have expanded beyond Africa, that survived up to modern times. However, their cranium and body features resemble those of *H. erectus*, with which they seem to have a phylogenetic relationship. The erectine origin of *H. floresiensis* is the more accepted hypothesis,

despite the size difference. To explain the small size of this species, it has been suggested that populations of *H. erectus* underwent strong insular dwarfism (caused by the limited food environment on their islands), a form of speciation also seen on Flores in several species, including a dwarf *Stegodon* (a group of elephant-type proboscideans). Since Flores remained isolated even in the recent glacial periods characterized by low sea levels, the discoverers of *H. floresiensis* suggest that this species, or its erectine ancestors, could have reached the isolated island of Flores only by water transportation, perhaps arriving on bamboo rafts about 100,000 years ago.

Archaic *Homo* Species

Numerous vaguely defined taxa, most of which are not widely accepted, are included in the group informally known as archaic sapiens humans. Among them are *Homo antecessor* (defined by Bermúdez de Castro, Arsuaga, Carbonell, Rosas, Martínez, and Mosquera in 1997), *Homo heidelbergensis*, *Homo neanderthalensis* (nicknamed Neanderthals), *Homo rhodesiensis*, and *Homo helmei*.

Homo antecessor is an archaic sapiens species that lived in Europe between 0.8 and 1.2 million years ago. It is considered the earliest known human form of Europe, although individuals of *Homo georgicus* from Georgia are older. Its physical traits are intermediate between the oldest *Homo ergaster* and the most modern *Homo heidelbergensis*. The sexual dimorphism of *H. antecessor* was the same as in its European successors *H. heidelbergensis* and *H. neanderthalensis*, but less than in its probable ancestor *H. ergaster* or *H. georgicus*. Adult males were approximately 1.70 to 1.80 m in height and 70 to 90 kg in weight, and adult females were 1.60 to 1.70 m in height and 60 to 70 kg in weight. Hands and feet of *H. antecessor* were similar to those of modern humans, therefore indicating modern locomotor and manipulatory behaviors. Its individuals had a rounded cranium with a protruding occipital bun, a single supraorbital ridge, and a long, vertical face with hollow cheeks (in contrast to the flat face of *H. ergaster* and *H. erectus*). It had less robust mandibles, smaller molars, and premolars that were more molarized than its predecessors. Its teeth had primitive characteristics that resembled *H. ergaster*, but its dental eruption pattern had the same developmental stages as *H. sapiens*. The cranial capacity of *H. antecessor* was 1,000 to 1,150 cm³ (1,050 cm³ on average). Its fossils are associated with a great variety of tools, including hammer-stones and retouched flakes. Certain evidence, such as cuts where flesh had been flensed from the bones, indicates that *H. antecessor* practiced cannibalism.

H. antecessor is very probably the ancestor of *Homo heidelbergensis* in the *Homo neanderthalensis* lineage. Since *H. antecessor* also has intermediate characteristics between *H. ergaster* and *H. sapiens*, it is also considered a

link between both species. Although the only known fossils of *H. antecessor* come from Atapuerca (Spain), some other specimens in Europe and northeastern Africa may also belong to this species. One of these is the fossil human identified in Ceprano (Italy), called *Homo cepranensis*, and nicknamed Ceprano Man. It lived between 0.8 and 0.9 million years ago, and its features seem to be also intermediate between *H. ergaster* and *H. heidelbergensis*. More problematic are the African specimens *Homo mauritanicus* and *Homo uxoris*. Both specimens have been considered to be modern African *Homo erectus* or *Homo ergaster*, the first one dated at 0.7 million years old and the second one at 0.7 to 0.9 million years old. By priority, some claim that the *H. antecessor* name should be changed to *H. mauritanicus*, but the morphological differences, at least in their mandibles (the only part found of *mauritanicus* to date), are too great to consider them to be of the same species.

All of these specimens, in addition to *H. georgicus* and older *Homo erectus*, open the debate on the origin of *H. antecessor*. There are two hypotheses: a northern-African origin and an Asian origin. According to the Asian hypothesis, the Caucasian *H. georgicus* is considered the probable ancestor of both the European *H. antecessor* and the south Asian *H. erectus* (and perhaps even of the African *H. ergaster*). In this case, *H. georgicus* would be the first human to leave Africa, being the link between *H. habilis* and all the later erectine humans (including *antecessor*), requiring that specimens similar to *H. georgicus* be found in Africa. Nevertheless, according to the fossil data known to date, there are great morphological and age differences that prevent establishing a clear phylogenetic relationship between *H. georgicus* and *H. antecessor*. The other hypothesis suggests that *H. antecessor* evolved from the African *H. ergaster*, although it is not known whether this event occurred in Africa (and therefore it is an immigrant to Europe) or in Europe.

Homo heidelbergensis is considered a descendant of *H. antecessor* and the direct ancestor of *Homo neanderthalensis*. It lived in Europe between 0.7 and 0.15 million years ago. They were very tall and corpulent, and had a sexual dimorphism similar to modern humans, with adult males being approximately 1.75 to 1.85 m in height and 70 to 90 kg in weight, and adult females 1.65 to 1.75 m in height and 55 to 70 kg in weight. The physical characteristics of its body (pelvis and limbs) were similar to *Homo neanderthalensis*. Their skulls were elongated, with a depressed, wide nasal bridge and a prominent supraorbital ridge. They showed significant sexual dimorphism in their teeth and jaws, but in general they had wider molars and thicker incisors than did *H. neanderthalensis*.

The cranial capacity of *H. heidelbergensis* was 1,100 to 1,450 cm³ (1,275 cm³ on average), overlapping the average of modern humans. They used core techniques to make tools, which were very varied. Their stone-tool technology is very close to the Acheulean industry used by *H. erectus*, although more advanced (including the possible use of red

ochre as paint). Some accumulation of individuals at specific postmortem sites could indicate ritual burial, but there is not enough evidence. It is possible that *H. heidelbergensis*, like its descendant *H. neanderthalensis*, acquired a primitive form of language. Since there were similar archaic sapiens humans living in Africa, such as *Homo rhodesiensis*, there is a controversy over whether or not the *H. sapiens* lineage evolved from an African *H. heidelbergensis*, or this species is exclusively European descending from *H. antecessor* and being the ancestor of only *H. neanderthalensis*.

Homo neanderthalensis, nicknamed Neanderthals, lived between 25,000 and 150,000 years ago almost exclusively in Europe, but also in parts of western and central Asia, including the Near East and the Siberian Altay mountains. They have been considered for a long time to be a subspecies of *H. sapiens*, but genetic evidence has shown that these are two different species, although they share 99.5% of their DNA. It has been calculated that both species shared a common ancestor about 500,000 years ago, and this ancestor could have been *H. heidelbergensis*. Nevertheless, other more recent studies indicate that the common ancestor lived about 800,000 years ago, suggesting that *H. antecessor* (and not *H. heidelbergensis*) was the true ancestor of both human lineages. This conclusion is more harmonious with the paleontological evidence and morphological divergence found in the fossil record. The postcranial skeleton of the Neanderthals was heavier and stronger than that of modern humans, with a more robust bone structure, although it was generally shorter. Adult males were approximately 1.6 to 1.7 m in height and 70 to 80 kg in weight, and adult females 1.5 to 1.6 m in height and 50 to 60 kg in weight. Their skulls were low, flat, and elongated, with an occipital bun, a projecting midface, and a thick supraorbital ridge.

The cranial capacity of *H. neanderthalensis* was 1,200 to 1,750 cm³ (1,420 cm³ on average). The assertion that Neanderthals had a brain capacity much larger than modern humans has persisted a long time among paleoanthropologists, but it is probably an effect of the statistical deviation in the analysis of the fossil record of Neanderthals. Similar studies in fossil *Homo sapiens* specimens (e.g., *Homo sapiens idaltu*) concluded that they had a 1,490 cm³ cranial capacity. Nevertheless, their intelligence might have been very advanced. They used more advanced tools than *H. heidelbergensis* and *H. erectus*, having created a predominantly flint industry known as the Mousterian of the Middle and part of the Old Palaeolithic. They made sophisticated stone flakes, hand axes, and spears. According to the reconstructions of their vocal tract (with the presence of a hyoid bone), and neurological (with hypoglossal canal size similar to modern humans) and genetic evidence (with the presence of the same version of the FOXP2 gene as in modern humans, which plays a role in human language), it is considered that the Neanderthals had an elaborate protolanguage that was more musical than the language of

modern humans. Moreover, they were almost exclusively carnivorous, being considered the apex predator (hunting large animals, such as the mammoths) for making good use of their stone flakes. They intentionally buried their dead in graves with goods, used pigment ochre, and practiced ritual cannibalism or defleshing. All these ritual treatments of the dead probably denote the development of a religious ideology.

It is widely accepted that *H. neanderthalensis* evolved from *H. heidelbergensis* in Europe and then became extinct, to be replaced or absorbed by modern humans traveling from Africa. Their last populations lived in southern Iberia, around the coast of Gibraltar, 24,000 years ago. Neanderthals and modern humans coexisted in Europe for millennia, surely intermixing their cultures, but very probably the species never genetically interbred, which has been proposed, since they were not interfertile, as they were separate species. Their last populations adopted the more advanced Châtelperronian culture (Upper Palaeolithic), a culture considered to have belonged first to our species *Homo sapiens*, which later passed this culture on to the Neanderthals.

Homo rhodesiensis, nicknamed Rhodesian Man and sometimes classified as *Homo sapiens arcaicus*, is a possible direct ancestor of *Homo sapiens* that lived in Africa between 125,000 and 450,000 years ago (and probably even longer ago). Their fossil remains show some primitive traits shared with *H. ergaster* and *H. antecessor*, and other traits that allow us to link them to *H. heidelbergensis*, but they also had other traits that relate them to *H. sapiens*. Adult males were approximately 1.60 to 1.70 m in height and 60 to 70 kg in weight, and adult females 1.50 to 1.60 m in height and 50 to 60 kg in weight. They had an elongated skull with a large supraorbital ridge, and high and narrow cheekbones. Their cranial capacity was 1,250 to 1,350 cm³ (1,310 cm³ on average).

H. rhodesiensis belonged to the Acheulean industry of stone tools (Lower Palaeolithic), but perhaps its first appearance is related to the beginning of the second phase of the Acheulean 600,000 years ago, in which the tools became thinner, more symmetric, and more trimmed than in older groups (ascribed to *H. ergaster* or to African *H. antecessor*). Most current paleoanthropologists believe this archaic human group to be within the variability of *H. heidelbergensis*. Nevertheless, others consider that there are three archaic human lineages: the African *H. ergaster*–*H. antecessor*–*H. rhodesiensis*–*H. sapiens* lineage, the European *H. antecessor*–*H. heidelbergensis*–*H. neanderthalensis* lineage, and the Asian *H. ergaster*–*H. erectus*–*H. soloensis* lineage. No direct linkage of these species can so far be determined.

Some paleoanthropologists have suggested that, within the African record, there is room for another intermediate species within the *H. sapiens* lineage: *Homo helmei*, also known as *Africanthropus helmei* or Florisbad Man.

Another name given to this group has been *Homo njarasensis*. It is anatomically intermediate between *H. rhodesiensis* (or *H. heidelbergensis*) and *H. sapiens*, and is considered as the direct ancestor of the first subspecies of human moderns, *Homo sapiens idaltu*, and therefore the origin of our species. This group is considered sometimes like the African version of *H. neanderthalensis*. It lived between 130,000 and 300,000 years ago. The cranial capacity of *H. helmei* was already 1,250 to 1,550 cm³ (1,390 cm³ on average), and its supraorbital ridge was very reduced. Its stone tools belonged to the Levalloisian, Mousterian, and Aterian cultures of the Middle Palaeolithic of Africa (which include microliths, as well as bone tools and carvings). Most paleoanthropologists do not consider this species as valid, but its possible validity is based primarily on the emergence of the Mode 3 technology (Mousterian and Aterian), which could be associated with a speciation event within the human lineage.

Fossil Evidence: Origin and Evolution of *Homo sapiens*

It is broadly accepted that modern *Homo sapiens* has only one extant subspecies (*Homo sapiens sapiens*) and only one fossil subspecies (*Homo sapiens idaltu*). The earliest *H. sapiens* fossils were found in the Omo River and at Herto (Ethiopia), respectively dated at 160,000 and 195,000 years old, and they are assigned to the subspecies *H. s. idaltu*. They lived in central East Africa (Ethiopia, Eritrea) between 125,000 and 195,000 years ago. They had a brain capacity of 1,450 cm³, and their supraorbital ridge is still slightly prominent. They are considered anatomically and chronologically intermediate between archaic humans (*Homo helmei*) and more recent, fully modern humans (*Homo sapiens sapiens*).

Modern *H. s. sapiens* is first present in the fossil record at the Kibish Formation and Mumba (Tanzania), dated from 130,000 years ago, and at Border Cave and Klasies River Mouth (South Africa), dated from 110,000 to 120,000 years ago. These are only slightly earlier than early *H. sapiens* at Skhul and Qafzeh (Israel). The Skhul human fossils were dated from 80,000 to 120,000 years ago, and those of Qafzeh from 92,000 to 115,000 years ago. These early humans may have been descendants of the first migrants to leave Africa. They have become classified as a new subspecies, *Homo sapiens palestinus*, although this taxon is not widely accepted. Nevertheless, these humans seem to have become extinct or retreated back to Africa 80,000 years ago, possibly to be replaced by Neanderthals escaping the colder regions of Ice Age Europe.

All other modern human fossils found outside of Africa are of more recent times. The oldest fossils of modern humans outside of Africa are those of Mungo (Australia), nicknamed as Mungo Man. They have been dated at 42,000 years old. In Asia, 40,000-year-old fossils of

H. s. sapiens have been found in Ordos (Mongolia), and others 32,000 years old in Naha-Okinawa (Japan) and 27,000 years old in the Zhoukoudian upper cave (China). Finally, the oldest modern humans found in Europe come from Pesteră cu Oase (Romania), Compe Capelle (France), Mladeč and Predmostí (Czech Republic), and Cro-Magnon (France)—all between 23,000 and 36,000 years old (they and the rest of early-European modern humans are nicknamed Cro-Magnons or cromagnons).

DNA analysis indicates that modern humans originated in Africa about 180,000 or 200,000 years ago. According to the recent African origin (RAO) and out-of-Africa theory, *H. s. sapiens* developed 180,000 years ago, possibly in East Africa, being the capoids or the khoisan form (formerly classified as *H. s. khoisanii*), the oldest representative of our subspecies. This first lineage is the mtDNA haplogroup L0, and it has been nicknamed the “mitochondrial Eve.” Khoisan mitochondrial divergence has been dated no later than 110,000 years ago.

Three main lineages of modern humans diverged between 80,000 and 120,000 years ago. The first lineage (mtDNA haplogroup L1 and Y-DNA haplogroup A) colonized southern Africa (ancestors of bambutoids as pygmies, formerly classified as *H. s. pygmaeus*). The first lineage to branch from haplogroup A has been nicknamed the “Y-chromosome Adam.” Those early human fossils found at Border Cave and Klasies River Mouth (South Africa) perhaps belong to this old lineage. The second lineage (mtDNA haplogroup L2 and Y-DNA haplogroup B) appeared 80,000 years ago and settled in central and western Africa (ancestors of negroids as paleocongrids, nilotids and bantids, formerly classified as *H. s. afer*). Finally, a third lineage (mtDNA haplogroup L3) remained in eastern Africa (perhaps ancestors of aethiopids, formerly classified as *H. s. aethiopicus*).

This last lineage (L3) was significant because it was the first *H. s. sapiens* to have left Africa, crossing the Red Sea 70,000 years ago. Previously, other early modern humans had ventured out of Africa briefly, as indicated by 90,000-year-old human fossils found in Israel (*H. s. palestinus*), but they became extinct. These people probably were more related to the first lineage (L1) than to the second (L2) and third (L3) African lineages.

It is known that humans are genetically highly homogeneous, which may have resulted from the Toba catastrophe 70,000 to 80,000 years ago. A supervolcanic event at Lake Toba (Sumatra) could have reduced the world human population to 10,000 individuals or even less, extinguished *H. s. idaltu* in Israel, and created a bottleneck in the human evolution of *H. s. sapiens*. According to this hypothesis, humans left Africa for the first time after the Toba supervolcanic event, migrating to Arabia and the Middle East. From that time, human survivors began to have a fully modern behavior, including the ritual of burying the dead.

The mitochondrial L3 lineage crossed the Red Sea in two waves: the first wave occurring 70,000 to 80,000 years

ago across the narrow span of water between the Horn of Africa and the Arabian Peninsula, and the second wave occurring 60,000 to 70,000 years ago, crossing the Red Sea more toward the north and settling in the Near and the Middle East. The first ones formed an old Arabian group (mtDNA haplogroup M and Y-DNA haplogroup M130) 60,000 years ago, which headed along the southeast coast of Asia (India, Sri Lanka, Indonesia, Filipinas, Malasia, and Polynesia) reaching Australia 50,000 to 55,000 years ago. The haplogroup M is nicknamed the Coastal Clan and is considered an ancestral east Eurasian lineage that derived from the australoid people, such as the australians-tasmanians, melanesians, veddooids, and negritos (those formerly classified as *H. s. australasicus*). The 42,000-year-old Mungo Man (Australia) is the oldest fossil probably belonging to this migrant lineage. They surely supplanted and replaced the last erectine humans (*Homo soloensis*) from southeastern Asia and Australia.

The second group derived from those first African emigrants (L3) went north and radiated in the Near and the Middle East, appearing as the mtDNA haplogroups N and R, and Y-DNA haplogroup M89. Descendants of these two groups moved out and explored the surrounding areas (Turkey, Caucasus, and central Asia), initiating a second great migration out of Africa and eventually colonizing the whole world. Because almost all of the mitochondrial lineages found in Europe and Asia descend from N and R groups, these people are considered the Eurasian Clan.

Europe was colonized 45,000 years ago by migrants from central Asia, the Near East, and the Middle East, slowly displacing the Neanderthals. They were people who emerged from the Near and the Middle East (mtDNA haplogroups N and R), and that bore mtDNA haplogroups J, T, and meaningfully pre-VH. Most people moved north across the Caucasus, bringing their lineages into Europe during the middle Upper Palaeolithic. These lineages were represented in Europe for the first time by the Cro-Magnons, heralding the end of the era of the Neanderthals in Europe. Descendants of early Europeans began to split off and form their own groups, represented by the mtDNA haplogroup HV (derived from pre-VH). Around 15,000 to 20,000 years ago, colder temperatures made living conditions nearly impossible for much of the Northern Hemisphere. Early Europeans retreated to the warmer climates of Iberia, Italy, and the Balkans. Their population sizes were drastically reduced, and much of the genetic diversity that had previously existed in Europe was lost. After the ice sheets began their retreat 15,000 years ago, this people moved north again and recolonized Europe. Some of these lineages (mtDNA haplogroups V and H, derived from HV 15,000 to 30,000 years ago) expanded toward Western Europe, others (mtDNA haplogroups K and U, derived from R 50,000 years ago) towards northern Europe, and finally others (mtDNA haplogroups I and W, derived from N 30,000 years ago) toward Eastern Europe.

Other groups derived from R, the mtDNA haplogroup U6, moved to northern Africa. After the last glacial maximum, expansions led people across the Strait of Gibraltar, allowing for some gene flow between North Africa and southwestern Europe.

Radiating out from central Asia and the Middle East, the mtDNA haplogroups B and F and Y-DNA haplogroups M89 and M9 (appearing 40,000 to 60,000 years ago) conquered the Far East (south and east Asia) 40,000 years ago. They formed the different southwestern Asian mongoloid groups that, together with Siberian groups, were formerly classified *H. s. asiaticus*. Fossils found in Ordos (Mongolia) that are 40,000 years old, and in the Zhoukoudian upper cave (China) that are 27,000 years old, are evidence of this new wave of human migrants toward southwestern Asia, replacing and/or mixing with the australoid M haplogroup in the south Asian coastlands. Descendants of early southern and eastern Asians began to split off and form their own groups, reaching the Philippines and Indonesia, and finally Melanesia, Polynesia, and Micronesia in more recent times.

Radiating out from the central Asian homeland and derived from N, R, and/or M 50,000 to 60,000 years ago, the mtDNA haplogroups Z, A, B, X, C, and D colonized Siberia approximately 30,000 years ago. They formed the group known as the Siberian Clan. Some of these lineages (A and B) also reached Korea, Japan, and southeastern Asia during this epoch. Human fossils 32,000 years old found in Naha-Okinawa (Japan), and nicknamed Yamashita-Cho Man, belong to this lineage. The haplogroup Z migration heading west, out of Siberia, came to an abrupt end around the Ural mountains and Volga River (Russia). Finally, several other Siberian lineages colonized America for the first time.

America was occupied by Asian people bearing mtDNA haplogroups A, B, D, and X, and the Y-DNA haplogroups M130 and M217; they crossed the Bering Strait from Siberia into Alaska during the last glacial maximum, when a land bridge, called Beringia, united the continents of Asia and America. Most parts of these haplogroups arrived from Siberia, except for the M217 group, which arose from east Asia. These groups were the ancestors of all Amerindians (sometimes classified as *H. s. americanus*). The reduced genetic diversity found in America indicates that these lineages arrived only 15,000 to 20,000 years ago. In fact, only the Y-DNA haplogroup M3 (derived from Siberian M242) is entirely American. Since a branch of haplogroup X found in Amerindians (such as Sioux and Navajo) is almost entirely absent from Siberia, an alternative hypothesis of the migration route toward America has been suggested: the Solutrean hypothesis, asserting that stone-tool technology of the Solutrean culture in prehistoric Europe (France, Spain) may have influenced the development of the toolmaking culture of the Clovis Paleo-Indians in America. This hypothesis suggests that peoples from

Europe may have been among the earliest settlers in the Americas about 13,500 years ago.

Future Directions

Homo sapiens sapiens began its existence between 180,000 and 200,000 years ago, but its lineage began to evolve more than 4 million years ago. After hundreds of thousands of generations, the hominids have trended toward being less physically skulled but showing a disproportionate encephalization. According to this trend, future humans could have larger heads and shorter legs and arms, retaining each time more and more traits previously seen only in juveniles (neoteny). Surely our future adults will resemble the morphology of our present babies. Nevertheless, future human evolution may not be governed by the same principles that govern the evolution of other animals, since humans differ from other species by their advanced social organization and language, as well as the use of advanced technology, controlled energy, and clothes. Many paleoanthropologists claim that the human brain has not changed for 150,000 years. On the contrary, genetic research shows that certain genes, related to brain size, did change between 6,000 and 35,000 years ago, suggesting that humans are still evolving.

A species gradually evolves through natural selection into a new species, but this usually occurs in small, geographically isolated populations. This type of evolution is very slow for a large and widespread species such as humans. Therefore, this type of evolution is not very probable for humans, since the tendency for genetic intermingling among humans is very large, and the mixing will increase in the future.

Today, there is no existing species that might compete or threaten the human species, as the Neanderthals were out-competed by *H. sapiens*. However, a species could arise that would be a rival of our own species: an explicit, new species, artificially created through genetic manipulation of ourselves or another species, or based on computers and cybernetics (artificial intelligence).

We have a high adaptability to changing environments and, excepting for a cosmic catastrophe, we will probably survive through the future climatic turnovers. Nevertheless, humans are capable of modifying their environment, so there is a risk that humans themselves will modify their environment in such a way that they cannot survive in it any longer. If earth would suffer a global disaster in the future, whether due to our fault or by other causes, humans could try to find a way out: the colonization of space. Today, it is a theme mainly of science fiction, but there are already several space programs that have, as their objectives, autonomous self-sufficient human habitation and the establishment of space colonies on the moon or on Mars. Space-colonization technology could, in theory, allow human expansion at a high, but subrelativistic, speed

toward interstellar colonization, permitting self-contained habitats with life spans from decades to centuries. If the isolation of this type of interstellar colony were prolonged long enough in time, then the birth of a new human species could become possible through the basic principles of evolution (natural selection, adaptation, genetic drift, etc.)—but in an extraterrestrial environment.

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3

HUMAN BRAIN

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Whereas claims of human uniqueness used to revolve around the soul, they now revolve around the brain. Ever since Thomas Willis and his Oxford circle colleagues discovered in the late 1600s that the brain governs behavior, scientists have devoted considerable attention to this complex and inscrutable organ. Until recently, most approaches to the brain have been introspective and deductive. Philosophers and scientists traditionally have attempted to explain the brain's workings by examining its current functioning. They study, in other words, modern minds. While this top-down approach has yielded many insights, the limitations are obvious. To understand the human brain, a historical or evolutionary approach is necessary. It is only by locating the brain in deep time and tracing its evolutionary development that we may hope to arrive at a more complete understanding of that which makes us uniquely human.

Background

Humans have large brains, in both absolute and relative terms. Presumably, it is this fact that prompted the normally restrained Charles Darwin to declare, in *The Descent of Man* (1871), that no one could possibly doubt the connection between large brains and higher mental powers. Whether Darwin was expressing a scientific truth or a cultural prejudice remains an open question. For reasons

poorly understood and rarely questioned, humans are enamored of size—if something is big, it is usually deemed remarkable and important. In many instances, this habit of mind serves us well. Size often signals something important about function. In other instances, the privileging of size is misleading. This has been especially true of the human brain.

In the century after Darwin, it became commonly accepted that fish gave rise to amphibians, amphibians to reptiles, reptiles to mammals, and mammals to man. Implicit within this overly neat phylogenetic ordering was the idea that brain size increased with each phase change, and that each progression involved the addition of brain tissue. Indeed, it was this idea that inspired Paul MacLean's "triune brain" model, which divides the brain into three parts (archipallium, limbic system, and neocortex) according to the sequence of their evolutionary appearance. Within the primate order, the story was much the same. As told by W. E. Le Gros Clark, primate evolution was largely a matter of progressive trends, one of which was expansion and elaboration of the brain. According to this traditional view, the most primitive primates (*prosimians*) had the smallest and simplest brains, more advanced primates (*simians*) had larger and more complex brains, and the most advanced primates (*great apes*) had even larger and more complex brains. Humans occupied the top rung of this primate *scala naturae*, and their brains were the biggest and most complex.

Against this backdrop, it should come as no surprise that those studying human evolution simply assumed, as Darwin himself seems to have done, that the transition from monkey to ape to human was largely a matter of growing bigger brains. Like most Victorians of his age, Darwin believed in progress, and his theory of natural selection reflected this belief. Firmly embedded within this progressivist paradigm, early anthropologists devoted themselves almost exclusively to the study of the brain, and more particularly crania. Paul Broca, who founded the Anthropological Society of Paris in 1859, contended that the new science of *craniology* was of such importance that anthropologists should focus exclusively on skulls. Speaking for many scientists of the day, Broca asserted that larger brains translated into greater intelligence. Given the prejudices of the time, this naturally meant that men had larger brains than women and Europeans had larger brains than Africans. In *The Mismeasure of Man* (1981), Stephen Jay Gould examined the evidence supporting these ideas and demonstrated that the data, if not simply made up or erroneous, supported none of these conclusions.

Obsessions over brain size have long vexed evolutionary thinking in general and anthropological studies in particular. In 1912, the discovery of fossils that came to be known as Piltdown Man seemed to confirm the idea that human evolution was largely a matter of growing bigger brains. Although there were good reasons to doubt the validity of the find, Piltdown's large braincase fulfilled the a priori expectation that encephalization was the key to human evolution. Piltdown's large brain cemented its status as a human ancestor. It took another 40 years before Piltdown was exposed as a hoax. During the interim, scientific acceptance of an actual fossil in the hominid lineage—*Australopithecus africanus*, discovered by Raymond Dart in 1924—was long delayed because it did not possess a large enough brain.

Given this history, one might think, incorrectly, that anthropology has freed itself from its early focus on big brains. One of the ongoing debates in paleoanthropology revolves around the parameters of the genus *Homo*. Sir Arthur Keith, whose distinguished career ultimately was tarnished because he championed the big-brained Piltdown as a human ancestor, maintained that *Homo* should be defined by cranial capacity. For Keith and others this *cerebral rubicon* was 750 cubic centimeters. Any bipedal hominid below this threshold was not *Homo* and anything above it was *Homo*. Not everyone agreed with this definition, which became apparent in the 1960s when the Leakeys discovered a fossil cranium below the 750 cc threshold and named it *Homo habilis*. Nearly 50 years later, anthropologists are still debating the boundaries of our genus, with cranial capacities playing a prominent, albeit slightly reduced, role in those debates.

These controversies have not, in the end, done much to advance our understanding of the human brain. Part of the problem has been the narrow focus of these studies, which

tend to orient themselves around fossil hominid skulls on the one hand and fully modern brains on the other. While this approach has merit, it is important to recognize that hominid brains have a much deeper evolutionary history. Any thorough understanding of the human brain requires some basic knowledge of primate brain evolution.

Primate Brain Evolution

The earliest fossil primates (adapids and omomyids) are approximately 55 million years old. Among a host of other diagnostic features for fossil primates, several significant ones involve cranial modifications that implicate the brain. In general terms, these derived characteristics include (1) brain enlargement, (2) enhanced vision, and (3) reduced olfaction. Because the insectivorous mammal that gave rise to primates remains unknown, it is difficult to determine whether brain enlargement is a valid descriptor of stem primates. The weight of evidence suggests that early primate brains were not enlarged and were comparable in size to primate sister taxa (*Scandentia*, *Dermoptera*, *Chiroptera*, *Insectivora*) at the base of the Archontan radiation. Although the earliest primate brains were not particularly encephalized, they were different. In basal primates, the extreme forward rotation of the eye sockets indicates an increased reliance on vision and decreased reliance on olfaction. Extreme orbital convergence suggests selection pressure for stereoscopic and binocular vision. A side effect of this convergence is that it constricts the space available for olfactory organs and their connections to the brain. Because early primates occupied arboreal habitats, the factors favoring enhanced vision may have included the need to locate branches for leaping-grasping locomotion, and the ability to prey on insects moving through the canopy.

Whatever the ultimate cause, there is no doubt that primate brains are visually specialized. Compared with those of other orders, a disproportionately large area of the primate brain is dedicated to visual processing. During the more recent course of primate evolution, the neocortex has expanded disproportionately. Because visual areas comprise approximately 50% of the primate neocortex, a great deal of this expansion is due to increased visual acuity. Primates have two distinct visual pathways in the brain: One (the magnocellular system) analyzes movement and form, while the other (the parvocellular system) processes detail and color. Visual area enhancement in early primates selectively altered the magnocellular system for detecting form and movement, whereas in later primates—including early anthropoids—the parvocellular system for discerning detail and color appears to have been selectively targeted. Because stem and early primates presumably were nocturnal and insectivorous, the enhanced development of the parvocellular system in later primates is often associated with an adaptive shift toward diurnality and frugivory. This shift, in turn, appears to have directly impacted the social behaviors for which primates are especially noted.

It is one thing for a small primate to hunt surreptitiously for insects at night and quite another to forage openly for fruit during the day. The former can be done in relative isolation and small groups, whereas the latter is best accomplished in the company of others and large groups. Social groups have several advantages, not the least of which is predator detection and defense. Complex social behavior requires considerable visual acuity—group members must be able to recognize one another, assess nonvocal behaviors, and respond accordingly. Group members must be able to process emotional and other states communicated through facial and gestural displays. It is not surprising, therefore, that there is a significant correlation between primate social-group size and neocortex size. There is a similar correlation between neocortex size and feeding ecology—frugivorous primates usually have larger neocortices than folivorous primates. This ecological correlation is typically explained in terms of mental mapping. Frugivory requires larger range size, with resources being patchy and temporal. The mental maps necessary to track these resources seem to require larger brains, larger groups, or both.

As is apparent, vision, sociality, and ecology interact in complex ways to alter the brains and behaviors of primates. This has been true throughout the course of primate evolution. Because none of these factors is uniform in space or time, primates have responded to these pressures differentially and variably. The resulting encephalization and reorganization has not, therefore, been uniform during the course of primate evolution. Encephalization and reorganization have occurred sporadically and independently within different lineages. Primate evolution has not simply been one long course of selection for bigger brains and increased intelligence.

Under the old classification scheme, the idea was that prosimians led to simians and simians to apes. With each supposed transition, there was a grade shift involving brains and behavior. Cladistic analyses have shown that this progressive phylogeny is no longer tenable. While it may be true that Strepsirrhines (lemurs, lorises, galagos) have smaller and less specialized brains than most Anthropoidea (a clade of primates including Platyrrhini and Catarrhini), this observation says nothing about supposed trends in primate brain evolution. Anthropoids did not evolve from Strepsirrhines; they are separate lineages, each with its own unique evolutionary history. Among anthropoids, Platyrrhines (New World monkeys) and Catarrhines (Old World monkeys and apes, including humans) display highly divergent patterns of encephalization and reorganization. Anthropoid brain evolution is, therefore, mosaic. There are no consistent directional trends, a fact made apparent by measures of encephalization for living anthropoids.

Brain Sizes and Encephalization Quotients

It has long been understood that absolute brain size, standing alone, says little about behavioral complexity. As body

size increases, so does brain size. This is due in large part to the principle of proper mass, which holds that a certain amount of neural tissue is required to perform a particular function. Because larger animals have more intrinsic functions than smaller animals, they require larger brains to coordinate their autonomic, sensory, and motor activities. Whales, for example, have brains weighing thousands of grams. Their absolutely massive brains, however, do not make them more intelligent than primates, whose brains typically weigh hundreds of grams. Expressing brain weight as a percentage of body weight simply reverses the size problem. Using this ratio, small animals such as mice appear to be relatively more encephalized than whales and primates.

In an effort to correct these problems and identify some measure of brain-body size that correlates with behavioral complexity, Harry Jerison (1973) proposed the use of encephalization quotients, or EQ. The idea is straightforward—EQ is the ratio of an animal's actual brain size to the brain size expected for an animal of its body size. On its face, EQ provides some measure of quantifiable objectivity. Despite this fact, EQs are neither straightforward measures of behavioral complexity nor definitive markers of intelligence. Embedded within EQ measurements are several assumptions, the most important of which is that there is a universally applicable, nonlinear scaling relationship between brains and body size. Researchers cannot, however, agree on the exponent that should be used to calculate EQ. Estimates vary widely from .20 to .75. Given this disagreement, the notion that an EQ value of 1.0 expresses a biological norm, or brain-size expectation given a certain body weight, is open to question. Consequently, EQ measurements and comparisons should be interpreted with caution. They simply serve as a useful first step in considering primate brain evolution and development. With these caveats in mind, Table 3.1 contains EQs for several species of extant anthropoid primates.

As is apparent, extant anthropoids are more encephalized than expected for mammals of similar body size. Despite this fact, EQ variation among anthropoids is great. *Alouatta* (howler monkeys) occupies the low end at 1.24 and *Homo* the high end at 7.18. Of particular interest is the fact that hominoid apes are not generally more encephalized than New or Old World monkeys. After humans, the primate with the highest EQ is not our closest relative the chimpanzee (*Pan*), but is instead the capuchin monkey (*Cebus*). Gorillas, for their part, are at the low end of EQs for anthropoids. Considered together, the EQ data should dispel the progressivist notion that apes are more evolutionarily advanced than monkeys. Judged by measures of EQ alone, this clearly is not the case.

When considering EQs, it is important to understand there is no such thing as a typical "primate brain." Although all living primates share a common ancestor dating back to the Eocene, today there are nearly 300 extant primate species, each one of which has a unique evolutionary history. For each species, this history involves structural reorganization of the brain, along with changes

Table 3.1 Mean EQ for Selected Anthropoid Primates (Platryhines or New World Monkeys, Cercopithecidae or Old World Monkeys, and Hominoidea or Apes)

Taxon	Mean Eq
<i>Alouatta</i>	1.24
<i>Aotus</i>	1.60
<i>Ateles</i>	2.39
<i>Brachyteles</i>	2.05
<i>Calicebus</i>	1.66
<i>Cebus</i>	3.25
<i>Chiropotes</i>	2.26
<i>Lagothrix</i>	2.20
<i>Pithecia</i>	2.02
<i>Saimiri</i>	2.86
<i>Cercocebus</i>	2.19
<i>Cercopithecus</i>	2.00
<i>Colobus</i>	1.34
<i>Erythrocebus</i>	2.09
<i>Macaca</i>	1.87
<i>Papio</i>	1.90
<i>Presbytis</i>	1.50
<i>Theropithecus</i>	1.49
<i>Hylobates</i>	2.50
<i>Pongo</i>	2.08
<i>Pan (common)</i>	2.70
<i>Gorilla</i>	1.38
<i>Homo (modern)</i>	7.18

SOURCE: Data based on Aiello, L., & Dean, C. (1990). *An Introduction to Human Evolutionary Anatomy*. London: Academic Press.

in cell types, metabolic chemistry, vascular patterning, and neural connectivity. While some of these changes are the straightforward consequence of allometric enlargement, the majority cannot be so explained. The lack of any consistent pattern and the differences among species suggest that primate brains have undergone mosaic evolution, and there has been differential selection for particular kinds of behaviors. While primate brains may be similar in terms of gross morphology, this does not mean that chimpanzee brains are more sophisticated versions of macaque brains, or that human brains are simply scaled-up versions of

chimpanzee brains. Each species has something unique about its brain. Given the many differences in primate ecologies and behaviors, this is not surprising.

Despite species-specific differences, there are some features of primate brains that appear to be unique to the order. Primates may be the only mammals that possess mirror neurons. These visuomotor neurons were first observed in macaques and are unique because they fire not only when an individual performs an intentional task (such as reaching for and grasping an object), but also when an individual observes another performing precisely the same task. Mirror neurons, in other words, appear to fire empathetically during the observance of purposeful acts performed by others. For this reason, mirror neurons have been linked to a range of primate specializations, including imitation, intentionality, agency, empathy, learning, and language. Taken together, these skills play a major role in social cognition. Significantly, mirror neurons also appear to play a major role in tool use. Although primates are not the only animals that have complex social systems and that use tools, the quality and complexity of primate behavior in these arenas differs from that of most other taxa. Another specialized neuron is found only among hominoid (i.e., great apes) species. Alone among primates, hominoids possess projection neurons known as spindle cells, found in the anterior cingulate cortex, an area associated with precision gripping and the regulation of cognitive-emotional processes. The remarkable fact that these cells exist only in our closest relatives (chimpanzees, gorillas, orangutans), in quantities that decrease as the phylogenetic distance from humans increases, suggests strong selection pressure for these specialized cells in our lineage.

Hominid Brain Evolution

Although progressive encephalization does not characterize primate brain evolution generally, it does characterize hominid brain evolution specifically. From *Australopithecus* to *Homo*, absolute brain size nearly tripled from an average of 450 cc to 1,250 cc. Some, but not all, of this expansion can be attributed to selection for increased body size. Correcting for body size and calculating EQ for hominids is not always easy, given that accurate estimates of body mass depend on postcranial remains. Because relatively few fossil crania are found with articulated or reliably associated postcranial remains, direct measures of body size are not often available. In their absence, researchers rely on various cranial proxies to estimate body mass. With these caveats in mind, Table 3.2 provides EQ values for selected hominids.

Because australopithecines had slightly larger brains and EQ values than living chimpanzees, modest encephalization is an appropriate marker (along with bipedalism) for the earliest hominids. As is evident from Table 3.2, absolute and relative brain sizes increased over time. Paleoanthropologists cannot, however, agree on the tempo and mode of hominid brain evolution. Some see steadily

Table 3.2 Mean Endocranial Volumes and EQs

Taxa	Mean (ma)	Mean Volume (cc)	EQ
<i>A. afarensis</i>	3.11	446	4.87
<i>A. africanus</i>	2.66	462	5.21
<i>H. habilis</i>	1.76	610	7.06
<i>H. rudolfensis</i>	1.87	789	7.35
<i>H. ergaster</i>	1.74	801	6.25
<i>H. erectus</i>	0.81	941	7.32
<i>H. heidelbergensis</i>	0.27	1,266	8.64
<i>H. sapiens</i>	0.01	1,330	9.63

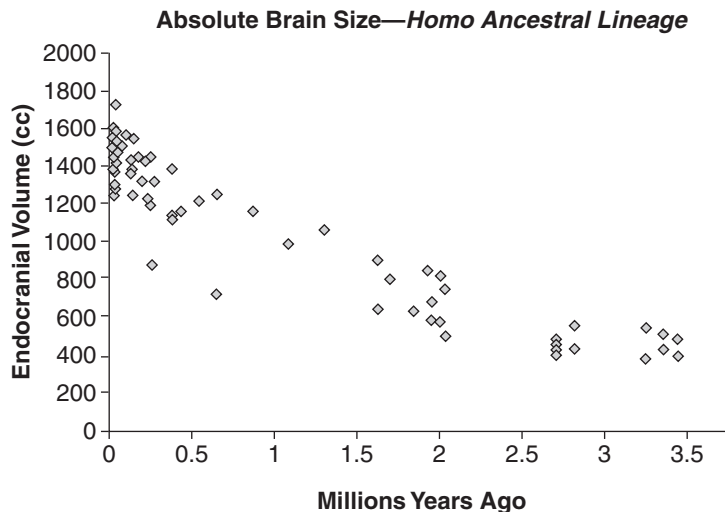
SOURCE: Data from Holloway, R., Broadfield, D., & Yuan, M. (2004). *The Human Fossil Record: Vol 3. Brain Endocasts: The Paleoneurological Evidence* (p. 301). (J. Schwartz & I. Tattersall, Eds.). New York: Wiley-Liss.

increasing cranial capacities and support a gradualist model. Others support a punctuated model and see an increase in cranial capacity with the appearance of early *Homo*, a long period of relative stasis, and another increase with the appearance of *Homo sapiens*. Regardless of which model is correct, two things should be kept in mind. First, our knowledge of within-species variation is lacking. Among modern humans, normal (i.e., nonpathological) brain sizes vary by as much as 1,000 cc (from 750 cc to 1,750 cc), without any apparent relationship to functioning or intelligence. Second, our sample sizes are small. For

hominids, there are approximately 200 crania from which brain sizes can be reliably estimated. Of these, only 74 represent the human ancestral lineage if one assumes a phylogeny of *A. afarensis*, *A. africanus*, *H. habilis*, *H. rudolfensis*, *H. ergaster*, and *H. erectus* (Africa only) leading to *Homo sapiens*. Table 3.3 plots these 74 cranial capacity measurements without any adjustments for body weight.

Regardless of how one chooses to characterize this scatter, the pattern of encephalization is clear, even after adjusting for body-size increases. Brain enlargement has several consequences, not the least of which is that it dramatically alters patterns of neural connectivity and developmental trajectory. Size, however, is not the only factor that can cause organizational change. The study of endocasts (molds of cranial interiors which reveal brain size and external morphology) shows that the hominid brain underwent significant reorganization over the last 3.5 million years. Although hominid brains are similar to most primate brains in terms of basic design (i.e., they are structurally homologous), the relative sizes of various structures have differentially enlarged or reduced over time. Among hominids, lateralization is an example of such change. Hemispheric lateralization is often associated with specialization of cerebral and motor function. Australopithecine brains show a hemispheric asymmetry that becomes more pronounced as one gets closer to *Homo*. A similar pattern characterizes the enlargement of Broca's and Wernicke's areas in hominid brains, both of which are associated with language. Another distinctive feature of hominid brains, vis-à-vis ape brains, is the relative reduction of the primary visual striate cortex and corresponding enlargement of the parietal lobe association cortex.

Table 3.3 Absolute Brain Size: *Homo* Ancestral Lineage



SOURCE: Data from Holloway, R., Broadfield, D., & Yuan, M. (2004). *The Human Fossil Record: Vol 3. Brain Endocasts: The Paleoneurological Evidence* (pp. 297–300). (J. Schwartz & I. Tattersall, Eds.). New York: Wiley-Liss.

Considered together, these and other distinctive changes to hominid brains indicate two things. First, hominid brains in general and human brains in particular are not simply scaled-up versions of ape or chimpanzee brains. Second, differential enlargement and reduction of brain structures indicate a mosaic pattern to hominid brain evolution. This is an important point, given that natural selection does not see brain structures. Selection can only see behaviors that are mediated by brain structures. If those behaviors enhance fitness, then selection will favor those individuals whose brains are organized in a way that facilitates such behavior. Given the substantial changes in brain size and organization that occurred during the course of hominid evolution, identifying these behaviors—and associated selection pressures—has been the focus of much research.

Hominid Brain Evolution: Selection Hypotheses

It has long been fashionable to suppose that once hominid encephalization began, brain size steadily increased due to selection for “intelligence.” There are at least three problems with this idea. First, intelligence is inchoate and relative. As a scientific term, it lacks rigor and specificity. It cannot be directly measured. Many animals are intelligent, in the sense that their brains fully enable them to cope with the demands of their particular environments. Invariably, intelligence is assessed from a *Homo*-centric perspective blinding us to the considerable intelligence of other species. This issue aside, intelligence—as applied to humans—is a concept freighted with historical prejudice and modern bias. Although there are researchers who believe in a generalized intelligence (called *g*), these beliefs nearly always revolve around culturally specific and historically recent forms of cognition. Whatever these might be, they rarely are applicable to the kinds of cognitive demands made on hominids in Plio-Pleistocene environments. Second, neither absolute nor relative brain size is a reliable proxy for the behavioral complexity and cognitive plasticity associated with “intelligence.” Rats have small brains (~2 grams) yet have remarkable behavioral repertoires that enable them to adapt to all manner of environments. Among primates, capuchin monkeys have relatively much larger brains than gorillas, without major differences in assessments of intelligence. Finally, intelligence is simply too broad a concept to be useful. Rather than speaking in terms of general intelligence, we should discuss specific skills and abilities for which there may be evidence that is amenable to testing. So parsed, intelligence includes toolmaking, foraging, sociality, language, and culture. Before examining how these and other factors may have exerted selection pressure on hominid brains, it is important to remember that encephalization did not come first—bipedality was the prime mover in hominid evolution.

Although bipedality and the brain are often treated as separate and distinct aspects of hominid evolution, this approach ignores the major impact that bipedality had on the neural organization of hominids. All primates (except one) are quadrupeds of one kind or another. This means that for nearly 55 million years, primate brains have evolved in a manner that subserves the several different forms of quadrupedal locomotion. Standing upright requires substantial changes to this basic primate design. Bipedalism had direct and indirect effects on neural organization. The vestibular system, which plays a major role in balance and orientation, had to be reorganized, along with changes to neural pathways and associated motor regions. Several studies have shown that bipedalism is, over longer distances, an energetically more efficient form of locomotion than quadrupedalism. To maximize this efficiency and aid upright walking, the typically flared primate pelvis had to narrow. This reconstruction resulted in constricted birth canals, which in turn altered developmental patterns in hominids. Hominid infants had to have smaller brains (and softer bones) at birth in order to pass through a narrow birth canal. Having smaller brains at birth delays development. In humans, this delayed development is much longer than it is in other primates. Delayed postnatal maturation (secondary altriciality) has several effects, not the least of which is that it prolongs dependency and enables learning. The cumulative impact of this life-history alteration should not be underestimated. In all likelihood, bipedality accounts for the slightly changed brain-body size ratios first seen in australopithecines.

Bipedalism had another major impact on hominids: It freed the hands for tasks other than locomotion. The earliest hominids almost certainly lacked the fine motor control for hands that we associate with later hominids. Over time, however, hominids would have begun using their hands for novel tasks, including stone throwing, toolmaking, extractive foraging, and gestural communication. All of these require an ability to sequence grasping activities in a deliberate manner, and would have resulted in a significant reorganization of related motor control regions in the brain. Indeed, many researchers hypothesize that activities such as stone throwing and toolmaking laid the neural substrate for the later emergence of language, which also involves finely controlled motor sequencing.

Of course, bipedalism did not just happen. There had to be selection pressure for upright walking. Most researchers agree that upright walking began during a period of cooling and drying that resulted in the retreat of African forests and the appearance of patchy savannah-like environments. This ecological shift resulted in changed foraging patterns, at least for hominids who were no longer restricted to arboreal habitats. Bipedalism enabled hominids to range over larger territories, where foraging opportunities are much broader than they are in the canopy. Several changes in hominid-foraging patterns have been suggested, including opportunistic scavenging, cooperative hunting, tuber

extraction, and shoreline harvesting. Whether early hominid foraging included all or only a few of these, each of these behaviors entail increased caloric intake, which is a major factor in any consideration of brain evolution.

In energetic terms, brains are notoriously expensive organs. Although the human brain constitutes a mere 2.3% of body mass, it consumes approximately 23% of the body's daily energy intake. Given the high-metabolic costs of maintaining neural tissue, there are serious constraints on brain size. Many researchers argue that removal of these constraints was the essential first step in hominid encephalization. There are several variants of this argument, the most well-known of which is Leslie Aiello's expensive tissue hypothesis (Aiello & Wheeler, 1995). Aiello notes that digestive organs are metabolically costly, and that in order to grow larger brains, hominids had to make a trade-off between digestive and neural tissue. The evidence for a reduction in hominid gut size and corresponding increase in brain size is compelling. As hominid brain size began increasing, the shape of the rib cage and thorax changed from the wide and flared hominoid pattern (indicative of a large gut designed to process lower quality foods) to the narrow and barrel-like human pattern (indicative of a smaller gut designed to process higher quality foods). These changes, in turn, are often associated with increased consumption of animal proteins, which could have occurred by hunting or, more likely, by way of scavenging and the secondary processing of carcasses and bones with stone tools.

Another group of researchers argue that this foraging and encephalization shift was associated with what they call the shore-based diet. Under this scenario, early hominids began exploiting the easy-to-harvest marine resources that are concentrated around the shorelines of lakes and rivers. These resources would have included crustaceans, mollusks, frogs, turtles, spawning fish, and birds' eggs. In addition, a wider variety of edible and nutritious plants are available near water, and these presumably were included in the diet. A key feature of this argument is that shore-based diets include considerable amounts of fatty acids (docosahexaenoic acid and arachidonic acid) that are essential for encephalization in mammals. Importantly, these are limiting nutrients for brain development. However, these constraints were removed, and there can be little doubt that a higher quality diet was an important factor in hominid brain evolution. Recognizing this, Richard Wrangham recently has suggested that cooking—which results in much higher availability of nutrients from food—played a significant role in hominid evolution.

All constraint hypotheses have something in common: They revolve around changes in hominid behavior. As a general evolutionary rule, behavior remains constant unless something causes it to change. When environments remain stable over long periods of time, there is little reason for previously adaptive behaviors to change. However, when environments become variable and fluctuate rapidly, formerly adaptive behaviors may become maladaptive.

Organisms with relatively stereotyped and static behaviors that are unable to adapt thus become extinct. With this in mind, several researchers propose that behavioral plasticity in the face of environmental change was an important factor in hominid evolution. During the late Pliocene and throughout the Pleistocene, climactic change became more frequent and severe. Africa in particular experienced environmental perturbations that dramatically altered ecologies and landscapes. These changes would have exerted strong selection pressure for flexible and fluid responses, or an ability to behave in nonstereotypical ways. Because behavioral plasticity is often correlated with encephalization, habitat instability and hominid brain evolution are probably linked.

The Social Brain

In 1976, Nicholas Humphrey published a seminal article titled "The Social Function of Intellect." Humphrey began with what appeared to be a paradox: Primates are among the most cerebral of animals, yet for the most part lead relatively undemanding lives. This thought occurred to Humphrey after spending a few months observing gorillas (and reading primate behavioral literature), all of which suggested that—compared with many other mammals—primate life (and in particular, foraging) was not especially difficult. Humphrey is not alone in this observation. Primatologists routinely confirm that field studies can be tedious, with long days spent watching primates leisurely foraging in trees or on the ground, alternated with long periods of rest and sleep. Given this fact, the question naturally arises: Why are primates so behaviorally sophisticated? For Humphrey, the answer was obvious. Primates are highly cerebral because they are intensely social.

Sociality is a complex evolutionary adaptation. One should not mistake mere aggregations of organisms with sophisticated social behavior. Life in a swarm, flock, or herd is in a limited sense social, but it does not involve the cognitive computations required of highly social mammals such as primates, cetaceans, and some carnivores. Complex social behavior usually involves tightly bonded groups or societies. Maintaining group cohesion while simultaneously tracking and navigating rank orders, member coalitions, shifting alliances, and individual relationships is no easy task, and is one that requires a fair degree of cerebral sophistication. Because relevant information must be constantly updated and stored over long periods of time, complex sociality places tremendous loads on memory and recall. It should come as no surprise, therefore, that all socially complex animals score rather high in various measures of encephalization and behavioral plasticity. Primates are especially notable in this regard.

With these observations in mind, Robin Dunbar (1998) proposed the social brain hypothesis to explain the fact that primates have unusually large brains, given their body size,

compared with other vertebrates. Primates consistently have EQs higher than those of most other taxa. Dunbar began by noting, as many researchers have done, that neocortical areas of the brain are associated with reasoning and consciousness, and that the neocortex has expanded disproportionately during primate and hominid evolution. Operating on the assumption that primate group size is a rough proxy for social complexity, Dunbar measured primate neocortex size and compared it with primate group size. He found a significant correlation between these variables, and concluded that neocortex size acts as a constraint on primate group size.

Sociality does not, of course, always involve cooperation. It often involves group competition, which can create selection pressure for the ability to deceive. Pursuing this idea, Richard Byrne (2000) has found that all primates (except for Strepsirrhines) have at least some ability to deceive. Byrne's Machiavellian intelligence hypothesis proposes that complex cognition in primates arises, in part, from the need to out-compete group members. Apes appear to possess greater deceptive abilities than monkeys, a fact which causes Byrne to argue that absolute brain size—rather than relative brain size alone—is an important factor in primate cognitive evolution. Byrne's hypothesis has two important features that extend beyond the confines of Machiavellian intelligence. First, he notes that social competition has an inherent feedback effect. Because deception engenders counterdeception and the behavior of others is constantly shifting, there may have been spiraling selection pressure for advanced social cognition. This idea is similar to the “red queen” effect that drives predator-prey adaptations in a coevolutionary arms race. Second, advanced deception—such as that seen in apes—requires a theory of mind, or an ability to imagine others' mental states. Significantly, mirror neurons and theory of mind have often been linked. Although the evidence for true theory of mind in other primates remains controversial, researchers agree that theory of mind is a key human attribute that played an important role in hominid evolution.

The Linguistic Brain

There can be little doubt that what separates humans from all other primates is language. Although cases such as Kanzi (bonobo), Washoe (common chimpanzee), and Koko (gorilla) show that intensively trained apes have impressive communicative and lexical skills, they do not possess language as we know it. More importantly, apes neither intuitively learn language (as do human children) nor spontaneously invent it (as did humans). Primate vocalizations and gestural routines are a long way from being languages or even protolanguages. Knowing this, the linguist Noam Chomsky long maintained that human language was so unique that it had no precedents in the

animal kingdom. Chomsky's early approach was anti-Darwinian and essentially held that an innate language module somehow appeared, fully formed, in humans. A less saltational but explicitly Darwinian form of this idea has recently been advanced for the FOXP2 gene. Given the complex and supramodal nature of language, it seems highly unlikely that it simply appeared at some serendipitous moment in hominid evolution. For something like language to have evolved, there must have been more or less constant selection pressure toward it for hundreds of thousands, if not millions, of years. For this reason, many researchers have suggested that hominid encephalization and language are closely connected. It is apparent, however, that simply having a large brain cannot explain language. If it could, we might expect whales and elephants to have language.

Early researchers into brain function and anatomy identified two regions as having special significance for language: Broca's area in the frontal cortex and Wernicke's area in the temporal cortex. While these areas are undoubtedly important, patients with lesions to these regions do not usually experience complete language loss. Total aphasia or loss of language have been reported in patients who experience severe subcortical damage, a fact indicating that language functions are widely distributed in the brain. More recent imaging studies in humans confirm that language cuts across many brain regions and involves multiple connections, some of which appear to be of relatively recent origin. Increased connectivity is frequently cited as a differential aspect of the human brain associated with language. In the end, language defies localization, and there is no “language module” in the brain.

Two leading researchers on brain evolution and function, Merlin Donald (1991, 2001) and Terrence Deacon (1990, 1997a, 1997b), argue that the expansion and reorganization of the hominid brain over the last 2 million years was driven not by language per se, but by specific abilities that eventually culminated in language. In Donald's view, early *Homo* possessed two critical abilities not seen in other primates: fine motor control and voluntary memory access. Together, these abilities allowed for *mimesis*, which is an ability to rehearse and refine body action in a representational manner. Mimetic skill could have operated without language, and would have greatly enhanced social cooperation and learning. In Deacon's view, these changes amount to symbolic thought—an ability to model the world in abstract ways and communicate with others, even without fully developed language. Although Donald and Deacon differ on details, they agree that pre- and protolinguistic skills (such as gesture and prosody) underwrote the unique course of human brain evolution. In support of this view, Robin Dunbar (1998) observes that primate group cohesion depends to a large extent on grooming and hypothesizes that language evolved as a form of social grooming.

The Conscious Brain

In many respects, the human brain is most remarkable for its conscious properties. Precisely what consciousness is defies easy description or explanation. For humans, it is often associated with attention, focus, and awareness. Francis Crick likens consciousness to a searchlight that deals with current tasks and conditions. Purposive intentionality, goal states, future planning, and voluntary decision making are all aspects of consciousness. Given our *Homo*-centric view of the world, many assume that consciousness is a uniquely human attribute. This view is mistaken. While humans possess a type of consciousness that is different, there is no reason to think that other animals are not conscious. Consciousness, in other words, exists along a phylogenetic continuum.

Whether consciousness itself is a direct product of selection or is an emergent feature of neural evolution remains a mystery. We know, however, that mobile organisms face special challenges as they operate in multidimensional environments. Sensory inputs must be coordinated with motor outputs in a stable arena of action. For smaller, slower, and less complex organisms, this coordination does not even require a brain, let alone something akin to consciousness. For larger, faster, and more complex organisms, a brain—and some form of consciousness—appears to be necessary. If this is the case, then it is not unreasonable to suggest that reptiles are minimally conscious and that mammals are moderately conscious. Conscious organisms are aware of the immediate environment, and depending on feedback, are able to adjust behaviors. In this sense, consciousness is a form of error correction and action modulation, and its adaptive utility is obvious. The ability to react rapidly to constantly and rapidly changing environments is critical to survival.

Many researchers refer to *primary consciousness*, which is most often noted in mammals and birds, and *higher-order consciousness*, which is typically associated with humans (and may be minimally present in some apes, elephants, and cetaceans). Primary consciousness revolves around a remembered present and involves episodic memory. Its activation requires an external or environmental stimulus. Higher order consciousness entails introspection and involves both short- and long-term memory. It is self-cueing and does not require external or environmental activation (though this often occurs). Higher order consciousness also entails causation and subjectivity, which is an awareness of self associated with agency. For humans, this aspect of consciousness is self-evident and manifests as a stable identity. For other species, its presence may be indicated by self-recognition in mirror tests. Chimpanzees, elephants, and dolphins all appear to recognize themselves when presented with mirrors.

Given the central role that consciousness plays in our waking lives, it is not surprising that many researchers locate it in a central part of the brain: the thalamocortical

system. The thalamus is medially situated to integrate sensory inputs and motor outputs. It appears to be a kind of switching center, with huge numbers of reciprocal relay cells engaged in recursive and parallel signaling. Gerald Edelman (2003) calls these relay signals *re-entrant interactions* that take place in the thalamocortical *dynamic core*. Significantly, brain wave activity in this core fluctuates in accordance with attention. Because the thalamus is centrally situated, it mediates between subcortical and neocortical processes. Its location, therefore, probably serves as an integrating area for the normally stable platform we call “consciousness.”

The Emotional Brain

Because language and consciousness play a central role in human experience, many philosophers and scientists have assumed that the mind is fundamentally rational. They have, in other words, privileged conscious cognition over other brain processes. Although Friedrich Nietzsche and Sigmund Freud vigorously challenged this assumption with their respective inquiries into “drives” and the “subconscious,” modern neuroscience typically eschews systematic inquiry into affective or emotional states. There is, however, one group of researchers who argue that much of our behavior is attributable to subconscious routines operating outside of language and consciousness. They are the evolutionary psychologists. In its most extreme form, evolutionary psychology holds that most of what humans do is driven by subconscious routines that evolved for specific and narrow purposes during the Plio-Pleistocene. Although there is little neurobiological evidence to support the idea that the brain is divided into modules, softer forms of evolutionary psychology focus on emotions and provide important insights into brain function and behavior.

As is true of consciousness, emotions exist along a phylogenetic continuum. At their most basic level, emotions are bioregulatory urges that govern approach/aversion and appetite/withdrawal behaviors. These urges are often parsed into arousal categories such as seeking, rage, fear, panic, play, lust, and care. Emotions allow animals to register environmental conditions, map body states, and maintain homeostatic balances. Many kinds of organisms—mammals prominently included—possess these abilities. Emotions enable reflexive responses to environmental stimuli and therefore play a major role in behavior. Internal-drive states related to food, sex, and safety are critical to survival and reproduction, the two essentials of evolutionary fitness. These drive states are largely regulated by emotions operating at subconscious levels. For animals possessing only primary consciousness—those locked into the present—emotions are highly adaptive and unproblematic. For humans possessing higher order and reflective consciousness, emotions—while still adaptive—are considerably more complex and are often problematic.

In humans, emotions register initially as drives that are then mediated by more complex cognition (i.e., language and memory). Feelings proper are the result of emotional-cognitive interactions. There is, in other words, an affective coloring to all conscious experience. This is, however, a two-way street—cognitive processes can trigger emotional responses. It should be apparent, therefore, that emotions play a major role in human decision making. What may appear to be purely rational thought processes are nearly always inflected by feelings that originate in the emotional brain. Under various circumstances, emotions and feelings can completely overwhelm executive level or rational cognition. *Sickness and love* provide but two examples, a fact well-known to all great novelists. Pure reason, as such, almost surely does not exist.

In the brain itself, emotions are usually identified with the subcortical limbic system, including the cingulate cortex, amygdala, and hypothalamus. In phylogenetic terms, these are relatively ancient structures that are closely connected with visceral functions. Their combined activity often triggers neuroendocrinal (hormonal) cascades, which can bathe the entire brain in chemicals affecting all aspects of feeling and behavior. The cellular and neuronal activity of the limbic system is regular and consistent. Jaak Panksepp (2003) suggests that these subcortical systems are akin to analog (regular stream) signals, whereas higher cortical systems are digital (intermittent pulse) signals. Operating within the context of the larger brain, these subcortical structures have major impacts on temperamental states, moods, and habits. They also play a role in memory formation, given that emotions often serve as tags for particular events. When similar emotions or conditions are experienced subsequently, the memory flood that sometimes results is a product of this valence tagging.

The Cultural Brain

Among scientists who study the brain, there is an unfortunate tendency to study it in isolation, as if it existed and operated in a box. The brain, of course, is encapsulated within a body, and the body exists in an environment. For humans, this environment is particularly rich: It is called culture. Although other animals possess transgenerational, social learning abilities that give rise to local traditions, the human brain takes these abilities to unprecedented heights. It is often said, with good reason, that the paramount human adaptation is culture.

Although human brains are specifically wired for various tasks at a subconscious level, higher order consciousness enables flexible learning across nearly all domains of thought and action. Human brains are, in a word, plastic. At birth (and compared with other primates), a human infant's brain is grossly underdeveloped. To reach a similar stage of development at birth compared with chimpanzees, human infants would need to gestate another entire term, or

until 18 months. This underdevelopment has several consequences, not the least of which is that it renders human infants utterly helpless and sets the stage for prolonged dependency. During early development, enormous amounts of energy are devoted to the brain. During the first few years of an infant's life, the rapidly growing brain consumes 60% of daily metabolic expenditure, a figure that stabilizes at approximately 20% later in life. None of this growth occurs in isolation: Human infants are constantly attended to and surrounded by conspecifics. Though it may be hard to discern, infants almost immediately begin imbibing this highly social environment. As a consequence, their brains literally develop in a cultural matrix.

As Merlin Donald (1991, 2001) poignantly observes, there is no such thing as an isolated mind. We can no more conceive of a brain independent of culture than we can of a body independent of environment. Brains severed from culture are not normal. Tragic examples of this essential connection are seen in cases where children have been socially isolated and neglected during their developmental years. These abused children typically suffer permanent impairment of linguistic, social, and other skills that most take for granted. Clearly, the brain undergoes profound changes during these early years and cannot develop properly unless embedded in a cultural environment. This enmeshment is so tight and constant that we sometimes underestimate the degree to which our minds are bound by culture. Symbolic thought, considered by many to be the key attribute of the human brain, does not develop as a matter of course. Rather, cultural programming is required before symbolic thinking can occur. Symbols, in other words, originate outside the brain. Cultural learning allows us to decode and manipulate those symbols, but only after they are internalized. Because experience and learning physically alter the brain and its connections, it can be said that culture actually instantiates itself in the brain.

Though we tend to associate "culture" with recent Holocene achievements such as literacy and mathematics, hominid brains and culture have long been locked together in an evolutionary embrace. Unfortunately, our view of Plio-Pleistocene hominid culture is limited by the fossil record of mostly stone tools and bones. While the lithics associated with the Oldowan and Acheulean tool industries can tell us something about the brains and behaviors of hominids, that something is necessarily limited. The hominids who manufactured and transported Oldowan tools certainly understood causation and possessed foresight in ways that chimpanzees do not. The later hominids who manufactured more refined Acheulean forms had further developed this anticipatory cognition and understood symmetry. Other than these kinds of limited insights, however, we do not know precisely what kinds of cultural innovations were fueling hominid evolution. The most likely explanation is that social, technical, and communicative skills were all under selection pressure, with the result being a distinctive form of hominid culture.

Whatever this culture may have been, it surely was more rich and complex than the picture we can paint from stones and bones alone.

Several researchers suggest that the hominid brain and culture formed an evolutionary feedback loop, having a ratchet effect on both. With each behavioral change and cultural modification, selection pressures would have favored those best able to adapt, and those best able to adapt would have possessed the kind of neural plasticity that often leads to further behavioral change and cultural modification. The notion of a hominid brain-culture spiral receives support from the evolutionary theory of niche construction, which posits that organisms can modify their environments in ways that alter subsequent selection pressures. The standard view in evolutionary theory is that selection pressures emanate from the environment to shape organisms who live, more or less passively, in the setting which presents itself to them. Selection, in this view, is a process with causation flowing only in a single direction. With the use of stone, bone, and fire, there came a point at which hominids began to actively alter their environments in ways that influenced subsequent selection. Humans, of course, radically alter environments to suit their needs, with consequences for subsequent behavior. Culture, in this view, widens evolutionary pathways so that causation can flow in two directions.

Conclusion and Future Directions

The human brain has deep evolutionary roots extending back in time to the first vertebrate brain, which appeared during the Cambrian some 500 million years ago. One lineage of vertebrates—the mammals—developed a relatively distinct brain that is roughly homologous across mammalian orders. Except for olfactory reduction and visual enhancement, early primate brains were not notably different from other mammalian brains. Primate brain evolution is marked primarily by emphasis on visual acuity, and only slightly by overall enlargement. Selection for visual acuity in primates most likely was associated with the shift to diurnality, changes in foraging, and complex social behavior.

The earliest hominid brains are not especially enlarged, but show signs of lateral and vascular reorganization that are of uncertain behavioral significance. Gross morphology aside, there can be little doubt that the foraging-related shift to bipedality worked significant changes to the early hominid brain. Bipedality forced changes to motor-control regions and had a major impact on the timing of brain growth and development. It was only after these changes had occurred that the hominid brain began to progressively enlarge. Issues of tempo and mode aside, hominid encephalization was most probably related to behavioral alterations involving sociality, technology, and communication. Considered together, these changes encompassed a distinctive hominid culture.

With the appearance of *Homo sapiens* some 200,000 years ago, the human brain had—in terms of overall size and external appearance—attained its modern configuration. There is no reason to think, however, that the human brain has stopped evolving since that time. Indeed, evidence from genetics suggests that there have been several mutations implicating the brain within the past 40,000 years. Some of these mutations involve size and speech, while other more recent ones involve auditory regions. These latter mutations may be especially relevant to the appearance of fully developed linguistic skills.

Progressivism in evolutionary studies and prejudice within anthropology hampered many early studies into brain evolution. An obsessive focus on size and “intelligence” has prevented many researchers from seeing that primate and hominid brain evolution has been an irregular, mosaic affair involving changes in structure, function, connection, cells, chemistry, growth, and development. Only over the last several decades have researchers begun to consider the brain in an evolutionary context relatively free from cultural myopia. This context has provided promising insights into pathologies ranging from schizophrenia to autism.

With regard to the human brain, it can rightfully be said that never has so much been known about so little. Brains, while small and unimpressive in appearance, are incredibly complex organs. The human brain has approximately 100 billion neurons and over 100 trillion synapses. Although the brain's physical, cellular, and chemical composition is relatively well understood, its ability to give rise to mind is not. In almost every respect, brain research is in its infancy. Consequently, future research possibilities into brains and behavior are nearly limitless. Going forward, anthropologists who hope to contribute to our understanding of the human brain and mind will need to be able to cross disciplinary boundaries and work with researchers in genetics, neurology, biochemistry, biology, zoology, paleontology, psychology, ethology, and philosophy. If we hope to unravel the marvelous mystery that is the human brain, the combined insights from these fields and others will be required.

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4

HUMAN ADAPTATIONS

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An adaptation is a feature of an organism that was produced through natural selection to perform a specific function. The *Oxford Dictionary of Biology* defines adaptation as “any change in the structure or functioning of successive generations of a population that make it better suited to its environment” (Hine, 2008, p. 9). Adaptations allow organisms to cope with environmental pressure or stress. Adaptations can be biological (physiological) or behavioral (cultural) and occur in all living organisms; however, this chapter will focus solely on human adaptations.

Human adaptation happens on a variety of levels. In addition to genetic adaptation through the mechanism of natural selection and cultural adaptations (e.g., clothing, shelter, social systems, rules/taboo), humans are capable of three additional forms of physiologic adaptation. Acclimation refers to very short-term changes in response to a stress, such as shivering in the cold or sweating in the heat. Acclimatization occurs over days or months, such as adjusting to breathing thinner air at high altitudes. Developmental acclimatization is a change in body structure over an individual’s lifetime, such as the larger chest size and greater lung capacity of an individual raised at those high altitudes. The ability of humans to respond physiologically or developmentally to environmental stresses is called *plasticity*. Human responses to new environmental conditions often occur in a combination of physiologic and behavioral changes.

Genetic changes would only be seen after the passing of many generations.

Theory

A cohesive theory to explain evolutionary principles evolved in Western Europe, building on knowledge and observations that date back to the 16th century. Many of these ideas were borrowed from Arab, Chinese, and Indian scientists and philosophers. These earlier scholars proposed the concept of evolution, but had no suggestions to explain the theory, process, or mechanisms driving this force.

Charles Darwin, a British naturalist, was the first person to suggest an explanation of the mechanics of the evolutionary process. As he published his theory of natural selection, a Scottish naturalist named Alfred Russel Wallace independently reached the identical conclusion. Since scientific knowledge builds on previous knowledge and theories, it is possible to see the development of ideas that caused these two gentlemen to simultaneously develop the theory of evolution by natural selection.

It was generally accepted throughout the Middle Ages that all forms of life on the planet were static. All species existed exactly as God created them. This belief that a life-form could not change after creation is called the fixity of species, upholding the idea that God created all animals and plants with the features they needed to perform their

tasks. Irish archbishop James Ussher (1581–1656) took this information in the early 17th century and studied the “begat” chapter of Genesis in the Bible. He determined that the earth was created in 4004 BCE. For decades afterward, this date was printed at the beginning of every Bible. The concept of vast geologic time simply did not exist.

As Europeans learned more about the wider world though, doubts about the common mind-set arose. From encounters with Chinese civilization claimed to have occurred before the date given for the creation of the universe to questions about how the inhabitants of the Americas got there after dispersing from Noah’s ark, the literal interpretation of Genesis was being systematically undermined.

It was a scientist named Copernicus (1473–1543) who began the revolution of modern scientific thought. He was a Polish mathematician and astrologer who simplified the Ptolemaic model of the universe by placing the sun at the center of the universe and the earth as an orbiting planet. This radical change to intellectual thought enabled scientists to view the physical universe in new ways. By the early 1700s, the concept of “motion” was widely accepted in the physical universe, but biologists still insisted on the fixity of species. One of the leading naturalists of the time, Carolus Linnaeus (1707–1778), declared that there was a continuum of life from algae to humans but each species was fixed and unchangeable. He developed a well-received classification system called *Systema Naturae* to classify organisms. He isolated common traits and assigned two Latin names to each organism—a generic term (genus) for the group of organisms and a more specific term (species) for the specific plant or animal. The two words together would be the name for that specific life-form.

While Linnaeus’s classification system was widely accepted, he had contemporaries that were vocal in their opposition to his views. Georges Louis Leclerc, Count Buffon (1707–1788), was a leader among his detractors. Buffon stressed the importance of change in the universe. He described the variety and number of minute changes in nature as a system of laws, elements, and forces. He felt the aim of scientists was to discover and explain these forces that drive nature, not simply categorize their result. Both arguments were widely discussed in intellectual circles well into the 19th century.

Erasmus Darwin (1731–1802), grandfather to Charles, was an eccentric scientist, doctor, and poet. He explored a number of evolutionary ideas, but tended to express his ideas in verse, making little impact on general scientific thought. While he believed in the process of evolution, he could not explain how it happened. Another scientist, Jean-Baptiste Pierre Antoine de Monet de Lamarck (1744–1829), was finally able to go one step beyond Buffon and Erasmus Darwin by organizing his ideas into a comprehensive theory of adaptation. Lamarck stressed that organic forms interacted with their environment. Their stability was proportional to their living conditions, and as those conditions changed, life-forms were impacted. In other words, physical

changes were caused by an environmental need. As an organism made a repeated effort to do something, “fluids and forces” would go to that point in the body and develop an organ to eventually fulfill that need. Lamarck also believed that new organs, or appendages, developed this way would be passed on to the next generation. This theory of acquired characteristics, or Lamarckism, is known to be untrue today, but many of his views are as valid today as they were almost 200 years ago.

Lamarck made the concept of evolution popular, but there was vehement opposition to the notion that existing species could develop into new species. Georges Cuvier (1769–1832), a contemporary of Lamarck and a very well-known scientist often called the “Pope of Bones,” was very vocal about his criticism of Lamarck’s views. By this time it was widely accepted, from examinations of the fossil record, that new species of plants and animals had come into existence. Cuvier insisted on the fixity of species, and developed a theory of catastrophism to explain how new species could appear. His theory proposed that a series of natural disasters or catastrophes (like the formation of a mountain chain) would destroy all life in that area, and be reflected in the geological record. Over time, the area would be repopulated by life from surrounding areas unaffected by the disaster. This would explain the appearance of new life-forms in the fossil record of a location without mentioning evolution.

The most influential opponent to Cuvier’s views was Charles Lyell (1797–1875). Lyell was a lawyer with a great interest in geology. He befriended Charles Darwin when he returned to England after his 5-year voyage on the HMS *Beagle*. Lyell’s greatest contribution to science was his three-volume *Principles of Geology*. In this pivotal work, he rejected catastrophism and reaffirmed the principle of uniformitarianism proposed by James Hutton in 1785, namely, that there are no forces working today that were not also active in the past. Lyell showed that the earth’s crust formed through very slow, gradual changes like weathering or erosion by water, wind, and ice. These forces, over the vastness of geologic time, could create the mountains, rivers, deserts, and coasts seen in the present. Lyell believed the earth was hundreds of millions of years old, which gave Charles Darwin a conception of time that made the gradual process of evolution possible.

Another inspiration to both Darwin and Wallace in developing their theories of natural selection was an essay written by Thomas Malthus (1766–1834), an economist. Malthus pointed out that unrestrained human population growth would cause it to double every 25 years, but the capacity for food production would increase far more slowly. Animals in the wild had to struggle for survival, which would restrict the population growth, but humans would have to apply artificial restraints given their limited food resources but infinite breeding capacity. This gave Charles Darwin the missing insight needed to explain selection occurring in nature. He realized that individuals with

favorable characteristics would be more likely to survive, and individuals with unfavorable characteristics would not. Previous scientists looked at a species as a single entity and minor differences within a species as irrelevant. Darwin was the first to realize that the struggle of the individual to survive was the mechanism that made evolution work. This is the process of natural selection by which individuals that share favorable characteristics will increase in number from generation to generation, so greater numbers within the species will share those adaptations better suited to the environment. Over time, successful adaptations will produce enough variation that a new species is formed. Darwin, Wallace, and others finally understood the importance of variation and adaptation and how these drive the process of natural selection, but no one in the 19th century understood how traits are passed to offspring. A contemporary of Darwin, the Augustinian monk named Gregor Mendel, was actually working out the rules of heredity, but his work was not recognized until the early 20th century.

In the early 1900s, the foundations of modern evolutionary theory were in place. Darwin and Wallace had articulated the importance of the process of natural selection in driving evolution, and Mendel's work was rediscovered, establishing the mechanisms for inheritance. One would think that a comprehensive theory of evolution was developed quickly from this knowledge, but for the next three decades rival groups would vehemently argue different viewpoints. Some biologists took the Darwinian view stressing the importance of natural selection in the production of variation, while others stressed random mutations as the source of variation. A combination of these views, called the modern synthesis, was finally developed in the mid-1930s. Biologists working with mathematical models came to realize that both mutation and selection were needed to explain evolutionary change. Mutation alone does not produce evolutionary change, but mutations are the source of variation, which produces different characteristics that natural selection chooses for or against.

A central component of modern synthesis is the relationship between populations and species. A species is a group of populations whose members can interbreed and produce fertile offspring. A species has a geographic range it inhabits, with populations of individuals clustering into smaller areas within it. A population in a remote area with little outside contact may eventually select characteristics specific to surviving in that region which result in measurable physiologic differences from the rest of the species. The accumulation of many small genetic changes over generations results in the differences seen in populations today. From a modern genetic perspective, evolution is defined simply as a change in allele frequency from one generation to the next.

Methods

Anthropologists today know that human variation is the result of a number of evolutionary factors, including

mutation, genetic drift, gene flow, and natural selection. Mutations are random, spontaneous changes in a gene that can be caused by any number of environmental factors. They are the ultimate source of all genetic variation. Genetic drift is also a random factor related to population size. In a small population, some individuals may contribute a disproportionate share of genes to succeeding generations. Gene flow is the exchange of genes between populations. It occurs when people migrate to a new area (either temporarily or permanently) and interbreed with another population. Finally, there's natural selection, the principle mechanism of evolutionary change. It is the process by which individuals with advantageous characteristics for reproduction in a specific environment leave more offspring in the next generation with the same trait, increasing the proportion of their genes in the gene pool over time.

Cultural adaptations have also played a significant role in human evolution. Cultural adaptation refers to nonbiological responses of individuals or groups to alleviate environmental stress. It is an important mechanism that allowed humans to survive and colonize relatively inhospitable areas until physiological adaptations could occur. All the evidence to date suggests that hominids evolved in the hot savannas of East Africa. Humans today cope better with heat than they do cold, illustrating the long-term adaptations to heat that developed in our ancestors. As humans migrated to colder environments, they invented fire, clothing, and shelter to survive.

Throughout the course of human evolution, people have settled in almost every climatic zone of the world. Using a variety of adaptations, they have adjusted remarkably well to living in extremely hot or cold temperatures, exposure to solar radiation, very dry or humid air, thin atmosphere, and broad seasonal fluctuations in climate. For populations to cope with the challenge of new habitats, they must undergo changes through a combination of natural selection and physiological plasticity. The interaction between both processes is so intertwined it is difficult to isolate either.

General build and skin color are the most obvious adaptations. Ancient Greeks took this knowledge one step further by associating physical characteristics with the environment in which people lived. People from the interior of Africa had the darkest skin and it was assumed that the tropical sun was the cause. Similar associations were made in other animals. The average size and shape of indigenous individuals had a relationship to the temperature, while nose size and shape correlated to humidity. A zoologist by the name of Constantin Wilhelm Lambert Gloger first commented on this phenomenon in 1833. Gloger's rule states that within a species of endotherm (warm-blooded mammal), skin pigment tends to be darker in warmer climates at lower latitudes or lower altitudes, and lighter in color in colder climates at higher altitudes or higher latitudes.

Adding to Gloger's rule, a 19th-century zoologist named Carl Bergmann studied the relationship between body size and temperature in a variety of mammal species,

explaining his findings in terms of heat loss. Bergmann's rule (developed in 1847) states that if two mammals have similar shapes but different sizes, the smaller one will lose heat more rapidly. This makes the smaller animal better adapted to living in warm climates. Larger animals lose heat more slowly and would be better adapted to colder climates. The reason for this relationship is that heat production is a function of the total volume of an animal while heat loss is a function of total surface area. A final aspect of Bergmann's rule factors the shape of a mammal into the relationship between heat production and loss. He states that two differently shaped animals with the same volume will produce the same amount of heat, but a linear shape would have a greater surface area and dissipate heat more rapidly. Therefore, mammals living in hot climates will have linear body shapes and those in cold climates will have stockier body shapes. Another zoologist, Joel A. Allen, applied these principles to body limbs and other appendages. Allen's rule (developed in 1877) predicts that mammals in hot climates will have longer and leaner limbs and those in cold climates will have shorter, bulkier limbs.

The Bergmann and Allen rules apply to adult humans, but evidence to date suggests that a combination of genetic and environmental factors influence the relationship between climate, growth, body size, and body shape. When children grow up in a climate that differs from that of their ancestors, they tend to grow as indigenous children do.

Measuring the size and shape of the human head has long been a focus of racial classification. In the 19th century, a Swedish anatomist named Anders Retzius developed a measure of cranial shape called the cephalic index. This index is derived from two measurements: the total length of the head and its maximum width. The width of the head is divided by the length, and the result is multiplied by 100. The cephalic index among human populations ranges from 70 to 90. These values only apply to the average for a population. There is a certain amount of variation within a population, and the numbers for different populations do sometimes overlap.

As this data was compiled and compared geographically, a pattern emerged. Populations in colder climates tend to have wider skulls relative to length than those in hot climates. This correlation fits with the Bergmann and Allen rules. Rounded heads, those with a high cephalic index, would lose heat more slowly and be advantageous in cold climates. Narrow heads lose heat faster and would have the advantage in hot climates.

Another variation with a strong relationship to climate is the nasal index. This index is determined by dividing the width of the nasal opening by the height of the nasal opening, and multiplying by 100. Typical values for humans range from 64 to 104. In the past, stereotypical racial views associated wide noses (large nasal indices) with African populations, but in actuality, there are some African peoples with wide noses and others with long, narrow noses. Instead, the nasal index has a direct relationship to the temperature and humidity of an area. Populations in

cold climates tend to have narrow noses, because high, narrow noses can warm more air before it reaches the lungs, which is advantageous in the cold. High, narrow noses also have greater internal surface area to moisten air in dry climates, either hot or cold. Wider noses are found in areas of high humidity.

Applications

The study of human variation and adaptation is useful in a variety of careers. The broad field of biological anthropology, also called physical anthropology, studies the mechanisms of biological evolution, genetic inheritance, human adaptation and variation, and primatology. The objects of study range from fossils and bones to living populations. In addition to researching and teaching in the anthropology department of a college or university, there are many situations that require the study of human adaptation.

A key opportunity to study human adaptations appears in biomedical research. Biomedical scientists focus on issues related to public health, including growth and development, nutrition, aging, disease, genetics, epidemiology, physiology, and forensics. Anthropology's theoretical bases of evolution, human adaptation, human variation, and their relationship to cultural influences are very relevant to biomedical practices. A growing number of biological anthropologists are therefore transferring their skills and interests to research careers in schools of medicine and in private biomedical research facilities.

Museums also have anthropologists on staff. Specialists in various subfields are needed to manage collections and prepare exhibits in addition to conducting research. Skills in educating visitors about the relationship between biology and culture and explaining the importance of the collection to the public are an important part of a museum's mission. Anthropologists also write grants to secure funding for museums to support additional research.

Another critical application of the study of human variation and adaptation occurs in the military. Knowing how troops will react to extended exposure from a variety of environmental stressors is necessary for the training and preparation of soldiers. Working in full body armor and gear requires specific adaptations, whether in extreme heat, cold, or high altitude. Psychological stress over long periods of time will also result in physiological changes to the body. This stress can come from a variety of sources, such as exposure to combat or the isolation of working in very remote places like submarines or arctic research stations.

There has been a great deal of research in the last several decades about human adaptation to conditions in space. Physical and psychological adaptations are necessary to endure long periods of time in a weightless environment. The majority of the data to date comes from missions of relatively short duration, making it difficult for scientists to extrapolate the effects of long-term exposure.

In addition, virtually all studies have been on physically fit, male cosmonauts. The effects of space on average individuals, children, and the elderly are completely unknown. Hence, there is a great deal of work to be done in this field as humans contemplate future space colonization, and researching the ability of humans to adapt to these extreme living conditions will play a vital role.

Comparison (Global)

Environmental conditions vary greatly around the world. Over thousands of years, human beings have adapted to living with extreme heat, extreme cold, high altitude, dietary limitations, and more. While human populations have a variety of cultural or behavioral methods to combat exposure to environmental stressors for rapid acclimation, the actual physical changes in over hundreds of generations can be seen in those native to a region. While demonstrating direct effects of natural selection is difficult, humans do show physiological differences in response to their environment. The question is whether these changes were due to adaptation through natural selection, or would any population of humans have the same physiological ability (plasticity) to adjust to that environment, given enough time?

Ultraviolet Radiation

Skin color is the best understood relationship between physical characteristics and climate. As the ancient Greeks hypothesized, there is a correlation between skin color and solar radiation. A pigment called melanin in the dermal layer of the skin is responsible for its color. Levels of melanin in a population are a genetic characteristic, but exposure to ultraviolet light will increase the amount of melanin in the skin of all populations at the same rate, regardless of the initial pigment level.

Ultraviolet light is strongest at the equator due to the way sunlight reaches the earth and weakens toward the poles. It is also stronger in the Southern Hemisphere than in the Northern Hemisphere. The distribution of human skin color around the world illustrates past evolutionary adaptations. It is believed that as hominids evolved in Africa, they developed more sweat glands and less hair to adapt to the hot climate. Darker skin would have been beneficial as protection from the damaging effects of ultraviolet radiation. As some human groups migrated out of Africa, lighter skin was selected for areas away from the equator.

Dark skin in areas of high solar intensity provides a number of benefits. Melanin blocks ultraviolet radiation, so the darker an individual's skin, the more protection against skin cancer. Some scientists reject this benefit as a selection factor however, because skin cancer generally affects individuals past reproductive age. If someone dies after the reproductive years have passed, it would not impact the process of natural selection.

Protection against sunburn has also been suggested as a beneficial adaptation. During the thousands of years of human civilization prior to the development of antibiotics, severe sunburn could lead to skin damage and exposure to dangerous infection. However, this benefit would have a minimal impact on an entire population.

The most likely advantage to darker skin in equatorial regions involves the damage ultraviolet radiation can cause on the levels of folate in the body. Ultraviolet light destroys folate, and deficiency of this mineral in an individual can lead to both birth defects and decreased reproductive capacity. As humans migrated farther from the equator, the dangers of ultraviolet exposure were reduced. This does not explain why light-colored skin evolved though, only that it *could* evolve.

The most widely accepted model for the adaptation of lightly pigmented skin focuses on the ability of the human body to synthesize vitamin D. Vitamin D deficiency can cause poor bone development and bone diseases like rickets. These disorders can affect fertility and mortality. Modern humans receive enough vitamin D through vitamins or food additives (like fortified milk), but in the past, people obtained the vast majority of their vitamin D from sunlight. As human populations migrated away from the equator, their darker skin blocked too much ultraviolet radiation. Lighter skin would then be a beneficial adaptation, resulting in healthier individuals.

Hot Climate

Because humans evolved in tropic or subtropic zones, they are genetically well adapted to hot, dry climates. They are one of very few mammals that can remain moderately active during the hottest part of the day. This is due to having the most efficient process of heat reduction in mammals—the ability to sweat.

Thermal sweat is produced by eccrine glands, which release a watery solution with virtually no fat or protein content, and very little salt. Most other mammals capable of sweating depend on apocrine glands, which produce a solution full of fats, proteins, and salt. These substances evaporate very slowly, reducing the rate of heat loss. Humans only have these glands on the face and hands. The Inuit, natives of arctic regions, demonstrate a unique adaptation here. The Inuit sweat less on their trunks and extremities, but more on their faces. This is an advantageous feature in the arctic, where moisture accumulating on clothing would be a hazard.

Human skin is covered by more than 1.5 million sweat glands, which can produce copious amounts of sweat over the entire body. Combined with the relative lack of body hair, sweating provides a very efficient cooling system for humans.

Humans also have a number of behavioral adaptations to living in hot climates. Clothing is important to protect individuals from solar radiation and the hot, dry winds of the

desert. Typical desert clothing is lightweight and loose. This allows air to circulate near the skin and rapidly evaporates sweat. The layer of air between the body and clothing also adds a layer of insulation. Desert shelter is usually compact to minimize surfaces exposed to the sun. Light colors on the outside reflect heat. Doors and windows are minimal and kept closed during the day to keep the interior cool.

Heat stress in humid, tropical environments requires a modified set of behaviors. Humidity retards the evaporation of sweat, so clothing tends to be minimal to increase the likelihood of evaporation. Shelter is open, often lacking walls entirely, to maximize the circulation of air. Lastly, behavior is modified. People will be most active very early and very late in the day, taking a long break during the most intense midday heat.

Cold Climate

Modern humans have a very low tolerance for cold, lacking the insulation of fur and hair. Exposure of the skin to temperatures as warm as 75° F causes constriction in the blood vessels of the skin. Temperatures in the 60s increase heat production in the body, resulting in shivering. Subcutaneous fat gives a little protection. It has low heat conductivity and helps retain core body heat, protecting internal organs.

If an adult submerges a finger into freezing water, blood immediately stops flowing to the area. Continued exposure would cause the body to force blood to the area in a cyclical fashion. Expansion and constriction of the blood vessels may be adaptive because this would keep heat loss to a minimum. Once temperatures drop below the freezing point though, the appendage would freeze without the heat caused by circulation. Therefore, the most adaptive response would depend on the length and severity of exposure to the cold.

There are measurable differences among populations exposed to this type of cooling. Men of black African descent have a much lower average of finger temperature in ice water. European men have a better physiological response, and men from the arctic and high altitude populations have the most effective response. The different levels of tolerance are due to vasodilation—the body constricts and relaxes blood vessels automatically, cycling the blood flow to the affected appendage.

Cultural adaptations to cold stress involve clothing and shelter. The Inuit, again, have adapted effectively to life in a polar environment. It is not enough to wear a great deal of heavy clothing to stay warm. Working hard in those conditions would cause an individual to overheat, and wet clothing in the arctic is hazardous. The Inuit instead wear layers of clothing that capture pockets of insulating air between them, much as the desert dwellers do. Their clothing is also designed with flaps and openings that can be adjusted as needed to prevent sweat buildup.

Inuit shelters are also highly specialized. Homes are designed with an underground entry that is curved to block

incoming wind. The main living area inside is constructed on a higher level than the fireplace to maximize access to the heat and minimize drafts. When the Inuit are out hunting or fishing for long periods of time, they build igloos. These temporary shelters have thick walls of snow and ice, which provide efficient insulation. The reflective surface of the walls also helps to retain heat.

The Quechua Indians living in the cold, dry highlands of Peru do not have such effective temporary shelters. The temperature inside their temporary structures is often much the same as outside. Their most effective protection against heat loss is in their heavy, warm bedding—woven from the fur of the llamas and alpacas they herd.

High Altitude

There are a number of stresses associated with living at high altitudes. Low oxygen levels, cold, strong ultraviolet radiation, and sometimes, poor nutrition combine to create an inhospitable environment.

Oxygen deprivation, or hypoxia, is common at high altitudes. While the amount of oxygen in the air remains fairly constant more than 60 miles above the earth's surface, barometric pressure decreases rapidly with an increase in altitude. The air is less compressed at high altitudes, making oxygen less concentrated. With this, there is less oxygen available to the hemoglobin in the blood. Hypoxia can then result in increased respiration, hyperventilation, and loss of appetite or weight loss. Memory, sensory abilities, and hormone levels may also be affected.

The thinner air results in higher concentrations of ultraviolet radiation, loss of rapid surface heat, and low humidity. Hypoxia is not only a danger to human life; it reduces plant and animal life as well. Trees cannot grow at altitudes over 13,000 feet, and the limited availability of plants and animals can be a source of nutritional stress.

Scientists have studied high- and low-altitude populations of Peruvian Indians and found two main differences. Chest dimensions and lung capacity are greater in all ages of the high-altitude group, and they have a shorter average height. Studies in other high-altitude areas around the world show similar chest and lung growth patterns, but not all groups reflect relatively short stature. Nutrition in the developmental years has a great influence on adult stature, and a limited diet appears to play an important role in the growth and development of Peruvian populations.

Water

There are no human populations living under water, but there are groups that, for thousands of years, have lived by the sea. Tribal groups found in Southeast Asia are referred to as "sea gypsies," known for their exceptional diving and swimming ability. One such tribe, the Moken, live along the coasts of Burma and Thailand. Moken children are expert divers, gathering shells, clams, and sea cucumbers

from the sea floor. While most humans have poor vision under water (due to human eyes losing the ability to focus, making everything blurry and small objects very difficult to see), the Moken children can see twice as well as European children under water. A study done by Anna Gislén and her colleagues (2003) found that the pupils normally dilate under water because it is darker, but the pupils of the Moken children constrict for improved focus. It is not clear if this is a genetic adaptation in this population, or if it is an example of human acclimatization. Given their traditional lifestyle, the ability to accommodate under water may have been selected for strongly.

Nutrition

There are vast differences in the types and availability of food resources around the world. During human infancy, childhood, and adolescence, much of the energy provided by nutrients is devoted to growth. Too few calories can result in a reduction in size and a delay in maturity. Too many calories, on the other hand, can result in fat accumulation and acceleration in physical maturity. Neither result is ideal. Inadequate nutrients can impact basic biological processes and lead to disease susceptibility.

Food acquisition changed little through most of the course of human evolution. Humans were hunters and gatherers starting at least 2 million years ago, until the development of agriculture about 12,000 years ago. In general, hunting provided the smaller portion of the calories in a diet and the greater portion came from tubers, fruits, and seeds, but in any case, local environment shaped diet. Groups living near water would exploit fish and seafood while those in arid regions relied on other sources for nutrients. An exception is the Inuit, as having so little vegetation available for consumption resulted in the bulk of their diet coming from meat and fish.

The development of agriculture had a profound impact on human development. The domestication of crops provided an increased concentration of food, which expanded permanent settlements and increased population growth more rapidly. These factors, in turn, increased the spread of disease. Climate, resources, and level of technology all influenced food quality and quantity.

One of the best-known genetic adaptations to diet is illustrated in the adult human ability to digest lactose, the sugar that is found in cow's milk. The body creates an enzyme called lactase to break down this sugar for digestion. While infants and young children in all human populations can digest milk, the gene encoding to produce lactase shuts off during childhood in some populations. If too much milk is ingested after this happens, it ferments in the large intestine, causing severe gastrointestinal distress. In many African and Asian populations today, most adults are lactose intolerant, but in European and Middle Eastern populations, adults tend toward lactose tolerance.

What would cause this variation? In hunter-gatherer societies throughout the Paleolithic, milk was generally not available after children were weaned. Perhaps the body continuing to produce an unneeded enzyme affected the digestion of the new foods in the growing child's diet, making it a selective advantage to have the production of lactase turn off after it was no longer needed. Many European populations are lactose tolerant, and are at least partially descended from peoples in the Middle East who also exhibit lactose tolerance. The Middle Eastern groups tended to be pastoral or agricultural, raising cows, goats, and other milk-producing animals. They undoubtedly consumed milk and milk products throughout their lives. Selection pressures in this environment would favor lactose tolerance.

The rise of agricultural societies created an increase in food production, but resulted in more restricted diets. Agriculturalists tend to rely on one or very few staple crops, resulting in less dietary variety which can lead to undernutrition, starvation, or malnutrition. Undernutrition and starvation result from a lack of calorie intake to thrive, but malnutrition results when diets lack a critical vitamin, mineral, or protein. In underdeveloped countries, protein malnutrition is the most common form, resulting in a disease called kwashiorkor, which causes swelling, anemia, hair loss, and general apathy. A related syndrome called marasmus is caused by a combination of protein and calorie deficiency.

Malnutrition and starvation have a profound effect on reproduction. Malnourished mothers suffer from high rates of premature delivery, prenatal mortality, and delivering children with birth defects and low birth weight. Infants that do survive face retarded growth and development, along with decreased resistance to infectious and gastrointestinal diseases.

In modern times, industrial societies are coping with the result of too much food being readily available. Combined with an increasingly sedentary lifestyle, food overabundance is a source of environmental stress. If more calories are ingested than needed to maintain an active and healthy body, the excess is deposited as fat. Obesity is a growing problem in Westernized societies, making people susceptible to heart disease, high blood pressure, and diabetes.

Disease

Throughout the course of human evolution, disease has exerted a great deal of pressure on human populations, with a variety of causes and effects. Disease can be hereditary (e.g., sickle-cell anemia), metabolic (e.g., vitamin deficiency), degenerative (e.g., heart disease), from malignant cells (e.g., cancer), or infectious (e.g., malaria). Cultural factors are as critical as physiologic causes in the spread of disease.

Before urbanization, disease impact was limited. Small groups of people were constantly moving around a region with little contact between groups to spread disease. Large

settlements with high population densities greatly accelerated the spread of airborne infections such as influenza, smallpox, and measles. The domestication of animals also introduced greater risks. The type of animal raised, sanitary conditions, and the proximity of animals to humans influenced exposure. Cultural behavior also contributes to the spread of disease: Practices such as ritual cannibalism, sharing ceremonial pools, having multiple spouses, and other activities can add to the risks.

Changing the environment also influences the development of disease. Clearing forested land in tropical regions for farming leads to open pools of standing water. These still pools of open water in a warm climate stimulate mosquito breeding, creating the ideal conditions to spread malaria. Crowded, unsanitary urban conditions repeatedly expose large numbers of humans to a host of easily spread infectious diseases. Changing patterns of land use, population density, birth rates, and access to medical care all impact the environment and other species that cohabitate with us. Large numbers of animal species are endangered or extinct as a direct result of human modification of the environment.

While many species suffer from human urbanization, other species—namely viruses, bacteria, and other pathogens—may thrive. In the past, infectious disease would decimate human populations. The bubonic plague swept through Europe in the Middle Ages and wiped out a large percentage of the population. Today, cultural adaptations in the form of modern medicine protect us from past diseases, but sometimes give rise to new pathogens. The overuse of antibiotics and antibacterial health and hygiene products has caused natural selection to occur in bacteria species. Bacteria resistant to these products tends to reproduce, creating very resistant “superbugs” that are very difficult to eradicate.

Future Directions

Human beings are still evolving. Evolution is a process, not a task with a final endpoint or finished result. Evolution is increasingly complex due to our biocultural nature, with human adaptability primarily based on our culture. We can change our behavior to adapt to a new situation faster than we can respond physiologically. We can also direct our cultural evolution while we cannot control the path of natural selection.

When one considers the vastness of geologic time, our population explosion is extremely recent. The implications are complex and little understood. The extent of our agricultural technology assures we have not yet reached the limits of food production. Medical technologies have (on average) reduced infant mortality rates and increased life expectancies, though social and political factors greatly influence both.

What are the potential effects of dramatic population increases? A likely result is increased genetic diversity. As

more individuals are born, the rate of new genetic combinations increases. As the individuals mature and reproduce, the gene pool of the species increases in diversity. Increasing diversity increases adaptive ability, which would be beneficial to the species.

However, there are also a number of troublesome consequences. Humans can no longer rely on gathering enough naturally growing plants for food. We are increasingly reliant on highly industrialized agriculture. High-yield crops and farmed livestock, both bred for specific characteristics, are the norm. These engineered crops are often treated with pesticides, hormones, fertilizers, and more. There is also increasing reliance on manufactured goods. The long-term impact of industrialization can only be speculated on though, since evolutionarily, the Industrial Revolution is still in its infancy.

Conclusion

In this chapter, we have defined various types of biological and cultural adaptations to the environment. In the past, human populations were viewed in terms of race. This chapter reviewed the development of evolutionary theory, ending with the modern synthesis of genetics and evolution.

Culture plays a critical role in the human ability to adapt. We have considered physiological and behavioral adaptations to various environmental conditions, including exposure to ultraviolet radiation, heat, cold, high altitude, nutritional availability, and the influence of disease.

Clearly, population growth is one of the leading influences on current human adaptation. One result is increasing population density in inhabited regions. Urban centers have millions of people in close daily contact. Evolutionarily, these situations are brand-new, so it is difficult to predict how we will adapt. Scientists have noted correlations between the level of development of a region and instances of heart disease, hypertension, cancer, and neurological disorders. As generations reproduce, will humans select for characteristics to resist these diseases? Humans will also have to adapt to new environmental stresses they have created themselves. In addition to crowding, noise pollution, and exposure to artificial radiation, the greater consumption of resources leads to waste, pollution, and environmental degradation. Fossil fuels used for energy are affecting the environment. Deforestation also contributes to global warming. Even if the planet were undergoing a normal warming cycle, human activity appears to be tipping the balance toward a catastrophic, global climate change.

It takes a long time for humans to undergo genetic adaptation, and the characteristics that are selected for cannot be controlled. It stands to reason that all humans in our modern global society have to agree to work together to protect and adapt to the always-changing world we inhabit.

We must integrate evolutionary, biological, and anthropological knowledge in order to understand ourselves and our place in nature. By using collaborative investigative methods and critical thinking, we surely have the capacity to change the world for the better.

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5

HUMAN GROWTH AND DEVELOPMENT

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Physical anthropology, developed in the 19th century before Darwin's theories of natural selection and Mendel's work on genetics, is one of the oldest subfields of anthropology. Physical, or biological, anthropology was originally defined as "the natural history of the genus *homo*" by its principle founder, Paul Broca (1871). In 1918, Aleš Hrdlička defined physical anthropology as the study of man's variation, including racial anatomy, physiology, and pathology (p. 4). Today, biological anthropology includes the study of the mechanisms of biological evolution, genetic inheritance, human adaptation and variation, human growth and development, primate behavior and morphology, and our hominin ancestry.

Many anthropologists specializing in human growth and development are found in departments of medicine, health sciences, and anatomy (Stein & Rowe, 2005, p. 2). However, it is not just biological anthropologists who study growth and development. The development of medical anthropology as a subfield has, among many other contributions, brought attention to the relationships among growth, development, and culture. There are also countless specialties in the health care professions that concentrate on human growth and development studies.

Human growth and development is an extensive field of study. A thorough investigation of the field would include a study of measurement, mathematical models, assessment strategies, birth weight standards, fetal growth, breast-feeding, weight and height ratios, childhood maturation,

disease, and treatments, to name just a few components. Here, anthropometry as a means of quantifying human growth will be discussed, along with measurement, rates of growth, and fetal and childhood development. The history of anthropometry will also be discussed at length because it is integral to human growth and development studies. In addition, the use of statistical models, anthropometric instruments of body measurements, and standards of measurements are all important developments in the field. With this, the current and new directions of the discipline will be introduced.

Last, the chapter will cover how malnutrition is a major barrier to proper growth and development and how anthropologists use anthropometry to assess malnutrition. The four major classifications of malnutrition will be addressed, along with malnutrition's effect on growth and development, how culture can contribute to malnutrition, and examples from around the world of chronically malnourished populations. In its many forms, malnutrition remains a global health challenge around the world and an obstacle to proper growth and development (World Health Organization [WHO], 2004).

Anthropometry

Anthropometry, defined as the measurement of the body and its proportions, is one of the oldest branches of

biological anthropology. Frenchman Alphonse Bertillon first defined anthropometry in 1883 as an early system of classifying individuals. The beginnings of forensic anthropology are rooted in anthropometry because it was understood that certain measurements of the body and the skeleton could distinguish individuals.

Anthropometry as a scientific endeavor entered mainstream anthropology in the 19th century as a reliable, quantitative way to study the human body. While anthropometry has a wide variety of uses, here we are concerned with this methodology in determining health and patterns of growth and development. Anthropometric data consist of important metrics of growth and development such as stores of fat, muscle, and even calcium in the form of bone mineral. Anthropometry is a dynamic field as changes in lifestyles, nutrition, and ethnic composition of populations can lead to changes in body dimensions around the world. A major challenge for anthropologists, then, is the troubling issue of setting standards suitable for people across the globe with very diverse diets and cultural practices. To assist, a *standard* defines a recommended pattern of growth that is associated with specific health outcomes (Butte, Garza, & de Onis, 2007, p. 154). Anthropologists are continuously updating the standards and searching for new measurement techniques.

Anthropometry is important for measuring growth and health status because it is generally noninvasive. The standardized methods and relatively inexpensive medical instruments of anthropometry are also used around the world. Since anthropometry measures the body's surfaces rather than the precise growth and development of cells or organs (Johnston, 1998, p. 27), it is only one of many tools that can be used in diagnoses. This is an important distinction to make, because while abnormal nutritional status begins with cellular changes, chronic malnutrition is later manifested in altered body measurements (Devlin & Horton, 1988; Waterlow, 1986).

History of Anthropometry and Growth Studies

Human growth and development have been studied for centuries, possibly as early as 2000 BCE with ancient Sumerian references to the stages of human gestation (Boyd, 1980, pp. 2–4). By the end of the 18th century, the field of medicine had well-established vital statistics of birth and death, as well as standards of body measurements, especially those of fetuses and neonates. In 1806, Sir Charles Bell, a Scottish anatomist and surgeon, published *Anatomy and Philosophy of Expression*, which detailed the changes in proportions of the human face and head from birth through adulthood. This was remarkable work for the time because it disregarded classical ideas of facial proportions and focused on the underlying structures of the face and head (as cited in Boyd, p. 313).

Georges-Louis Leclerc de Buffon's *Natural History: General and Particular*, translated and updated in 1812 by William Smellie, contained the first comprehensive study of human growth rates from birth to maturity and served as an integral treatise on rates of growth in the 19th and early 20th centuries. This book underwent hundreds of editions and is considered by many to mark the beginning of modern anthropometry (Hrdlička, 1918).

In 1833, Lambert Adolphe Quetelet, a statistician and astronomer, published an article accompanied by drawings that acknowledged the differences between modern rates of growth and those body proportions idealized by ancient Greek and Roman sculptors. Quetelet also took into account that people's rates of growth may vary around the world and that people with certain diseases, such as dwarfism, may grow at different rates. Quetelet's 1835 landmark work, titled *Sur l'homme et le développement de ses facultés, ou essai de physique sociale*, marked the origins of the systematic and quantitative study of rates of human growth and development. His theory of anthropometry was based on the notion that the distributions of anthropometric data follow the laws of chance (Boas, 1982, p. 77). Quetelet also developed a simple but revolutionary measure that classified people's weight compared with an ideal weight-to-height ratio. The Quetelet index, more commonly called *body mass index* (BMI), is the most widely used measure of malnutrition and obesity worldwide (Eknoyan, 2008, pp. 47–51).

Sir Francis Galton was another important figure in the development of anthropometry. Like Quetelet, he began as a statistician and branched out into measuring human growth and development. Galton started an anthropometry laboratory in which he published research from 1874 until the turn of the century. His innovative research during this period included the use of "fingerprints" in criminology studies, a technique already in use in Bengal, India.

Fetal and Childhood Growth

The study of fetal and childhood growth is almost as old as the study of growth and development itself. An early article titled "Foetus" published in the *Dictionnaire des Science* (1816) by Murat reported the length of fetuses during their 9-month gestation. Quetelet used Murat's values and in 1835 constructed an equation for the total period of fetal and childhood growth (Boyd, 1980, p. 303). However, the study of child growth rates was still considered underdeveloped at the turn of the 20th century. Hrdlička stated in 1918 that the study of fetal and childhood growth was far from complete despite the progress of neonate studies in America. He recognized that studying child growth and development had an impact on the health of individuals later in life and that anthropometry was especially helpful in detecting and treating individuals with abnormal growth or pathological development (Hrdlička, 1918, pp. 20–21).

In 1876, Galton had discovered what appeared to be a correlation between weight and height for 14-year-old boys: As their height increased by an inch, their weight increased by 4 pounds (Galton, 1876, pp. 174–180). Growth status and rates of growth in children are related to later growth, composition, and proportions of the body in those individuals. These growth measures can be associated with current and future risk factors for serious diseases, such as the various forms of malnutrition.

Population Growth

Investigators of human growth and development did not recognize the degree of population differences for quite some time. Louis René Villermé was the first statistician of public health in the early 19th century to note that the height of a population correlated positively with the productivity of the soil. He found that stature was greater and rates of growth were faster in wealthier countries. Villermé may have been one of the first scientists to recognize a correlation between malnutrition and growth stunting of different populations.

Emmanuel Le Roy Ladurie also crossed an important threshold as one of the first historians to systematically investigate the geographic variation and the socioeconomic correlates of human height in 19th-century France. In a series of publications beginning in 1969, he showed that the physical stature of French soldiers born in the late 1840s correlated positively with their education and wealth. Those who were able to read and write were 1.2 cm taller than their illiterate counterparts. It was presumed that literate men came from wealthier families and spent more time and money on education and less at manual labor than did illiterate people (Komlos, Hau, & Bourginat, 2003, p. 1).

During the late 19th and early 20th centuries, anthropologists were preoccupied with measurements of skulls, cranial capacities, and facial angles of both the dead and the living, which were often used to reach racist conclusions. In fact, much of the history of anthropometry is published in books and articles about race and evolution. William Stanton's 1960 work highlights the history of anthropometry in America in the context of race, evolution, and religious debates.

In 1842, Anders Adolf Retzius introduced an equation of head-width to head-length ratios to distinguish the dolichocephalic (long-headed) from the brachycephalic (short-headed), which remained the main cephalic index used through the 20th century. Many Native American skeletal remains were unearthed and beheaded for such measurements, often used to conclude their smaller cranial capacities or differing cranial dimensions indicated aboriginal inferiority (Wade, 2000).

Instruments to measure cranial angles and capacities were in heavy use in the late 19th century by biological anthropologists. These instruments included sliding calipers, craniographs, stereographs, goniometers, a number of

instruments for studying the interior of the skull, and osteometric boards. Many of these were developed and/or modified by physician Paul Broca (as cited in Hoyme, 1953, pp. 418–419), the most prolific scientist of cranial measurements in the 1860s and 1870s.

The emphasis on cranial measurements declined in popularity in the late 1800s, and many anthropologists shifted to studying the total physical type of man. They attempted to describe and compare tribes and races as biological units, and define the normal physical status of man, “preferably the white race” (Hrdlička, 1918, p. 9). Additionally, Hrdlička stated that the paramount scientific aim of biological anthropology was the complete study of the “normal white man living under ordinary conditions” (p. 9). Contemporary anthropologists believed that “the yellow-brown or black man would serve equally well, if not better, were we of his blood and were he as readily available” for anthropometric study (Hrdlička, p. 18). At this time, “abnormal” ethnic and racial composition and admixture of populations was considered a messy situation that could not be properly studied. Some studies in the early 20th century, however, were without implications of racial inferiority. These studies provided the research essential for anthropometry to become a legitimate field of study that contributed to the larger study of human growth and development of populations (Hoyme, 1953, pp. 422–423).

Despite this change in status of biological anthropology and anthropometry, Hrdlička wrote that not many institutions were devoted to instruction of anthropometry and complained that the more “attractive” subfields of anthropology—namely archaeology and ethnology—were diverting average anthropology students away from anthropometric studies. He stated that progress of anthropometric studies at the turn of the century was stalled due to a lack of trained professionals and interested students, and that “a new competent physical anthropologist is almost an accident” (Hrdlička, 1918, p. 11).

Franz Boas, credited as a pioneer of the four-fields approach to American anthropology, was also well versed in German mathematics and applied his research to human growth rates from 1883 to 1912. He is most well-known for his research with Eskimo and Inuit populations, but he also collected anthropometric data on the Cheyenne, Cherokee, Oglalla, Omaha, Chippewa, and Winnebago tribes as well as European migrants, among others (American Philosophical Society, 2006).

Although anthropometric data between populations were gathered in the 19th century, it has been only recently that these data were systematically collected around the world. Documenting and analyzing the growth patterns of people around the world can tell us much about adaptability and the complex human-environment interactions. The greatest differences found in human growth and development are largely attributed to environmental factors, as they are between industrial and nonindustrial nations, and between wealthy and poor

groups within nations. For example, developing countries tend to exhibit low birth weight.

Current and Future Trends in Anthropometry

Today, many anthropologists specialize in biological or anthropometric studies. Current trends in anthropometry seek to understand the genetic component of human growth and development that may account for interpopulation growth differences. Anthropometric instruments and measurements have been standardized for international reference. These measurements are referred to as either *standards* or *references* in the literature. A reference describes the growth pattern of a defined population that is not necessarily associated with good health (Butte et al., 2007, p. 154). A growth reference is a table or chart that is meant to account for differences of age and sex in anthropometry (Cole, 1998, p. 80). A challenge to using a growth reference is the variability in rates of growth that occur in school-age and pubescent children. The “peaks” of weight and height are obtained over a wide range of ages, and thus a reference tends to flatten out the median curve, especially during puberty. Also, modern anthropologists are concerned with the validity of international standards because, even after socioeconomic factors are controlled for, there remain differences in rates of growth between populations of the world (Ulijaszek, 1998).

To combat some of the challenges of using international standards for all children around the world regardless of their current health status, growth charts have been made for children suffering from specific diseases. Growth charts currently exist for such diseases as achondroplasia, Marfan syndrome, sickle cell disease, and Turner syndrome that allow the growth of affected children to be judged in relation to others with the same disease (Roche & Sun, 2003, pp. 66–67). Identifying unusual growth patterns in children given their primary diagnosis can help to identify comorbidity, children with more than one disease or illness.

Height and weight are highly heritable traits, and limited data are available for interpopulation effects of genes on growth during childhood and adolescence. In an attempt to eliminate genetic or cultural bias, the WHO Multicentre Growth Reference Study of 2006 collected primary growth data from 8,440 children from Brazil, Ghana, India, Norway, Oman, and the United States. The resulting growth curves constituted new international standards for growth and development for children from birth to 5 years old (WHO Multicentre Growth Reference Study Group, 2006). Growth rates vary more for children over age 5 between populations. The current WHO growth reference for older children and adolescents is based on 1977 data and growth charts that are in need of updating. Cole (1998) states that growth references need to be updated every 10 to 15 years to capture secular trends in height and weight (p. 82). In order to produce international growth

and development standards for older children, Butte et al. (2007) outline a number of factors that need to be considered with new data collection. Samples of healthy children from around the world must take into account the environmental influences on growth of children and adolescents: proper nutrition, lack of endemic infections, socioeconomic status that does not limit growth, low levels of environmental pollution, and populations without high levels of psychosocial stress (p. 155).

Three-dimensional body imaging, an emerging trend in anthropometry, was first developed in 1973 using light sectioning. These early attempts were laborious, time-consuming, and not entirely accurate. Today’s computer three-dimensional systems have dramatically increased the usability of 3D body scans for surface anthropometry. There are currently at least four body-imaging systems in use in the United Kingdom, the United States, and Japan. The primary use of body-imaging technology is to identify distortions of body shape, such as those related to skeletal pathologies like scoliosis or facial abnormalities. Body imaging can also be used for producing prosthetics or measuring arthritic swelling and tumors, among other important applications (Jones & Peters, 1998, pp. 30–33). However, 3D body imaging has its limitations. First, the human body has external and internal factors that are always changing its form. These small-shape changes cause the computers to record an error factor that is even affected by skin and body-hair pigmentations. Additionally, no current medical computer system is able to record 100% of the body’s surfaces. Despite these current limitations, 3D imaging may become more useful in the future as technology becomes better able to handle the unique challenges of measuring the human body.

Malnutrition

Now that we have discussed how to measure the body, let us discuss conditions in which measuring the body is important for diagnosis. Anthropometric measurements are compared with international standards in order to identify diseases such as malnutrition. Malnutrition is defined as a medical condition that is caused by improper diet. Nutrition is a multidisciplinary science including food science, physiology, biochemistry, genetics, epidemiology, anthropology, and psychology. Nutrition studies are relatively young compared with growth studies and biological anthropology, which developed over the past 150 years. Today, there are four recognized manifestations of malnutrition: overnutrition, secondary malnutrition, micronutrient malnutrition, and protein-energy malnutrition:

1. *Overnutrition* occurs when nutrients are oversupplied relative to the amounts required for normal growth, development, and metabolism. The term can refer to obesity brought on by general overeating, as well as the oversupply of a specific nutrient.

2. *Secondary malnutrition* is not a direct result of the person's diet but describes an illness or condition that prevents absorption of nutrients, increasing excretion, or causes the body other damage that is triggering a response to increase its required nutrients.
3. *Micronutrient malnutrition* is caused by lack of sufficient micronutrients, such as vitamin A or zinc, in the diet that can impair normal growth and development, as well as make the individual susceptible to diseases.
4. *Protein-energy malnutrition (PEM)* is caused by underfeeding and is expressed in two forms: kwashiorkor and marasmus. Kwashiorkor is caused by a diet consisting of carbohydrates with insufficient protein intake and is identified by the potbelly-like appearance of sufferers that is caused by edema and an enlarged liver. Kwashiorkor usually presents at age 2 to 3 years and lasts for a few weeks, resulting in either recovery, if one is given proper nutrition, or death. Marasmus presents as a result of low caloric intake and is also referred to as wasting, where the sufferer has an emaciated appearance. Marasmus, more common than the fatal kwashiorkor, often develops before the child is 1 year old due to lack of breastfeeding and lasts several months.

Micronutrient and PEM malnutrition are both classified as primary malnutrition, or undernutrition. Within the category of undernutrition, varying degrees of severity are expressed as either first-, second-, or third-degree malnutrition with third degree being the most severe. In addition, some authors also use the terms *acute* and *chronic* undernutrition to refer to the length of time the sufferer has experienced periods of undernutrition. Case studies used in this chapter discuss second- (acute) and third-degree (chronic) malnutrition in populations in various regions of the world.

Effect of Malnutrition on Growth and Development

Deficiencies in protein and calories are more severe than the specific nutrient deficiencies mentioned above because protein and calories are essential for growth, health, activity, and survival. Calories provide the energy the body needs for involuntary functions such as blood circulation, breathing, and maintaining body temperature. Protein is needed in the diet because the body does not produce enough amino acids to build essential proteins—it is essential for building cells, carrying nutrients to and from the body's cells, and developing antibodies.

Anthropologists can assess malnutrition visually in a number of ways. Radiographs can indicate the presence of lines of arrested bone growth. These lines are generally believed to be caused by undernutrition. They are identified as dense lines that form at the epiphyses of long bones and can continue to form parallel lines down the bone shaft if periods of undernutrition are chronic and recurring. They occur most often in the bones of the leg, particularly the distal tibia. Regular occurrences of

dense lines may be an indication of repeated periods of undernutrition or seasonal food shortages (Walimbe & Gambhir, 1990).

Dense lines on the leg bones were first detected and described by Ludloff in 1903, but in 1921 Stettner was the first to interpret them in terms of arrested growth. Asada (1924) and Harris (1933) induced line formation in experimentally starved laboratory animals, and it was Harris's research that dubbed them *Harris lines*. The precise mechanism of line formation remained obscure until the research of Park and Richter in 1953 (as cited in Mays, 1985, p. 207). They were able to show that periods of undernutrition cause the bone growth to form transversely, instead of in normal, vertical columns. The impact of Harris lines on bones was articulated by Scrimshaw, Taylor, and Gordon (1968), who stated that Harris lines can result in permanent stunting of the skeleton (pp. 56–57) and result in short-statured individuals.

Park (1964) has stated that Harris lines do not form with a mere slowing of growth; arrested growth needs to be complete to form Harris lines (p. 823). In addition, after growth arrest, sufficient recovery from undernutrition is needed to restore bone growth (Mays, 1985, p. 209). Marshall's 1968 longitudinal study has found there is a significant correlation between periods of malnutrition/infection and the presence of Harris lines. Mays states that the probability of line formation is significantly increased by a period of nutritional stress or disease, but there is not a simple, direct correlation where Harris lines always indicate undernutrition.

Another way to assess undernutrition is by visual inspection of teeth. Dental hypoplasia can be identified as striations on the teeth that indicate severe periods of undernutrition. Dental hypoplasia is the loss of thickness of surface enamel due to periods of arrested growth during the development of the teeth; it can be viewed as a line or a groove in the tooth, called *linear enamel hypoplasia (LEH)*. LEH can be present in adult or deciduous (baby teeth) dentitions. Like Harris lines, LEH indicates a recovery from malnutrition, in that the tooth shows a period of arrested growth in the form of a groove or line and the recovering period of normal enamel deposition below the LEH. Researchers sometimes use dental hypoplasia analyses to assess adults who have experienced childhood undernutrition and its recovery and to document famine cycles.

Most commonly, individuals can also be assessed by anthropometric measurements of skin-fold thicknesses, BMI, and weight:height, weight:age, and height:age ratios. These ratios can be interpreted differently by researchers, and many studies have differing parameters to determine malnutrition. Today, the various WHO standards tend to be the reference point that anthropometric measurements are evaluated against. The WHO standards indicate measurements of healthy individuals, and deviations from these standards can aid in malnutrition diagnoses.

Consequences of Malnutrition

Comorbidity refers to the presence of one or more diseases in addition to a primary disease in an individual. Undernutrition lowers resistance to infectious diseases resulting in comorbidity. Of most concern to malnourished children of developing countries are diarrheal disease and pneumonia. Tuberculosis, malaria, measles, whooping cough, and intestinal worms follow. Measles is another concern, which results in extremely high mortality rates in the developing world because of malnutrition at weaning age and lack of vaccinations. In developing countries, childhood death rates due to measles can be up to 83 times higher than in the United States.

There is another manifestation of undernutrition called nutritional growth failure, or *stunting*. Stunting appears as children, and then later adults, come to lie outside the normal range of body weight and/or height for their age. Short-term undernutrition is indicated by wasting, and long-term, chronic undernutrition can result in growth stunts (McElroy & Townsend, 1996, p. 220). While growth stunting does not present itself with kwashiorkor or marasmus symptoms, individuals are likely to suffer from physical underdevelopment and mental impairments.

Culture and Malnutrition

Culture plays an important role in dictating food consumption, as well as defining and treating nutritional illnesses. Since food is a basic necessity that is often part of a frequently repeated family routine, attitudes and usages centered on food are intimately connected with individual and family life (Black, 1943, p. 142). Acceptable foods to eat, dietary restrictions, religious fasting, healing rituals, and many other cultural factors may hinder proper nutritional status. For example, African mothers often put children affected by diarrheal diseases on a prolonged starvation diet that causes acute forms of malnutrition, also making them susceptible to other infections (Konczacki, 1972).

Differences in the nutritional status of children in Mexico are attributed largely to cultural food styles and/or available income of a household. In many studies, it has been concluded that nutrition is better in rural *mestizos*, individuals of mixed native and Spanish ancestry, than rural Indians and worst in urban *mestizos* (Balam & Gurri, 1992; Malina, Himes, Stepick, Guitierrez Lopez, & Buschang, 1981; Muñoz de Chávez et al., 1974). Rural Indians and *mestizos* may both be extremely poor, but nutritional differences may lie in the narrow scope of foods used by more “traditional” Indian families, who rely mainly on staples such as maize and beans. However, in Mexico, Baer (1998) states that women are contributing more to household income and are thus making more important spending decisions. As this area is largely reliant on imported and store-bought foods,

the mother’s education level is thought to be directly related to the dietary status of her children. Baer goes on to state that the imported foods in the local stores are unfamiliar and that women do not know their nutritional value—a problem exacerbated by local advertising of these unfamiliar and high-priced foods as being “healthy” regardless of their nutritive qualities (p. 5). Baer’s study concluded that people of low income in the Sonoran region consume greater amounts of beans and grains while the higher income households consume more fruits, vegetables, dairy, and meat (p. 43). These findings are consistent with areas where there is a high prevalence of malnutrition and diet is restricted to local or ethnic foods such as maize and beans. These foods do not contain sufficient amounts of protein or calories. However, this is not to say that all “traditional” foods are deleterious.

In addition to providing food, in many societies the family also delivers most of the health care. Studies have shown a positive correlation between poor health outcomes and the level of stress in the home (Loustanaou & Sobo, 1997, p. 24). This implies that stressed families of malnourished individuals may not be seeking or have access to outside health care. In the following examples, it becomes apparent that different forms of malnutrition are prevalent in different areas of the world due to cultural norms of food consumption and recognizing malnutrition.

Examples of Malnutrition Worldwide

Protein-Calorie Malnutrition in Mesoamerica

In 1988, 14.2% of children under age 5 in Mexico were considered underweight, and 22.8% of them were short for their age, as stated by Long-Solis and Vargas (2005). These authors also stated that short stature is a sign of chronic malnutrition and higher risk of disease. They also conducted a survey in 1999 and found that the percentage of underweight children dropped to 7.5 and those considered to be short for their age was down to 17.7%, reduced by 22%. In addition, the authors found that half of the indigenous children surveyed were considered to be too short for their age, or stunted, with implications on their nutritional status (Long-Solis & Vargas, 2005, p. 165).

Malina et al. (1981) researched undernutrition in Oaxaca because it is among the poorest states in Mexico, with high child mortality rates. They analyzed children by weighing and measuring stature, arm circumference, and the triceps skin fold of 1,410 children 6 to 14 years of age. Excluding the children of wealthier families, the authors found that in categories of weight and stature, the rural *mestizo* children were healthier than the rural, indigenous Zapotec children. In addition, urban *mestizo* and indigenous children were found to be smaller and more underweight than the rural *mestizos*. This study shows that the move to cities does not necessarily lead to improved growth status (p. 269).

However, within chronically malnourished areas, there exist children with good nutrition; not every child in the community will be undernourished. Muñoz de Chávez et al. (1974) examined the epidemiology of good nutrition in these areas to find factors that lead to some children being better nourished than others in families of similar size and economic status. It was found that large family size was not a factor because many well- as well as ill-nourished children were from families of the same size. The difference lies in the composition of the family; those with more working adults had better nourished children while families with more children than adults did not have good nutrition (p. 224). The families with more working adults had greater income and were observed to have spent more of their earnings on food than the families of undernourished children. In addition, in support of Baer, this study found that families that were more “indigenous” had more undernourished children than the “occidentalized” families. Maize and beans were the staple foods in the families with more traditional cultural views, while the families that had more Western concepts and culture actively sought out other food items for their children (p. 225).

Secondary Malnutrition in Africa

Individuals suffering from certain diseases may become susceptible to undernutrition due to the nature of their illness. In many parts of Africa, adults and children have been found to have high rates of secondary malnutrition due to HIV infection. The undernutrition is due to decreased nutrient intake, malabsorption, and altered metabolic rates due to HIV infection. Secondary malnutrition of this nature has even been identified as the cause of death in AIDS patients due to the depletion of body mass (Gramlich & Mascioli, 1995, p. 2).

In fact, HIV-infected African children were 17 times more likely to suffer from undernutrition than uninfected children (Mgone et al., 1997). In South Africa, marasmus, or wasting, was more strongly associated with HIV-infected children than kwashiorkor. This study also found that HIV-infected children had higher rates of mortality than uninfected children (Yeung, Wilkonson, Escott, & Gilks, 2000, p. 108).

Micronutrient Malnutrition in Asia

Micronutrient malnutrition can occur in any population in which the local diet lacks one or more essential nutrients for proper growth and development. In Southeast Asia, many people subsist on a diet lacking in green and yellow fruits and vegetables that contain vitamin A. The symptoms of vitamin A deficiency begin with impaired vision and night blindness, leading to xerophthalmia and total blindness. Xerophthalmia is an ocular condition that leads to opaque spots on the eye and degeneration of the cornea. Additionally, individuals suffering from micronutrient

malnutrition may also exhibit signs of undernutrition such as wasting or stunting.

Vitamin A deficiency is considered a significant public health problem in India, Pakistan, Bangladesh, Indonesia, and the Philippines. A study in India estimated that the prevalence of xerophthalmia in children under age 6 was 8.7%. A study among children in Yemen showed that night blindness was found in 0.5% of the children. In northeastern Thailand, the prevalence of night blindness in rural areas was 1.3%, and among children of the Orang Asli of Malaysia night blindness was found in 16.0% of the children (Ngah et al., 2002, p. 88).

Overnutrition in the Western World

Overnutrition often refers to being overweight or obese, the general condition of overeating foods high in calories, surpassing the amounts needed for proper growth and development. Overweight is defined by a BMI of between 25 and 29.9 (kg/m²), and obesity is defined by a BMI greater than 30. Overnutrition is a growing problem in developed countries. In 2006, Dr. Barry Popkin from the University of North Carolina stated there were now more overweight people worldwide than undernourished people. He reported to the International Association of Agricultural Economists that the number of overweight people had topped one billion (of which 300 million are obese), compared with 800 million undernourished.

In 2003 and 2004, 17.1% of U.S. children and adolescents were overweight and 32.2% of adults were obese. Approximately 30% of non-Hispanic white adults were obese, 45.0% of African American adults, and 36.8% of Mexican American adults. Among adults age 20 to 39, 28.5% were obese, 36.8% of adults age 40 to 59 years were obese, and 31.0% of those age 60 or older were obese in 2003 and 2004 in the United States (Ogden et al., 2006, p. 1549). In England, rates of overweight and obesity are also growing, with 23.1% of men and 24.8% of women classified as obese in 2005 (The Information Center, 2006).

Overnutrition and excessive body weight in developed countries is brought on by a host of conditions. Increased sedentism, lack of exercise, increased use of packaged and processed foods, fast-food consumption, poor diet choices, and general overeating are all contributing factors. Excessive body weight is associated with various diseases such as cardiovascular diseases, type 2 diabetes, sleep apnea, certain types of cancer, and osteoarthritis. As a result, obesity has been found to reduce life expectancy.

Conclusion

This chapter examined human growth and development through two perspectives: anthropometry as a means of quantifying growth and development, and malnutrition as a major obstacle to proper growth and development

worldwide. The long history of anthropometry began in 1883, contemporaneous to the development of physical, or biological, anthropology. Anthropometry benefited the field of anthropology as it provided a quantifiable way to measure the human body and its parts.

Many scientists played a part in the development of anthropometry as a scientific endeavor, including Quetelet, Broca, Boas, Galton, and Hrdlička. These individuals developed mathematical and statistical models of human growth rates, developed the instruments of anthropometry, and set standards for anthropometric measurements and population studies. These “founding fathers” of anthropometry helped pave the way for anthropometry as a widely accepted means of measurement of the human body worldwide. But of course, this was not a totally smooth transition. The history of anthropometry was marred by a period of racist thinking and conclusions. The fields of anthropometry and biological anthropology have since distanced themselves from those racist ways of thinking and have developed into reputable fields of scientific inquiry. Today, anthropometric measurements and methods are widely accepted and practiced, and can even be used to diagnose abnormal growth patterns such as those characteristic of malnutrition.

A major barrier to proper growth and development is malnutrition. Malnutrition comes in four major forms: (1) overnutrition, (2) protein-calorie malnutrition, (3) micronutrient malnutrition, and (4) secondary malnutrition. Taken together, malnutrition remains a formidable obstacle to proper growth and development worldwide, and much of the earth's population suffers from one type of malnutrition or another. Protein-calorie malnutrition is referred to as undernutrition and manifests as wasting or stunting. Chronically stunted populations, like those of Mexico, provide an example of where culture and diet may play a part in the prevalence of undernutrition.

Micronutrient malnutrition refers to a condition where individuals are not receiving adequate amounts of the vitamins and minerals the human body needs for proper growth and development. In Asia, populations that subsist mainly on rice and have low intakes of green and yellow fruits and vegetables tend to be deficient in vitamin A. Vitamin A deficiency leads to blindness and remains a problem in certain areas of India and Southeast Asia.

Overnutrition tends to be a disease of the developed nations but is now found all over the world in people with abundant food resources. The United States remains one of the fattest countries in the world, where overindulgence has led to high rates of cardiovascular disease, diabetes, and cancer.

There are many ways to approach a synthesis of human growth and development. Much of the literature in the field today is housed in medical journals. However, biological anthropologists remain at the forefront of developments in anthropometric techniques and instruments. Anthropologists are also leaders in the study of

how culture and population differences play a part in proper growth and development around the world.

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6

HUMAN BIOCULTURAL DIVERSITY

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This chapter focuses on human diversity as seen in both culture and biology. Of the innumerable ways humans can be culturally diverse, this chapter briefly discusses just a handful of characteristics such as religion and belief, social organization, gender, sexual orientation, and even the cultural constructs of race and ethnicity. In addition, a few features of human biological diversity will be discussed such as skin, hair, and eye color and body structure and stature.

Skin color, hair texture and color, nose form, stature, and even eye color are just some of the observable aspects of human biological diversity that have served as adaptations to environmental and geographic conditions. Anthropologists strive to teach physical diversity in terms of *geographic clines*, gradual changes in physical characteristics over a geographical area. In certain geographical areas, there tends to be a co-occurrence of physical traits such as skin color, and these are often explained as human adaptations to the environment.

Lastly, human groups construct ideas of race differently. This chapter will conclude with a brief history of the concept of race in the Western world and its impact on society. The ways in which race can be constructed by each culture vary dramatically. From the very narrow ideas of four races in America to the over 500 racial classifications of Brazil, the race concept is very much in the eye of the beholder. This chapter aims to provide a broad overview of only some of the ways in which humans are culturally and biologically diverse.

Cultural Diversity

Humans express themselves in a myriad of ways—through customs, traditions, sexual orientation, religion, and many more. As such, these expressions of cultural diversity are much more prevalent than are expressions of biological diversity. *Culture* refers to the set of learned behaviors, beliefs, attitudes, values, and ideals that are characteristic of a particular society (Ember & Ember, 2009, p. 23). Since many characteristics of culture, such as customs, traditions, language, kinship, politics, and subsistence strategies, are discussed elsewhere in this text, this section of this chapter aims to briefly address aspects of cultural diversity such as religion, belief, gender roles, sexual orientation, and social organization.

Religion and Belief

It is often stated in anthropology that concern for a higher power is a cultural universal (Kottak & Kozaitis, 2008, p. 85). *Religion* has been defined anthropologically as the “belief and ritual concerned with supernatural beings, powers, and forces” (Wallace, 1966, p. 5). For many, religion is a formal institution involving regular worship in groups. With its group nature, religion creates a community of shared beliefs. The solidarity that participants experience is an important social function, but just as religion forms bonds between people, it is also divisive.

People have a sense of belonging to a religious belief system, often to the exclusion of others. Religious diversity is defined by the different ways people interact with deities and the supernatural, the types of religious practitioners that are sanctioned, and the way religion is used as an adaptation to external forces.

Communication With the Supernatural

The *supernatural* refers to the existence of entities outside the visible universe. People in every human culture believe there are supernatural forces that affect their daily lives. The founder of the anthropology of religion, Sir Edward Burnett Tylor, stated that people invented the supernatural as a way to explain events and conditions for which they had no reference to explain any other way. People needed to explain their existence, the meaning of death, and even dreams, but had no other explanation for these phenomena. He posited that the earliest forms of religion were *animistic*, involving the belief that humans, animals, and nature were imbued with spirits (Tylor, 1871/1958). This also means the earliest religions were probably *polytheistic*, in which people believed in more than one god. *Monotheism*, belief in a single god, developed later.

People around the world interact with supernatural beings and deities in different ways. These strategies include prayer, dreams, visions, rituals, and sacrifices (Wallace, 1966, pp. 52–66). Ember and Ember (2009) simplify the difference between these strategies. Prayer refers to asking the supernatural to do something on one's behalf, while rituals and sacrifices are thought to be sacred acts that will please and compel the supernatural to act (p. 195). The latter strategy is termed *magic*, supernatural techniques meant to accomplish specific goals (Kottak, 2008, p. 183), while manipulating the supernatural for harm against others is referred to as *witchcraft*. Witchcraft is often used to explain tragic or unforeseen accidents and illness in cultures such as the Azande of Zaire or populations in Papua New Guinea. Violating a taboo or acts of carelessness are recognized causes of illness or death, but witchcraft is used to explain the otherwise unexplainable.

People in cultures that believe in witchcraft also tend to believe strongly in revenge and retaliation for bewitching each other. Some anthropologists have stated that belief in witchcraft may be an adaptive mechanism that acts to level society and purge marginalized individuals from the group. People who are particularly successful and acquire much wealth are often accused of invoking witchcraft to cause their peers to fail so that they may triumph. Accusing wealthy individuals of using sorcery for ill-gotten gains often strips them of their wealth and acts to level society again (Whiting, 1950).

Shamans are intermediaries between the human and spirit worlds. These part-time religious specialists are also often associated with healing. Common techniques of the shaman include dreams and *trances*. Trance involves the

use of an altered state of consciousness in which communication with the supernatural is possible. Individuals may obtain trancelike states through exhaustive dance or running, taking alcohol or hallucinogenic drugs, or deprivation of food, water, or sleep. It has been stated that 90% of the world's societies practice religious trance (Bourguignon, 1973). Shamans are also quite common around the world, and the ability to communicate with the supernatural and cure the sick is the shaman's primary responsibility. The belief that illness is caused by the supernatural is prevalent worldwide. In 1980, George Murdock compared 139 societies and found that only 2 did not contain the belief that gods or spirits could cause illness.

Religion as an Adaptation

The purpose of religion is more than just explaining the unexplainable. Religion serves the emotional needs of people as well. People can take comfort in the fact that there is an omnipresent and all-powerful deity watching over them. A belief in the afterlife or a "better place" can also help people cope with emotions experienced due to terminal illness and death. Anthropologists recognize that all religions act to reduce anxiety and uncertainty. According to Malinowski (1931/1978), when humans face much uncertainty and danger they turn to magic. He hypothesized that when people lack control, magic and spirituality alleviate psychological stress.

Human societies around the world are divided into many major and minor religions and belief systems. The largest world religions are Christianity, Islam, Buddhism, and Hinduism. Of course, there are many others not mentioned here as well as numerous divisions within religions. Religion is a major factor in human cultural diversity because people around the world see religion as part of their identity, as something that defines them to the exclusion of other belief systems. Because people tend to be emotionally attached to their belief system, religion is often a form of conflict that divides groups of people.

Gender and Sexual Orientation

To understand diversity in gender and sexual orientation it is important to distinguish between sex and gender. *Sex* is a biological and anatomical classification referring to the chromosomes present in an individual; females have two X chromosomes and males have one X and one Y chromosome. Men and women also differ biologically in primary and secondary sexual characteristics. Primary sexual characteristics are genitals and reproductive organs, while secondary sexual characteristics are often breasts, voice differences, and hair distribution (Kottak & Kozaitis, 2008, p. 145). But there are other differences in male and female biology beyond sexual characteristics. *Sexual dimorphism* refers to those nonsexual differences such as height, weight, muscle mass, lung capacity, and endurance. Today, there is

quite a bit of overlap in these areas but these differences existed to a greater degree throughout human evolution.

As opposed to sex, *gender* refers to the cultural construct that defines acceptable male and female behavior. These gender roles vary widely across the globe. Anthropologists have identified recurring themes in gender divisions of labor, but gender roles differ with the environment, economy, and political system of societies (Kottak & Kozaitis, 2008, p. 146).

Because gender differences exist in societies, often gender stratification develops. *Gender stratification* is the unequal distribution of power between males and females that reflects their different positions in the social hierarchy.

In many societies, gender stratification favors males. According to many anthropologists, gender divisions of labor progressed into gender stratification favoring men when many societies abandoned foraging in favor of farming (see Diamond, 1987, 1998; Kottak, 2009). Previous foraging subsistence valued the work of women because their vegetable food-gathering and small-animal trapping provided a majority of the daily caloric requirements (Diamond, 1987, 1998; Lee, 2003). The shift to agricultural lifestyles involved long days of hard manual labor, in which male biological differences were favored. As men became the primary food producers, there was a shift of women and domestic tasks to an inferior status. Also, in many societies, males are granted access to the public sphere and the outside world, which gives them experiences and power over females who do not possess access to such experiences (Rosaldo, 1980; Kottak, 2009, p. 228).

However, the gender roles and expectations are too great for some. Individuals sometimes feel they do not belong to their sex or gender. In some societies, there is a place for these people whose sex and gender do not correspond, individuals who feel they are neither man nor woman.

The Third Gender

The “two-spirits” Native North Americans constitute a third gender, often referred to as *berdache*. The two-spirits has been identified in over 150 North American tribes in the historical and ethnographic literature. An interesting feature of the berdache identity is that it could include both males and females. Berdache are known for preferring work of the opposite sex and engaging in homosexual relationships with nonberdache individuals. The two-spirits identity is believed to be the result of supernatural forces that come to them in visions or dreams. The community to which berdache belong often regards them as being neither male nor female, but they are distinguished from typical male and female gender roles. Many Native North American tribal groups also attributed fertility and sexual powers to berdache shamans (Roscoe, 1998).

In the Middle East, the country of Oman has a third gender called *xanith*. A xanith is anatomically male but takes on gender roles that are in between those of males and females. While men wear white and women wear bright

patterns, xaniths wear unpatterned, pastel clothing. They also have medium-length hair and intermediate social roles. Gender roles are strictly defined in Oman and women are not to leave the home without permission. A xanith, though, may come and go as he wishes as well as interact with both men and women socially. Xaniths may have sexual relationships with women or men, or choose to remain unwed. If a xanith is involved in a relationship with a man, he will be allowed to retain his male public status as a man as long as he is also married to a woman and can prove he consummated that marriage (Wikan, 1982).

The *fa’afafine* are a third gender specific to Samoa, in the South Pacific. These individuals are born male but are raised as females. The literature suggests there are two ways in which parents may choose to raise their son as a *fa’afafine*. First, and traditionally, sons became *fa’afafine* because the couple had plenty of sons and not enough daughters. Traditional gender divisions of labor prohibited men from doing domestic work, and raising a son as a *fa’afafine* served as an adaptation to having too few daughters. Other sources state that, more recently, sons may choose to be raised and treated as *fa’afafine* because of homosexual or effeminate tendencies (Mageo, 1992). *Fa’afafine* are not always considered homosexuals or transvestites, because they retain characteristics of being both male and female; they do “women’s work” as well as sometimes taking a wife and having a family.

In contrast to *fa’afafine*, *hijras* are third-gender individuals of India, a group that includes hermaphrodites (individuals born with both male and female genitalia), eunuchs (castrated men), and homosexual men. Due to the relatively few humans that are born truly hermaphroditic, Nanda (1999) believes that most *hijras* are men who have undergone the emasculation procedure or homosexual men who have retained their genitalia. Many *hijras* state that they were born as neither man nor woman, even if they had undergone the emasculation procedure, and are united in their belief that “no greater insult is possible than to describe them as males” (Lal, 1999, p. 127). In fact, *hijras* dress and behave as females but do not try to pass themselves off as females; they make themselves known to be *true hijras*, neither man nor woman.

Hijras belong to a special caste of devotees to the mother goddess Bahuchara Mata and are traditionally employed as performers in special ceremonies, such as weddings and the blessing of newborn children. According to Hindu belief, and much like Native American berdaches, these third-gender individuals have the power to bring fertility and prosperity in traditional ceremonies. Although the presence of *hijras* at ceremonies is believed to be auspicious, Indians are somewhat fearful of these sexually ambiguous individuals because they also have the power to bring infertility and misfortune on families that do not pay them enough. Additionally, many *hijras* are homosexual prostitutes, which decreases their respect, and those *hijras* that make a living as street performers receive much public scorn and ridicule (Nanda, 1999).

All of the societies with a third gender discussed here are considered to have some form of institutionalized homosexuality. Sexual orientation is generally divided into four forms: (1) *heterosexuality*, sexual attraction to the opposite sex; (2) *homosexuality*, attraction to the same sex; (3) *bisexuality*, attraction to both sexes; and (4) *asexuality*, no sexual attraction to either sex. Although all four forms exist in many parts of the world, they are defined differently by each culture. For example, in the societies mentioned above, a form of institutionalized homosexuality exists within the purview of a third gender.

Institutionalized "Homosexuality"

An extreme example of institutionalized homosexuality can be found among the Etoro of Papua New Guinea. Here, masculinity is considered an achieved status whereby adolescent boys need to acquire the characteristics that will make them men. Particularly, this includes the acquisition of semen from older men. Beginning around age 10 and continuing into adulthood, males are inseminated orally by older men, usually their maternal uncles (Kelly, 1976). It was considered inappropriate for two youths to engage in this activity because it is believed they are draining each other's semen supply, and thus shortening their life spans.

It is also important to note that a number of Papuan societies practice *female avoidance*. Femininity is believed to be an ascribed status—something one is born with and does not need to acquire through deeds during the lifetime. This innate femininity is also considered highly polluting. Males in these regions live in communal housing with other men, hide ritual and sacred objects from women, limit all interactions with females, and even have a taboo against heterosexual intercourse. Sex with women is believed to sap the life force from men and is only to be practiced for procreation. Viewed in light of these dramatic circumstances of female avoidance, institutionalized homosexuality does not seem so surprising. The Etoro are exhibiting homosexuality not as something driven by their hormones or genes, but as a cultural tradition (Creed, 1984).

Discussions of gender roles and sexual orientation need to be viewed in light of a number of cultural characteristics, such as religious beliefs, and social and political structure. Particular practices and belief structures can often be better understood by how they trace their descent, how power is structured, and how these relations came to be.

Sociopolitical Organization

Human cultural diversity is also expressed by human social and political organization. Elman Service (1962) is well-known for his sociopolitical typology that divides human groups into the four categories of band, tribe, chiefdom, and state. A *band* is a kin-based society where all members are related through blood or marriage. Band-level societies engage in nomadic or seminomadic foraging,

or hunting and gathering. This type of society is usually egalitarian, where people enjoy relatively equal political, economic, or social status. This does not mean that all people in band-level societies are equal; egalitarian bands do have status differences based on gender and age. Bands are also based on reciprocity, an economic system that governs exchange between social equals, which serves to forge and solidify relationships. The Khoisan of southern Africa are famous examples of band-level societies that retained many "traditional" features up until the 1970s (Lee, 1979, 2003).

Tribes are sedentary or seminomadic societies living in villages that practice small-scale agriculture such as pastoralism and/or horticulture. Like bands, tribes are also organized by kin groups, although tribes claim common descent through clans and lineages. Also like bands, tribes lack formal government, but many tribes possess a village head or "big man." A big man is like a village leader that has influence in more than one village. The Yanomami of the Amazon forest and the Masai of East Africa are examples of tribal societies.

Chiefdoms are also kin-based societies. Although they do possess permanent government, kinship, marriage, descent, age, and gender are factors that divide people in chiefdoms into social classes. A person's status can be determined by achievement or ascription. Achieved status refers to the social position one holds due to hard work, perseverance, skills, or other actions and activities achieved during one's lifetime. An example of an achieved status would be an occupation, since no one is born a doctor and that status must be earned. An ascribed status is one that is assigned at birth and generally cannot be controlled or changed, such as gender and nationality. Wealth, power, and social status can be either achieved or ascribed in chiefdom-level societies. An example of a chiefdom is the Cherokee of North America.

State-level societies are political units with formal governments based on codified law with law enforcement. States also have economic, or fiscal, systems that are needed to support the large population and government officials. Compared with bands, tribes, or chiefdoms, states are large and urban based, and they exist as today's nation-states. Any contemporary country is a state-level society.

Even though Service's (1962) classification system seems clear-cut and functional, this is no longer the case. Anthropologists recognize that no category except the state truly exists today as a self-contained form. All forms of social organization exist within the larger nation-state and are subject to its laws and regulations (Kottak, 2009, pp. 108–125).

Cultural diversity exists in many forms. Diversity is expressed in the way people worship, the way they adhere to or reject gender roles and norms of sexual orientation, and even the way they are socially organized. These are just a few of the ways in which humans express diversity; others include language, kinship structures, values, marriage, folklore, ethnicity, and music, which are discussed in further

detail throughout this text. Now we turn our attention from human cultural diversity to biological diversity.

Biological Diversity

In addition to the many ways people can be culturally diverse, there also exist some biological differences. Again, human biological diversity is far less pronounced than the infinite ways in which people express themselves culturally. Anthropologists explain physical differences in human appearance in terms of *geographic clines*, a term coined by Sir Julian Huxley in 1938. Clines are gradual shifts in *phenotypes* over a geographical area. A phenotype is an observable trait or characteristic, such as skin, hair, or eye color, nose form, or stature. Biological anthropologists recognize that human expression of certain physical characteristics shifts with geographic and environmental conditions. These gradual shifts in phenotypes are not clearly delineated, and they do not separate “races” of people. Phenotypic variations are known to be adaptations to environment and geography.

Human Adaptations

Over the course of human evolution, human physiology has adapted to a number of environmental factors such as amount of UV light exposure, extreme hot and cold climates, and availability of nutritious food. Many human biological traits have taken about 4 million years to develop while others are more recent in human history. As *Homo sapiens sapiens* migrated out of Africa, they began to inhabit a wider variety of climate zones. Humans were able to adapt to many environmental conditions within the last 500,000 years of their existence. This section of the chapter aims to describe the most common environmental obstacles and how human biology was able to adapt and even flourish under these conditions.

Skin Color

Humans manufacture most of their vitamin D by absorbing and then synthesizing UV light through the skin. However, the ultraviolet light emitted from the sun that reaches the earth is unevenly dispersed. Areas around the equator are exposed to higher levels of the sun’s UV light than far northern or southern areas, and this UV light dispersal is roughly latitudinal. The UV light distribution on the earth’s surface is quite uneven and is even considered inadequate for proper vitamin D production in some regions.

Melanin is a pigment compound found in the skin. Melanin granules range in color from brown to black and protect the skin from overproduction of vitamin D. Individuals exposed to high levels of UV light express high levels of melanin in the skin, resulting in dark skin color. Individuals living in environments with little to no UV

exposure are characterized by low levels of melanin in the skin and express light skin color. In other words, the amount of melanin in the skin is related to the amount of daily exposure to UV radiation (Frisancho, 1993, p. 154).

Skin color is darkest near the equator, in regions where melanin production in the skin is elevated due to the amount of sunlight. These high levels of melanin protect the body from sunburn. Additionally, increased melanin production prohibits overproduction of vitamin D. As one moves farther away from the equator, either north or south, the clines of skin-color variation contain less melanin, resulting in lighter skin. Light skin is able to better manufacture vitamin D without much exposure to UV sunlight (Frisancho, 1993, pp. 166–167). This being said, individuals living in extreme northern or southern latitudes may still experience ill health due to vitamin D deficiency.

In the 17th through 19th centuries, many children in northern European countries suffered from rickets, a vitamin D deficiency disease. Rickets is characterized by muscle weakness, projections above the ribcage, and skeletal malformations such as bowed legs and narrow pelvis. This corresponded to a time in history when middle- to upper-class Europeans prized milky-white skin and outdoor activities were seen as “lower class.” Thus, outdoor activities were avoided unless the skin was completely covered up. Scientists then began to notice a link between rickets and sun exposure and ran some experiments to determine if this was the case. In 1919, Huldschinsky exposed children with rickets to radiation from a lamp and found that the children were cured of the disease in a few months. A few years later, in 1921, Hess and Ungar exposed children with rickets to sunlight in New York City for a few months and also found that they were healed of their lesions. Vitamin D deficiency has also been found in women in the Middle East due to cultural mandates that women be shielded from view in public. The practice of covering the skin with dark clothing in this region has led to hypocalcemia, low calcium levels in the blood, in women, which also affects the health of their children through breastfeeding (Dawodu et al., 1998).

Another factor affecting skin color is disease. Recessive genes can cause albinism, or hypomelanism, which is characterized by a lack of melanin in the skin, hair, and eyes. People born as “albinos” have white hair and skin and eyes with pink or pale-blue irises because their cells lack the ability to produce melanin. Albinism can be severe or quite mild, but individuals who cannot produce normal levels of melanin are at higher risk of skin cancer, astigmatism, optic nerve hypoplasia, and photosensitivity.

Hair and Eye Color

Ultraviolet light exposure affects not only melanin in the skin but also hair color and texture and even eye color. This is due to variation in melanin content of hair and eye pigment. Most humans have brown or black hair

that contains more melanin than red or blond hair. Likewise, different eye colors contain a different density and distribution of melanin: Blue eyes contain the least amount and dark brown eyes contain the most melanin.

Generally, dark or light skin, eyes, and hair co-occur as an adaptation to the environment. Light hair, skin, and eyes help people of northern regions produce adequate amounts of vitamin D for survival where little UV radiation reaches the earth's surface. By the same token, large amounts of melanin in the skin, hair, and eyes protect these features from overexposure to high levels of UV light in equatorial environments. However, this generalization has a few exceptions. Many European children are born with blond hair that darkens with age. Additionally, Aboriginal Australians have dark skin and eyes but light or even blond hair.

It is important to note that eye and hair color are not entirely defined by geographic clines. There are complex patterns of genetic inheritance that affect eye and hair color. Researchers know that there are many genes that affect these traits as well as admixture among the world's populations (Molnar, 1998, pp. 246–247).

Body Shape and Stature

Another environmental factor that has affected human evolution is climate. Human physiology is quite remarkable in its ability to adapt to extremely hot or cold conditions. Body build and stature appear to have been altered in order to acclimate to environmental conditions. Although generalizations can be made that body shape and stature follow geographic clines, there are a few notable exceptions. It is imperative to remember that other factors such as diet, disease, and complex genetic inheritance and variation also play a role in determining body shape and stature.

According to Fourier's law of heat flow, we know that the amount of radiant heat that can be lost in an object depends on the ratio of surface area to body mass. Researchers also know that about 67% of the heat lost in a human at rest is due to radiation (Stein & Rowe, 2000, p. 408). Taking these two facts into account, one can see how humans with a higher surface area:body mass ratio would be better at radiating heat from the body. Conversely, humans with a low surface area:body mass ratio would be better able to retain, or conserve, that body heat. We would expect to find tall and slender individuals with a higher surface area:body mass ratio in hot climates and short, stocky people with a low surface area:body mass ratio in cold climates. A good example is the Nuer of equatorial Africa. The Nuer are part of a larger group of tall East Africans, referred to as Nilotes, that all exhibit long, slender bodies with long limbs. These features are adaptations that allow their bodies to dissipate and dispel large amounts of body heat in their hot climates. Conversely, the Inuit of the Arctic exhibit short, stocky bodies with short limbs that allow them to retain body heat in their cold climates. The high amount

of subcutaneous fat that makes them "stocky" acts to insulate and help retain body heat.

Of course, there are a few exceptions to this theory. Most notably, the Mbuti Pygmies of the Congo live only a few hundred miles from some of the tallest people in the world, the Tutsi (Hiernaux, 1977). How could the world's smallest population live so close to one of the world's tallest? A possible explanation for this has to do with the humidity in the hot, steamy forests that they inhabit. The pygmy body form is completely different than that of their tall, heat-dissipating neighbors; however, they are well suited to a hot, wet climate. The high humidity of the forest makes heat loss due to radiation and sweating ineffective. Instead, pygmies compensate with a reduction of internal body heat production. This is possible with a reduction in metabolism and muscle mass, which are accomplished with weight reduction. They are light and small because they are not producing as much body heat as their tall neighbors. While their neighbors can thermoregulate with sweating, pygmies had to adapt a different mechanism to acclimate to the hot and humid regions they inhabit (Molnar, 1998, pp. 198–200). Further evidence to support this hypothesis is that "pygmoid" populations around the world, such as Negritos of the Philippines and New Guinea, exhibit a similar body form and inhabit similar high-humidity regions.

As has been demonstrated in the preceding sections of this chapter, humans display a wide range of both cultural and biological variation. However, the cultural variation of humans is much greater and more complex than their biological variation. Cultural variation includes such differences as religion, beliefs, gender, sexual orientation, and socioeconomic status in society. Cultural features can also be widely dispersed throughout the world's populations. In contrast, much of humanity's biological variation can be explained as adaptations to geographic clines. Such features as skin color, hair and eye color, and body form and stature have helped people acclimate and thrive in different areas of the globe.

While the biological facts seem to point to adaptation to environmental conditions, other factors, such as diet, disease, and inheritance, play a role in the expression of human variation. Additionally, cultural constructs of these physical differences are quite different around the world. Many cultures rely on the concept of human races to explain physical differences. Unfortunately, the concept of race in the Western world has largely ignored biological explanations for human differences and historically has aimed to classify people into discrete categories. Grouping people based on phenotypes has led to prejudice, discrimination, and segregation.

Race in Western Culture

The concept of race in Western science has changed dramatically over the last 200 years. At the beginning of the

19th century, European thought about race was influenced by two significant forces: the doctrine of Christianity and the rational philosophy of the Enlightenment. The Judeo-Christian creation story reinforced the belief that all of mankind is descended from a single couple, Adam and Eve. The theory that all humans are descended from a single pair of ancestors is called *monogenesis*.

Since before the medieval period, the perception of the universe known as *scala naturae* was strongly integrated into both religious and scientific European thought. *Scala naturae*, or the “great chain of being,” was a perspective that fit the natural and supernatural world into a hierarchical structure that paralleled medieval European society itself. *Scala naturae* placed God at the top of the universal order, nobility at the highest levels of humanity, and the peasants at the bottom. The Christian church and the medieval state used *scala naturae* as a philosophical source of authority. Following this system meant never questioning one’s station in the great chain, much less the validity of the structure as a whole. Even into the Enlightenment of the 18th century, this perspective had a strong following.

The Enlightenment

As Europe’s exploration and colonization expanded throughout the world in the 18th century, its society became increasingly aware of human cultural and biological diversity. Scientists of the time worked to put this diversity into a rational order. Carolus Linnaeus was an 18th-century biologist best known for his work creating a classification system, or taxonomy, of organisms. Contemporary biology’s current taxonomical system is based on his work. Linnaeus included humans in his taxonomy, separating mankind into distinct races, and attributing certain traits to the races as a whole. The development of racial types by Linnaeus in 1758 is perhaps the beginning of the model of race we still experience in contemporary Western culture. Another very important Enlightenment typologist was Johann Blumenbach. In his text, *On the Natural Varieties of Mankind* (1776), Blumenbach divided humanity into three major races, as well as two connecting minor races. At the center of this continuum was the “ideal” Caucasoid (Europeans). The Malaysian minor race connected the Caucasoid to the African race, and the Aboriginal Indigenous Americans connected them to Asians. There are several important aspects to Blumenbach’s approach. He argued for the influence of climate on race type, which explained how such gradation of variation could occur. The gradations of race that he observed, and his environmental explanation for the emergence of race, reinforced the possibility of a single origin of humanity.

Polygenism

European society considered its exploitation of cultures on other continents as bringing positive changes to inferior

racess. In America, however, the exploitation was not kept in far-off colonies, but was a part of everyday life. American society subjugated both the American Indians who were being driven from the land, and the African slaves being used to develop the economy. In this context, some thinkers proposed that these other races were not descended from the same ancestors as Europeans, but were instead effectively different species.

Gould outlines two key players in the American school of polygeny: Agassiz the theorist and Morton the empiricist (Gould, 1996, p. 74). Louis Agassiz was a Swiss-born comparative paleontologist and biologist at Harvard who never produced any evidence to back up his radical polygenist claims. As Gould describes, Agassiz appears to have arrived at the polygenist conclusion from visceral reaction to close contact with black slaves in America. He made subjective, racist observations and claimed them to be objective philosophical inquiry. Despite the abstract nature of his work, Agassiz was still an important figure in the polygenist-monogenist debate.

Samuel Morton (1839), an American physician and natural scientist, focused his efforts in support of polygeny on practical craniometry. He believed bigger skulls equated to bigger brains, which indicated greater intelligence (Wolpoff & Caspari, 1997). Morton sought hard scientific data to build a comparative body of evidence for inherent racial distinctions. To do this, he compared a large number of human skulls from many different populations throughout the world. His comparisons observed smaller volumes in American Indian than in Caucasian skulls. Another observation he saw as important was made in his study of Egyptian skulls, *Crania Aegyptiaca* (1844). He found a clear distinction between the white ruling class and the “Nubian” working class of ancient Egypt. Using a world chronology based on a literal interpretation of Christian scriptures, Morton dated these white Egyptian skulls to soon after creation, or around 4000 BCE. Such a find reinforced the concept of the original diversity of races, and argued that race was beyond the influence of environment, as Blumenbach had postulated. Besides conclusions brought about by his literalist-scriptural view, Morton’s more empirically based conclusions, derived from calculating cranial capacity by filling skulls with mustard seed and measuring how much the skull could hold, also produced what could only be described as bad science. His samples were chosen from both men and women, without any concern over characteristics that vary between men and women (sexual dimorphism). Also, he excluded samples that he deemed anomalous, despite the clear bias inherent in such manipulation.

At the same time that Morton was conducting racial studies biased toward fitting observable data into preconceived notions of race, scientists like Charles Darwin were working sufficiently outside the influence of *scala naturae* to produce new explanations for human diversity. Darwin’s *On the Origin of Species* (1859) implied, as a matter of

logic, that humanity is a product of divergence from a previous species altogether. Darwin's work also credited the influence of randomness; all biological variation did not follow some predestined chain of being, but rather was subject to unpredictable variability. This is a critical distinction that served to completely overturn much of the philosophy of science up to that point. If Darwin's work served to completely outmode the issue of polygenism versus monogenism, it also set in motion what would become the contemporary challenge to the concept of race as a whole.

Race as a Social Construct

Biology since Darwin has still included concepts of race determined by culture and its understanding of genetics. Despite increasingly strong arguments against scientifically definable race, the concept has not disappeared from biological study. The Race, Ethnicity, and Genetics (REG) Working Group of the National Human Genome Research Institute (2005) highlights the lack of genetic diversity among so-called races when compared with other animal species. Of the genetic variation that does exist among humans, only 5% to 15% occurs between groups on different continents (p. 521).

Grouping populations into racial or ethnic categories due to a small part of their phenotype can confuse issues that have a much more complex genetic background. While doing broad population studies does require some generalizing terms, the most specific, unambiguous types should be used. Overall, the type of study being done should determine such classifications. Clearly, how scientists have approached race over the last 200 years has been determined by a variety of forces. Researchers like Samuel Morton serve as examples that science is inevitably a product of the society that produces it. In "Darwin's Influence on Modern Thought," Ernst Mayr (2000) argues that such a relationship can exist between a scientist's work and the culture that produced it.

Conclusion

Humans vary culturally and biologically. It must be noted, however, that humans express far less biological diversity than cultural diversity, and many of these variations can be explained as adaptations. Humans striving to explain the inexplicable, to understand death and the nature of life, have invented belief systems to help them cope with the world around them. People use these beliefs and traditions to alleviate anxiety, to obtain hope, and to create equality among the believers.

In their quest to understand the world, people have classified all that is around them, putting types of animals, plants, and even people into categories they can understand. In so doing, humans have created ideas of racial groups and even gender roles and divisions that are not based on

biological realities. These classifications have often served to benefit one group and subjugate others. In many cultures, these human divisions are not accepted by all and subgroups have emerged. In Samoa, Papua New Guinea, and Native North America, third and fourth genders have emerged as a way for some people to deal with the gender divisions and inequalities that had been instituted.

People are also divided into different socioeconomic categories. Elman Service's (1962) typology aimed to order all humans into bands, tribes, chiefdoms, or states. It is well understood that these categories no longer exist as self-contained entities, but humans continue to keep themselves divided. Racial classifications have also served to group people together often under the assumption of biological differences. Anthropologists now understand that many human biological traits serve as adaptations to the environment. Traits used to classify people into races are actually advantageous characteristics for their environment. Despite this new knowledge, people continue to use racial classifications as a way to organize the people around them. Although the history of the race concept in Western culture has come a long way, it is apparent there is still a long way to go.

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RACE AND RACISM

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In 1977, 43-year-old Susie Phipps, a white woman living in Louisiana, decided to apply for a passport in order to take a cruise. Since she didn't have a previous passport, she went to the Division of Vital Records in New Orleans to obtain a copy of her birth certificate. In addition to her parents' names, her date of birth, and so forth, her birth certificate also listed her race, a common feature on birth certificates at the time of her birth. Much to her shock and dismay, her race was listed as "colored." Apparently, she took this news so badly that she was forced to retreat to her bed for three days. She claimed there had been a terrible mistake. She was white, she said, had white children, two white husbands, and lived in a white neighborhood.

In 1982, Susie Phipps sued the state of Louisiana to get her racial designation changed to "white." During the ensuing trial, a number of scientific experts, including physical anthropologists, were called to testify. Without exception, they all stated that there was no scientific way to determine a person's race, and that the concept lacked scientific validity. The judge, as it turns out, was in complete agreement with the scientists and yet he ruled in favor of the state and threw out the suit. Why?

It turned out that Susie Phipps was the great-, great-, great-, great-granddaughter of a black slave who eventually married a Frenchman by the name of Joseph Greggerie Guillory, Phipps's great-, great-, great-, great-grandfather. According to a Louisiana law passed in 1970, any person with at least 1/32 "Negro blood"

was black. Therefore, the judge ruled that Susie Phipps, a woman who had lived her entire life as white, whose race on her children's birth certificates was listed as white, whose friends and family members saw her as white, was legally black. Culture, it seems, trumped science.

This story underscores the ongoing confusion and tension in our society over the very meaning of race, its validity as a concept, and its application. Anthropology is not immune from this tension. Since Sherwood Washburn's (1963) "new physical anthropology" of the 1950s, most anthropologists have rejected the concept of race as a scientifically valid means of describing human biological differences. Nevertheless, the notion of race still persists within both anthropology and the public. In order to sort out this confusion, we need to understand exactly what is meant by the term *race*, and how it is understood and used by different segments of society. This seemingly contradictory view of race is made explicable through an analysis of the history of the concept, beginning with its use by the ancient Greeks and continuing through the development of science in Western thought. Our ongoing ambivalence toward the concept of race is evident in the ways in which we, as anthropologists, teach our students about race in particular, and biological variability in general. Race epitomizes the tension within modern anthropology between those who focus on our diversity and those who emphasize our sameness.

According to the *Oxford English Dictionary* (1989), *race* is defined as

each of the major divisions of humankind, having distinct physical characteristics; . . . a group of people sharing the same culture, language, etc.; an ethnic group; a group of people or things with a common feature; a distinct population within a species; a subspecies. (Vol. 13, p. 69)

This definition includes references to both cultural and biological characteristics. This mixing of the biological with the cultural is a basic component of racism and has a long history in Western thought. In addition, the definition implies that different races are identified with essential, inherent tendencies or behaviors.

History of the Concept of Race

Greek Essentialism

The notion that different races not only look different, but also behave differently as a result of their physical differences, can be traced back in Western thought at least as far as the writings of the ancient Greeks, particularly to the humoral model of existence proposed by Hippocrates (460–377 BCE) in his *Discourse on Airs, Waters, and Places*.

In Hippocrates's humoral model, all living things are imbued with an *essence* that determines their physical characteristics and nature. The essence of an organism not only determines its physical traits, but also, in the case of animals, determines temperament (aggression, passivity, etc.), intelligence, and behavior. The essences are the product of the exact combination of qualities, elements, humors, and associated temperaments. All living things have the four humors of yellow bile, blood, black bile, and phlegm; it is the exact ratio of these humors in an organism that ultimately determines its physical traits and temperament. Once the first member of a particular group arises, a template is created from which all descendants are derived. For example, a dog is a dog because it contains dog essence. The first dog arose in a particular part of the world and the qualities and elements of this dog resulted in a preponderance of one of the four humors with its corresponding temperament. Once the first dog came into being, all subsequent dogs inherited the same essence, thus determining their dog features and behaviors. These essences are immutable; thus all dogs will remain basically the same indefinitely in physical composition and temperament. All living things were also listed along a scale, the "great chain of being," which ranked organisms from the most godlike (humans) to the least godlike (insects, etc.).

The humoral model was also used to explain humans. Unlike dogs, however, the Greeks saw humans as made up of a number of distinct groups, each with its own physical features, temperaments, and corresponding behaviors. Thus, some humans, because they originated

in an environment characterized by the qualities of "hot" and "moist," resulting in the element "air" and the humor "blood," have the temperament of bravery, aggression, and militancy; others, who originated in a region where "moist" and "cold" qualities resulted in a predominance of the element "water" and the humor "phlegm," are passive and lethargic. All descendants of these original human types would inherit these same immutable features and temperaments from their parents.

Different human types were also ranked differently along the great chain of being. Thus, some people were inherently superior or inferior to others. During the medieval period in Europe, the Greek humoral model was kept mostly intact; the only significant change was in terms of origins. Instead of influential environmental factors such as air, water, heat, cold, and so forth, the church substituted the God of Genesis as the creator of all living things. However, the basic-essentialist assumption that different types of animals, including different human groups, were unchangeable remained the same. The medieval Europeans also adopted the notion of the great chain of being, ranking different types of people into higher and lower groups. This ranking was held to be unchangeable; one's position on the hierarchy was assumed to be part of God's divine plan.

"Scientific" Racism

One of the first Europeans to explicitly apply the humoral model to different racial types was Jean Bodin (1530–1596). In his *Methods for Easy Comprehension of History*, Bodin associated people of different skin colors with different humors. Thus, whites (Europeans) had a predominance of the humor phlegm; yellow-skinned people (Asians) had a predominance of yellow bile; blacks (Africans) were assumed to have more black bile; and red-skinned peoples (Indians) were associated with the humor blood. Following the Greek model, Bodin also associated a particular temperament with each of these peoples based on their predominant humor. Indians (red skin, blood) were savage and warlike, while Africans (black skin, black bile) were lethargic and slow-witted. Asians (yellow skin, yellow bile) were cunning and devious, and Europeans (white skin, phlegm) were reflective and rational. Thus, the relationship between racial features and behavior, which was commonly assumed in the minds of most Europeans, became officially established in Western thought thanks to the work of Jean Bodin.

Following Bodin, the work of Carolus Linnaeus (Carl von Linné, 1707–1778) lent further scientific credibility to the racist association between race and behavior, including things like personality, intelligence, and morality. In his famous work, *Systema Naturae*, Linnaeus created the first formal system of taxonomy, the classification of plants and animals. Expanding on the work of John Ray, Linnaeus extended scientific nomenclature to all known life-forms, including humans. Organisms were grouped into categories

(taxa) based on similarities in the form and function of traits. However, this was not an evolutionary scheme. All species were viewed as permanent and immutable. Each was made by the creator in its present form and would remain so indefinitely. This applied as much to the different types of humans as it did to any other organisms. While Linnaeus put all varieties of humans into the same genus and species, *Homo sapiens*, he did assign different races to different subspecies categories. Thus, Africans were given the name *Homo sapiens afer*, while Europeans were called *Homo sapiens europaeus*. In keeping with Bodin's use of the Greek humoral model, Linnaeus assigned different temperaments or behavioral characteristics to each racial subspecies. For instance, *Homo sapiens afer* was "ruled by caprice." He described African women as "women without shame, [whose] breasts lactate profusely." *Homo sapiens europaeus*, on the other hand, was described as "rational" and "ruled by customs." Because of his reputation among the naturalists of his day, Linnaeus gave scientific credibility to the idea that people could, indeed, be divided up into races, and that these different races possessed different inherent and unchangeable abilities and potentials. Furthermore, these races could be ranked in terms of behavior and ability: Europeans (whites) were the highest, followed by Asians (yellows), then Indians (reds), and finally Africans (blacks).

Blumenbach's Skulls

Linnaeus's work sparked a great deal of interest in classifying all manner of plants and animals, including humans. Among those who were caught up in the taxonomy frenzy was a naturalist by the name of Johann Friedrich Blumenbach (1752–1840). He, too, assumed that people could be easily and accurately divided into essentialist racial categories. However, unlike his contemporaries, Blumenbach wasn't content to merely create racial typologies without reasonable data to support them. He looked at skin color and rejected it as the basis for racial types, noting that greater color variability existed within types than among them—an observation that turned out to be quite prophetic. Instead of looking at externals, such as skin color or hair texture, Blumenbach focused his work on the many characteristics and landmarks of the skull, taking dozens of measurements and observations. These data led him to create five racial types. While still essentialist in character, his work was less subjective than his contemporaries. In fact, some of the measurements Blumenbach developed are still used by forensic anthropologists today in order to establish the biological affinity of human remains. Because of his pioneering work in osteometrics, some people refer to Blumenbach as the father of physical anthropology.

Polygenesis: Beyond Racial Typologies

An underlying current that ran throughout much of the research on race was that different races represented, at the

very least, different subspecies or perhaps even separate species of humanity. The latter view is known as *polygenesis*, the belief that different races have entirely separate biological lineages. Perhaps the most explicit use of polygenesis in explaining different racial types is found in *Types of Mankind* (1854), by Josiah Nott and George Gliddon. Nott and Gliddon argued that each racial type had its own independent evolutionary line proceeding through a series of animals to its modern racial form. Among other things, this work gave scientific legitimacy to the common belief that races should not crossbreed; the result was dangerous to both parties involved. It also made it easier to justify the ranking in the chain of being for the races since they were actually separate species.

The Darwinian Revolution

In 1859, Charles Darwin published *On the Origin of Species*. The impact of this work on the thinking of people about life was monumental. The belief in the fixity of categories in nature, having existed at least since the Greeks, was shown to be incorrect. Instead, Darwin described a world in constant flux. The effects of natural selection reshaped every generation. Our taxonomic categories were fleeting and arbitrary; there was nothing essentialist or permanent about them.

These ideas transformed the way we look at the world; however, there were some notable exceptions. Darwin himself couldn't imagine how racial features could in any way be considered as promoting fitness. After all, what possible difference could the color of one's skin or the shape of one's nose make to survival and reproductive success? Darwin's failure to consider racial features as part of the adaptive process in humans led him to assume that these characteristics were not merely irrelevant but also permanent. It is hard to miss the irony that the very person who overthrew the notion of fixity in animals added to the prevailing ideas that racial types were permanent. It wasn't until his volume *The Descent of Man* (1871) that Darwin himself finally recognized the possibility of adaptive value in different racial traits. By then, of course, the damage had already been done and, consequently, the publication of Darwin's *Descent* had little impact on racist views.

Francis Galton and Eugenics

The failure of Darwin's work to overthrow the essentialist views of race gave rise to a number of so-called evolutionary schemes to address the race "problem" in England. One of the most insidious of these was *eugenics*.

Francis Galton, a cousin of Darwin's, began the eugenics movement in the 1880s as a way of addressing what he called "the race-destroying problem of heinous blood." Like most racial essentialists, Galton firmly believed that superior behavior was determined by superior biology, and that

those individuals who behaved “poorly” did so because of inferior biology. He believed that if the “superior races” (i.e., upper-class British) could produce more offspring than the “inferior races” (the lower classes), England could do away with all manner of ills (e.g., crime, prostitution, insanity, and drunkenness). However, he observed that in spite of their superior biology, the upper classes reproduced at a slower rate than the lower classes. The reason for this circumstance, he reasoned, was the tendency of upper-class men to seek out heiresses as marriage partners. It was the “bad blood” in such families that caused the lower rates of reproduction among wealthy families.

Galton assumed that upper-class families with “good breeding” would surely have produced male heirs to titles and lands; heiresses would only be found in families of lesser breeding who were incapable of producing male offspring. Not only did these inferior families fail to produce male heirs, but also they had less reproductive success overall compared with families of “good blood.” Thus, heiress blood was “race destroying.”

Galton’s solution to the problem was “positive” eugenics, the deliberate matching of children for marriage from families of good blood. Galton reasoned that if a registry could be created listing superior families, then prospective brides and grooms for one’s children could be selected from this list, assuring healthy and plentiful offspring for the upper classes, and reducing the likelihood that the superior races would be degraded by marriage to people from the inferior races. And since behavior follows biology, the greater the number of children produced from these matches, the greater the number of properly behaved people in society.

These registries proved difficult to construct; genealogies were often vague, lacking in completeness and hard to verify. Galton’s response to this setback was the promotion of “negative” eugenics: the active reduction in fertility among the lower classes. Social programs were established that prohibited certain people from marrying, and in extreme cases (i.e., prostitution, criminal behavior, insanity, “feeble-mindedness”) people were involuntarily sterilized. This was all done in the name of improving society. Since crime and other similar behaviors were caused by inferior biology, the only way to solve the problem was to reduce the number of people of inferior biology in society. Eventually, the majority of the population would be comprised of people of good breeding, thus creating a utopian society in which bad behavior was eliminated.

By the early 1900s, eugenics spread from England to other European countries and to the United States. In the United States, class distinctions were less marked than in England, so ethnicity replaced class as the main marker of social/biological rank. Each new wave of immigrants to the United States was assigned the bottom rung of the latter. Thus Italians, Irish, Jews, and Germans each took their turn as the most despised group.

Eugenics received much support from the new science of genetics that had sprung from the 1900 rediscovery of

Gregor Mendel’s work. Heredity was being seen more and more as something relatively fixed and immutable. This idea of “hard” heredity gained favor as the notions of “soft” heredity, based on the work of Jean-Baptiste de Lamarck, were discredited. Environmental influences on behavior were minimized as the pendulum swung strongly to the “nature” side of the nature-nurture debate. People are the way they are in their ethnicity and behavior because of their genes. Change was only possible through the long, slow process of mutation.

Franz Boas

The first real challenge to the claims of the eugenicists came from the work of Franz Boas, the father of American anthropology. Boas was the subject of scorn and even censure from his scientific colleagues for questioning the connection between race and behavior. The “hard” heredity of the eugenicists implied that one’s behavior (ethnicity or culture) was essentially determined by one’s biology. In the absence of any real adaptive explanations of so-called racial features, it was assumed that racial features and their associated behaviors were fixed. This represented a clear example of preevolutionary, essentialist thinking.

In a landmark article on eugenics published in *The Scientific Monthly* in 1916, Boas systematically lays out the problems with the eugenicist argument. He begins by saying how wonderful it would be if we could, indeed, rid humanity of all ills through the control of reproduction in the same way that desired characteristics are bred in domesticated animals. He follows this with a series of brilliant syllogisms pointing out that no firm connection between biological features and any sort of temperament, intelligence, or behavior had been established, only assumed. He also argues that even if such a connection did exist, then we would be hard-pressed to decide which features would be considered desirable under all conditions, and which may be subject to fad and fancy. Imagine, he said, selecting for a type of personality or talent that may be considered important today, only to have such a trait become less desirable in the future. Furthermore, the future may bring problems that call for certain behavioral traits that aren’t necessarily seen as useful today. By reducing biological variability, we reduce our adaptability.

The most prescient part of Boas’s argument is his discussion about the role of the environment, both physical and cultural, in shaping behavior. This is where he lays the foundation for anthropology’s separation of biology and cultural behavior. Culture, he argues, is not biology dependent. Indeed, it is wholly the product of one’s social and physical environment, along with the specific history of the society to which it belongs. This is such a part of the anthropology worldview today that we take it for granted. However, in 1916, this was seen as revolutionary, even heretical. It was a “rejection of modern science.” “Modern science,” of course, meant eugenics in particular, and genetics in general.

Boas was not content with merely suggesting hypothetical views to counter eugenics. He was first and foremost a scientist, and he recognized the importance of empirical evidence to support his ideas. He soon began a study of recent immigrants to the United States. He began by looking at Sicilian immigrants in terms of two factors: (1) cranial features, such as cephalic index, and (2) cultural behavior. He had two major goals in mind. First, he wanted to test the assumption held by the eugenicists that racial features, such as the cephalic index (a simple index derived by comparing the length of the skull with the width of the skull), were permanently linked with behavior. Second, he wanted to examine the connection between environment and behavior. He tested his idea that biology and culture were independent by comparing the cultural behavior of immigrants and their children upon arrival in the United States with their behavior after 10 years in residence. His findings were surprising, even to Boas. As he expected, the behavior of the Sicilians after 10 years in the United States was markedly different than their behavior upon arrival. This cultural change was most profound among the children, many of whom behaved in ways identical to children whose families had been in America for generations. Clearly, cultural behavior was the product of the environment, and was independent of biology.

The part of the study that was most unexpected, even to Boas, was that even the biology was subject to change. Cephalic index, once thought to be a static identifier of race, also changed among the Sicilian immigrants. Again, the most profound changes occurred among the children. Even biology, it seemed, was subject to modification from the environment.

Sherwood Washburn and the New Physical Anthropology

Boas and his students separated the racist connection between biology and culture for all of anthropology. However, physical anthropologists continued in their efforts to categorize human biological diversity. This search for “types” was not unique to physical anthropology. Cultural anthropologists described “Apollonian” and “Dionysian” cultural types, while archaeologists constructed any number of typologies based on pottery design or lithics. All of these involved the creation of an archetype through the arbitrary selection of characteristics deemed essential to a particular type, and the subsequent search for cases that fit the archetype. As in all essentialist approaches, the defining characteristics of a particular type were fixed and stable.

In the 1950s, physical anthropologist Sherwood L. Washburn changed the way we look at biological diversity. He argued that the search for racial types is not scientific, and actually ignores the dominant paradigm in all of the life sciences—evolutionary theory. One of the most important implications of evolutionary theory is that life is

in a constant state of flux. There are no static, unchanging elements. Even the taxonomic category of species is a temporary designation of a breeding population. In applying this to physical anthropology, Washburn (1951) said, “[Anthropology] must change its ways of doing things to conform with the implications of modern evolutionary theory. . . . There is no way to justify the division of a breeding population into a series of racial types” (p. 298).

Racial Typologies: Essentialist View

Racial types, like all essentialist concepts, are based on the assumption that certain core features exist almost exclusively in one type and not in another; each type is discrete and relatively stable. This is precisely why Washburn recognized that racial typologies are nonevolutionary in their form. All humans belong to a single species, *Homo sapiens*. Any biological differences we can observe among individuals or breeding populations (demes) must have arisen after the dawn of our species. This is evidence that humans, like all species, are in a constant state of change, in terms of both our biology and our culture. So-called racial traits, therefore, may have come about as adaptive responses to the different environments humans encountered as we expanded out of Africa some 100,000 years ago. This shifts our focus in physical anthropology from searching for static, essential features of racial types, to evolutionary explanations of biological diversity.

The American Anthropological Association (AAA) (2007) permanent Web site on race, *Race: Are We So Different?* (<http://www.understandingrace.org>), shows why essentialist views on race are arbitrary and nonscientific. Take, for example, *stature*. If we observe three people of different heights, as illustrated in Figure 7.1, we can easily divide them up into three types: short, medium, and tall.

However, as we add more and more people to our sample, we quickly realize that our essential types are arbitrary and lacking in scientific validity. As our sample size grows, as shown in Figure 7.2, we see that what we thought were fixed types actually are part of a graded continuum from short to tall, with no obvious or justifiable points to divide one type from another.

A similar situation exists with attempts to divide people up by skin color. If we start with three, as shown in Figure 7.3, we can easily create a typology comprised of light skin, medium-color skin, and dark skin.

Here, we see three actual groups: the Chöpi, the Jirel, and the Dutch. Each is supposed to represent a skin-color type. However, as Figure 7.4 shows, we encounter the same problems that we did with stature when we expand our sample size to include many more people from around the world.

Once again, we can find no scientifically valid point to draw our lines to separate this continuum into skin-color types.

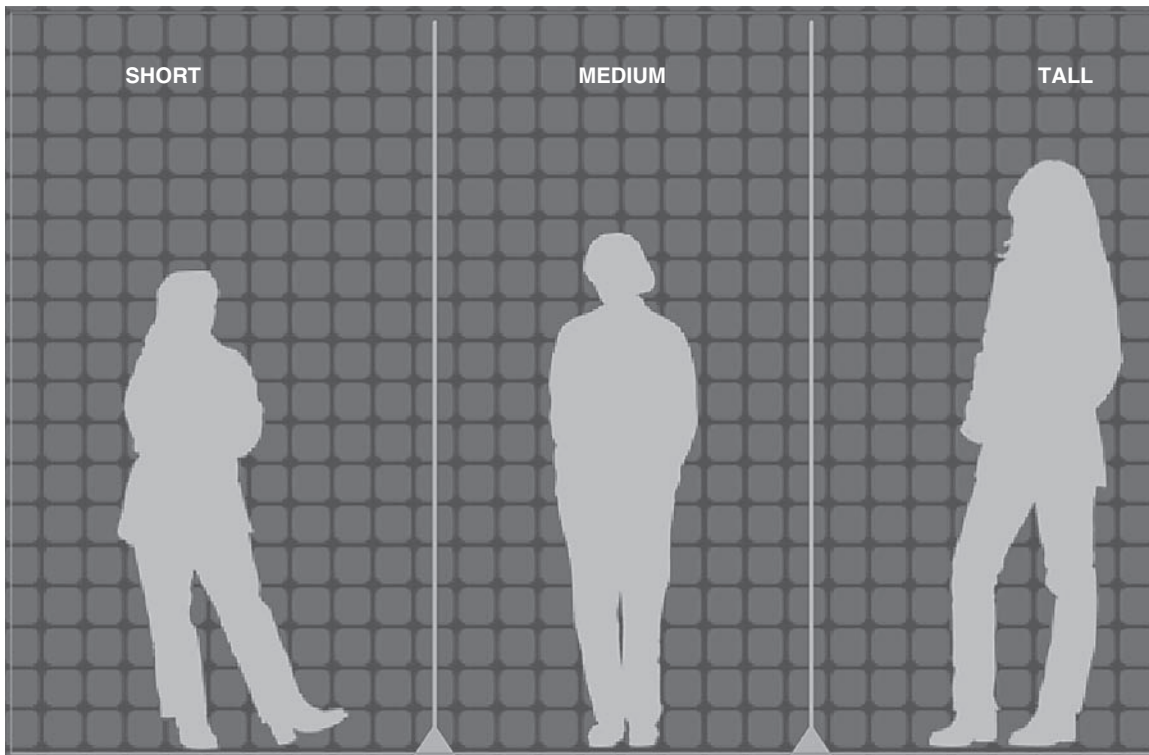


Figure 7.1 Human Stature: Sample of Three

SOURCE: Journal: *American Anthropological Association*, <http://www.understandingrace.org>. Image courtesy S2N Media, Inc.

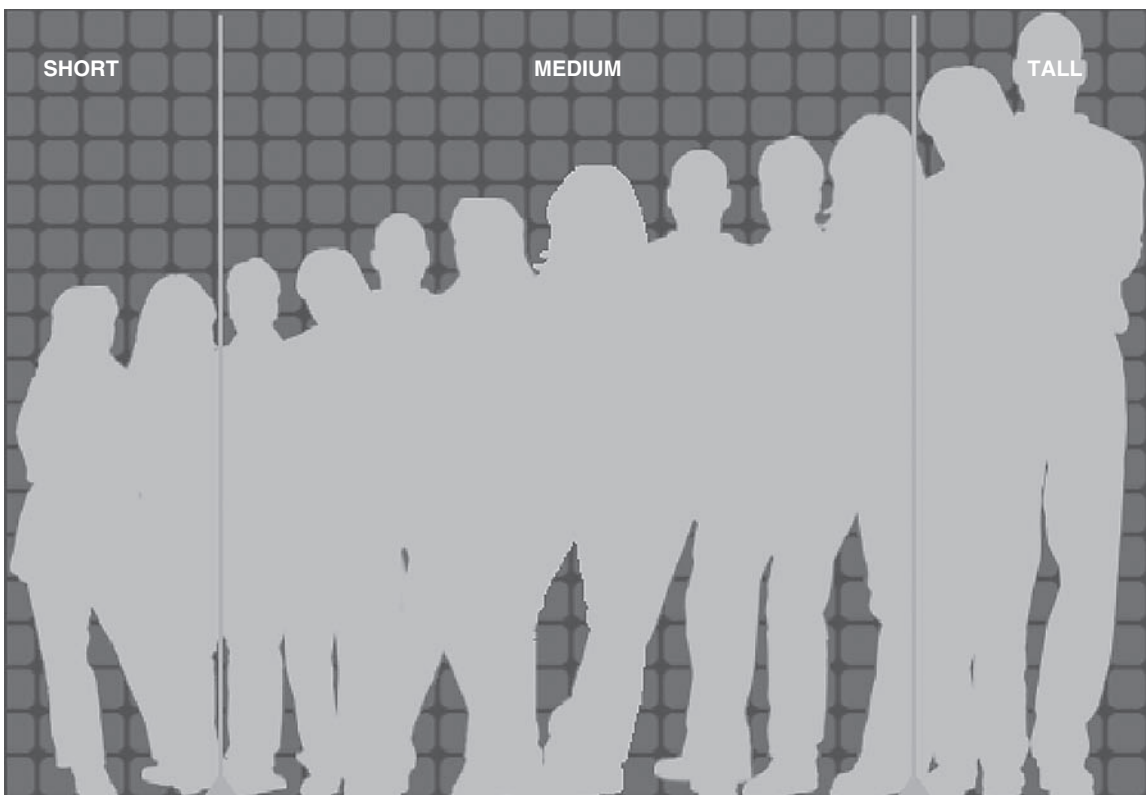


Figure 7.2 Stature: Large Sample Size

SOURCE: Journal: *American Anthropological Association*, <http://www.understandingrace.org>. Image courtesy S2N Media, Inc.

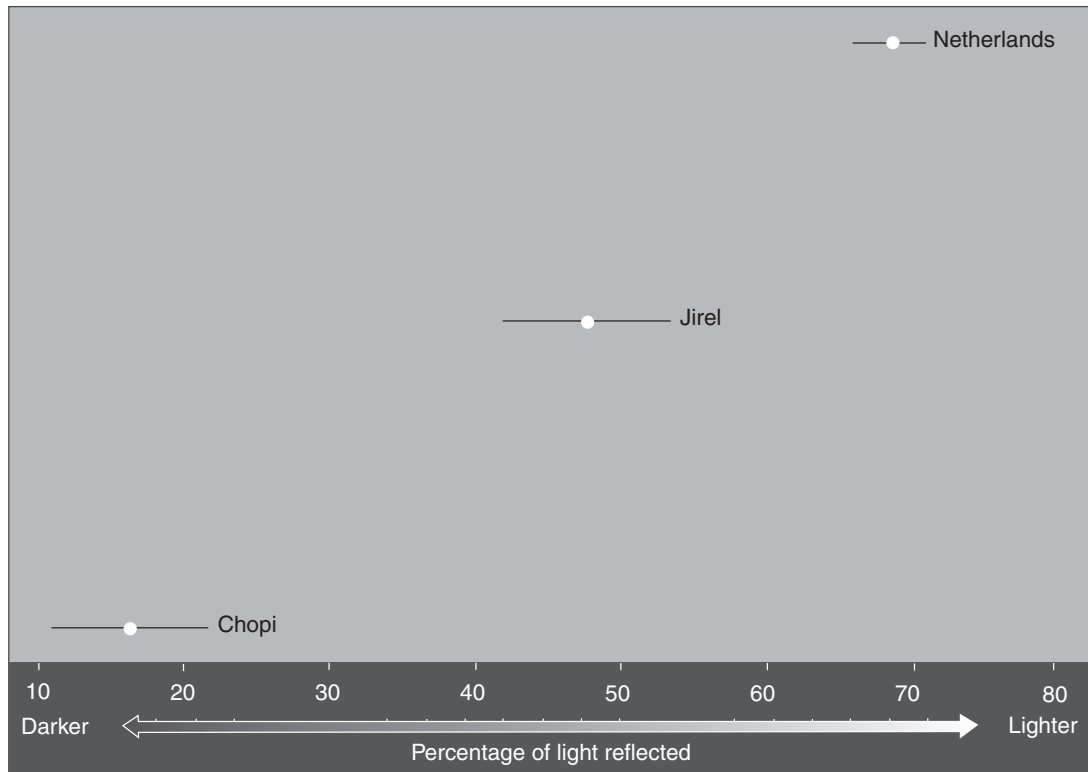


Figure 7.3 Skin Color: Sample of Three

SOURCE: Journal: *American Anthropological Association*, <http://www.understandingrace.org>. Image courtesy S2N Media, Inc.

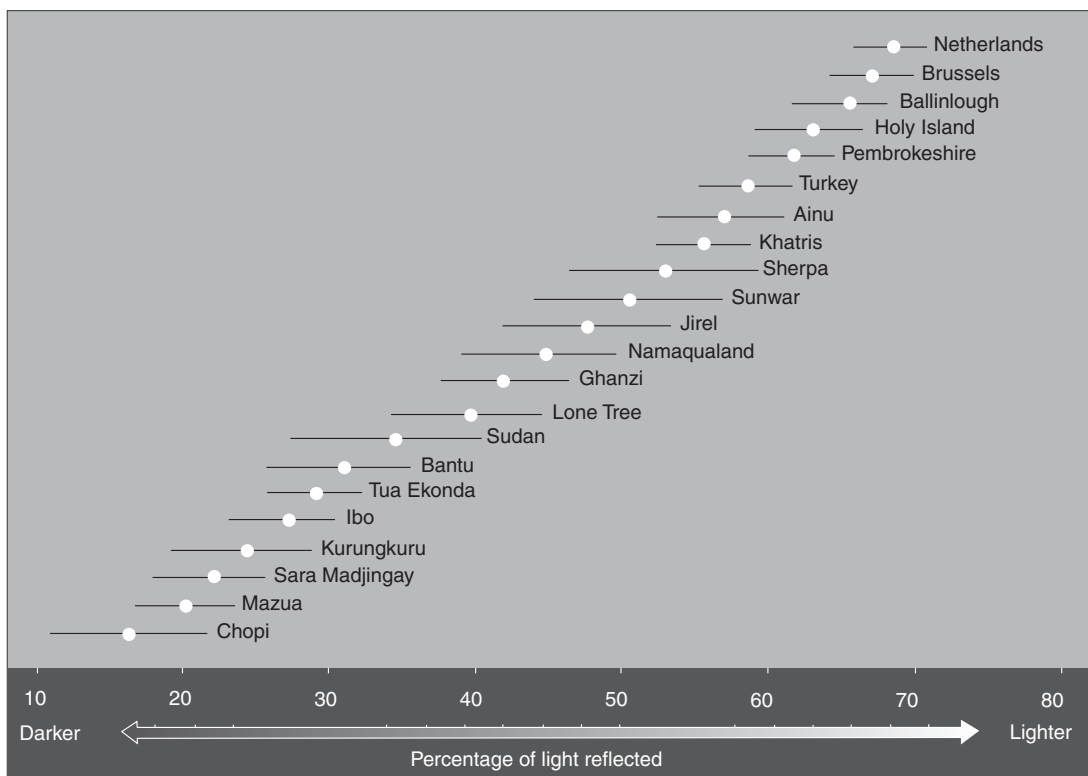


Figure 7.4 Skin Color: Large Sample Size

SOURCE: Journal: *American Anthropological Association*, <http://www.understandingrace.org>. Image courtesy S2N Media, Inc.

What these examples illustrate is that the biological differences we observe in people today represent *clines*, not types. Clines are gradual, usually continuous changes in the representation of traits from one area of the world to another. Skin color is an excellent example of a cline. As we move from the tropical areas of the world, where we find the darkest skin shades, to more northerly latitudes, skin shades get progressively lighter and lighter. There are no breaks or jumps in skin shade where one might reasonably draw a line.

Washburn pointed out in his presidential address at the American Anthropological Association meeting in 1962 that because “races” are open-ended systems that blend seamlessly into one another, the number of races one proposes depends on the purpose of the classification (Washburn, 1963). In other words, unless one specifies why a particular group does or does not have a particular trait, the classification has no meaning and leaves open the possibility of creating an almost limitless number of races.

Recent genetic research demonstrates that there are very few genetic characteristics that are unique to any particular breeding population. Rather, the majority of genetic varieties (alleles) are found in all human populations. The difference is in the frequency in which they are distributed from one population to another. Again, skin color provides a good example of how this works.

Pigmentation in the skin is determined by the amount of melanin. Melanin is produced by *melanocytes*, cells located in the bottom layer of the skin’s epidermis. The more melanin produced, the darker the pigmentation. All people, no matter what their skin shade, have about the same number of melanocytes. The differences come from how active the melanocytes are. The activity of the melanocytes is determined by the action of two genes that turn on the chemical activity that produces melanin. The differences in skin shades aren’t due to discrete differences in biology from one group to another. Rather, the biological mechanism for pigmentation is found in all groups. As we move from the tropics to Scandinavia, the melanocytes produce less and less melanin. Surprisingly, all of this is related to the amount of ultraviolet radiation striking the earth (more at the equator and less at the poles), the synthesis of vitamin D, and the absorption of calcium.

Finally, racist views of humanity have been discredited through worldwide comparisons of DNA. The old essentialist view separated people into distinct groups genetically with only the slightest amount of overlap between groups, as seen in the Venn diagram in Figure 7.5. However, the actual genetic picture looks quite different. As shown in Figure 7.6, humanity is all about overlap in DNA. The most salient feature about our species in terms of biological variability is our sameness. The differences are only minor adjustments to different environments made by our ancestors as they moved around the globe.

A couple of other quick points about racial typology: In addition to the fact that most biodiversity exists in the form of clines, we should also note that the traits used to categorize

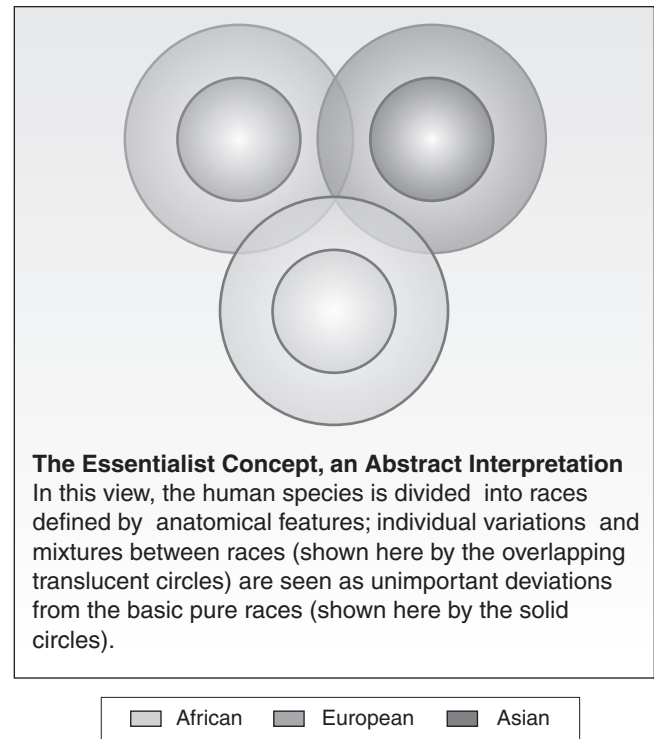


Figure 7.5 Human Variability: Essentialist View

SOURCE: Journal: *American Anthropological Association*, <http://www.understandingrace.org>. Image courtesy S2N Media, Inc., based on the work of Jeffrey Long.

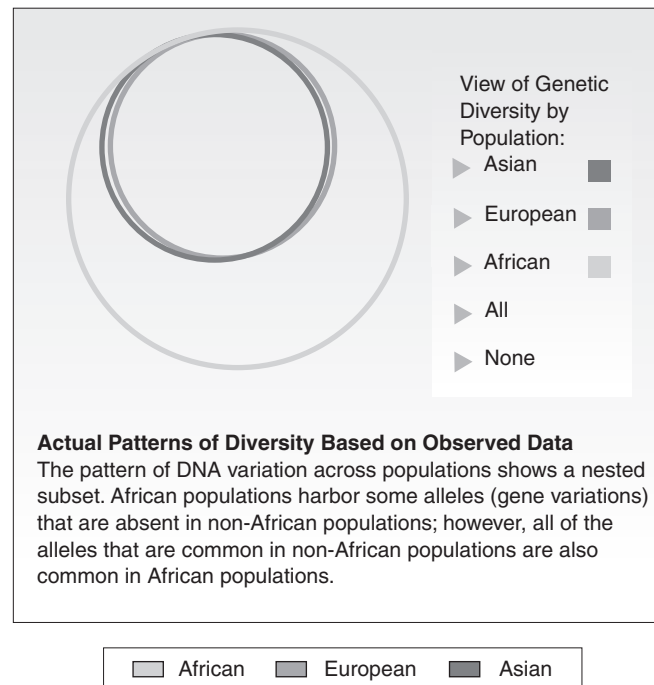


Figure 7.6 Human Variability: DNA Evidence

SOURCE: Journal: *American Anthropological Association*, <http://www.understandingrace.org>. Image courtesy S2N Media, Inc., based on the work of Jeffrey Long.

people into races are often arbitrary. Everything from skin color to the shape of the nose has been offered as “essential” elements of a race. Furthermore, the traits that are used to define races often don’t go together. A particular skin shade will vary independently of nose or ear shape. This is something that Blumenbach realized over two hundred years ago.

While physical anthropologists have abandoned the search for racial types, they certainly haven’t lost interest in human biodiversity. On the contrary, Washburn’s advice to use evolutionary theory to explain the frequency and geographical distribution of different phenotypes has led to the creation of a vigorous and productive research agenda in physical anthropology. Such topics as lactose tolerance among certain adults, the persistence of sickle-cell anemia and related conditions, differences in immune responses, and differences in lung and vascular capacities in certain parts of the world are just a few of the many issues being investigated today in biodiversity studies.

Race and Intelligence

Despite decades of research on intelligence by modern psychologists and other scientists, some segments of our society still cling to the persistent belief that some “races” are inherently more intelligent than others. If this were merely the view of white supremacists or other hate groups, then it could be easily ignored. Unfortunately, publications from some academics purporting to show racial differences in intelligence continue to show up on a regular basis. These publications tend to rely on two things to “prove” their case: IQ scores and standardized-test scores.

Modern psychologists are quick to point out that what one measures in an IQ test is as much about social environment as it is about innate intelligence. If intelligence were only genetically determined, then a person’s IQ should remain stable throughout life. However, we know that IQ can change depending on the social or intellectual environment in which one lives. Furthermore, psychologists recognize that all instruments such as IQ or aptitude tests contain a certain amount of cultural bias that will tend to favor test takers from the same cultural background. In order to compare two *groups* in terms of intelligence, we would first need to show that the individuals who comprise those groups are essentially identical in terms of background, cultural affiliation, and social experiences. It’s fairly easy to demonstrate that certain groups in our society, because of discrimination, have not shared equally in terms of wealth, education, and other benefits.

In the same presidential address mentioned above, Washburn (1963) described a study that compared the standardized-test scores (mean scores) of blacks and whites in the North and the South. It found that black children in the North scored better than white children in the South. Rather than accept the obvious conclusion that Northern schools were expending more educational effort

than Southern schools, those who saw things in racialist terms argued that all the “bright” black children had migrated to the north, so these represented an innately more intelligent group than the white children in the South. However, Washburn (1963) pointed out that the mean score of Northern whites was also higher than that of Southern whites. Washburn quipped, “Are we to believe that the intelligent Whites also moved to the North?” (p. 529).

Should We Abandon the Concept of Race?

Human traits exhibit continuous grading rather than discrete boundaries, making it scientifically impossible (or at least invalid) to group people into meaningful units called races. Furthermore, a person’s biological ancestry is the result of fluid adjustments over time to changing environments. The traits we might use today to classify people into races may be quite different or even absent in the future. Given these facts, should we simply discard the concept of race from anthropology? The resounding answer in the anthropological literature is “yes and no.” In order to untangle this paradox, we need to look at who is using the term *race* and exactly how they are using it.

Forensic Anthropology

Most anthropologists have no quarrel with the notion that race has no biological validity in terms of defining distinct groups based on physical attributes. However, there is one area in physical anthropology where the idea of classifying people into types is still very much alive and well: forensic anthropology.

Forensic anthropologists are charged with identifying individuals in a medicolegal context. They are called upon by law enforcement to help identify human remains that are too skeletonized to be analyzed using conventional soft-tissue methods of identification. Their skills are used in homicide cases, disasters such as plane crashes or fires, and any situation where osteological analysis may shed light on the deceased. Forensic anthropologists examine skeletal remains to determine age at death, sex, and any signs of trauma or disease that might affect the skeleton. In police cases, they look for any unique characteristics that may help in identifying the deceased, and they attempt to determine time, manner, and cause of death.

While anthropologists may balk at the idea of putting people into racial boxes, this sort of information is of great value to law enforcement. An obvious question one would ask, when trying to determine the identity of a person whose skeletal remains have been found, is about race: Was the individual black? White? Asian? It falls on forensic anthropologists to try to provide this information. The way they do this is through the careful measurement of dozens of features of the skeleton, in particular the skull. Decades of analysis of skeletons of people of known ancestry have enabled forensic anthropologists to identify

a constellation of osteological features that vary by ancestry. No single feature is sufficient to make a designation about ancestry, but taken together these features are highly predictive of a person's biological affiliation. Dr. George Gill (2000), a forensic anthropologist, reports an accuracy level of over 80% using new and traditional methods. The anthropology department at the University of Tennessee, Knoxville has taken the osteometric information from many thousands of individuals of known ancestry and put together a useful program called FORDISC, a computer program that can help individual researchers assign biological affiliation to a specimen of unknown ancestry. While FORDISC has been criticized for providing false identifications, most of these cases have been shown to be the result of user error and not due to the program itself.

Conclusion

Outside of the rather narrow confines of forensic anthropology, shouldn't we abandon the outmoded and dangerous term *race*? If we simply stop talking about race and instead talk about individuals, then couldn't we achieve a race-blind society and put an end to racism? After all, race is not a valid way to describe human biological variability, and, at best, it is simply a cultural construction.

Dr. Alan Goodman, former president of the American Anthropological Association and a noted authority on the concept of race, firmly supports the idea that race is not a valid way of conceptualizing human biodiversity, but he also rejects the notion that "race" is a mere cultural construct that has no real impact on people's lives. He calls race "a lived experience" that can have devastating effects (Goodman, 2006). People discriminate based on appearance. This includes such things as skin color. But overwhelmingly, discrimination is based on cultural or ethnic indicators such as language, dress, social habits, and so forth.

We tend to separate people into ethnic categories, but we often use racial terms to identify these categories. Thus, one talks about "black" culture or "white" culture as if the color of one's skin is somehow connected to one's behavior. While the connection is clearly not genetic, it is real nonetheless. An example can be found in the 2008 presidential election when then-candidate Obama was criticized by some leaders in the African American community for not being "black enough." Clearly, they were not talking about his skin color, but rather his lived experiences as a person of color. Obama didn't go through the "typical" black experience of discrimination and the social injustice that goes along with it, because he was raised by a white family in biologically and ethnically diverse Hawaii.

Using racial labels like "black" or "white" as shorthand for ethnic experiences may be useful and even necessary for Americans when talking about race. However, it also keeps alive the centuries-old essentialist notions about race and behavior. As long as we keep using biological terms to describe cultural characteristics, it may be inevitable that

we will continue to see the connection between the two as inexorable. Can we find a way to talk about the social injustice caused by racism without using racist terminology? That remains one of the biggest challenges facing our society today.

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DNA AND GENETIC ENGINEERING

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Anthropology has studied humankind in numerous capacities: morphologically, culturally, archaeologically, and philosophically. However, the knowledge gained by understanding the DNA molecule has increased our knowledge of humankind on a genetic and molecular level. In addition, with the completion of the Human Genome Project in 2003, the entire human genome has been sequenced and is now available for analysis. This is important to anthropologists because it allows the field to go beyond the bones and into the DNA.

Genetic engineering may provide scientific ways to explore the chemical record provided by DNA. Anthropologists will be able to view and explore the past, the present, and conceivably the future of any species, including our own, by the scientific examination of DNA. In addition, understanding DNA and genetic engineering will potentially provide anthropologists with analytical data to explain our genetic relationship to other primates. This type of data will serve to strengthen and further clarify earlier DNA homology studies that have already provided empirical evidence of our close genetic relationships to chimpanzees and gorillas. In the future, this technology can be used to determine our genetic relationship to Neanderthals and Cro-Magnons.

The genetic study of *Homo sapiens sapiens* is possible because the DNA molecule provides a chemical record of humankind's genetic makeup and evolutionary history as a process of time. This chemical record will allow examination because DNA is present in every cell in the body and is

universal to all life-forms on this planet. All current conglomerations of DNA in all living species are a result of genetic variation and natural selection within populations throughout ongoing organic evolution.

An Introduction to Biotechnology and Genetic Engineering

The two terms *biotechnology* and *genetic engineering* are used somewhat synonymously. However, the two have different origins and initially they had slightly different applications. Biotechnology, by conventional definitions, is the intentional alteration of other living things (i.e., plants and animals) for the purpose of benefiting humankind. This has been done throughout the history of our species. In fact, the word *clone* is Greek for "twig," because small sprouting twigs were removed from mature trees and planted in order to grow new trees.

Examples of early biotechnology include breeding animals that have desirable characteristics in order to increase the chances of producing offspring with those characteristics. It was noted even as far back as ancient times that if a fast male horse was bred with a fast female horse, most of the offspring would be fast.

Another example of early biotechnology would be the intentional pollination of specific crops that are more disease resistant and yield better fruition, while purposely not pollinating other crops lacking those desired characteristics.

Historically this method of biotechnology was limited to controlling what type of particular male specimen bred with a particular female specimen in an attempt to procure

favorable genetic characteristics in the resulting offspring. In many ways, these practices were an early form of eugenics (see Box 8.1).

BOX 8.1 EUGENICS AND EUTHENICS

Eugenics is considered the use of genetic measures, such as selective breeding, to make improvements to the genetic characteristics of a population. The word *eugenics* was originated by Sir Francis Galton (1822–1911), in his book *Hereditary Genius* (1869/1990). Positive eugenics is the encouragement of individuals within a population, with desirable and beneficial characteristics, to propagate through breeding. Conversely, negative eugenics is the discouragement or intentional prevention of the procreation of individuals in a population with undesirable, or subjective and nonbeneficial, characteristics.

Euthenics is the improvement of an individual's (or organism's) functioning, efficiency, and well-being by modifying environmental factors that are controllable. Examples of controllable environmental factors are living conditions, medical treatment, and education. Positive euthenics is the proactive method of improving an individual's quality of life. Examples of positive euthenics would be vaccinating against debilitating diseases and the potential use of genetic engineering to correct genetically inherited disease. Conversely, negative euthenics is the intentional or unintentional degradation of controllable conditions that subjects a population to a poorer quality of life. Examples of negative euthenics would be pollution, overpopulation, lack of education, lack of access to medical treatment, and disproportionate distribution of vital resources.

Euthenics differs from eugenics in that the focus of improving the individual is done after birth has already occurred, whereas eugenics strives to improve the probability of giving birth to an individual with desired genetics through selective breeding habits (i.e., before birth). Note that positive and negative euthenics affects an organism after it has been born and does not focus on selective breeding or the discouragement of two individuals breeding together. Another way of looking at this concept is that eugenics is a pregenetic attempt to improve an organism. Conversely, euthenics is a postgenetic strategy to improve an organism's well-being.

The concept of proliferagenics is the utilization of both eugenics and euthenics to improve and proliferate the genome and the well-being of a species. This idea focuses on improving pregenetic natural selection and then applying postgenetic euthenics to maximize the vitality of a species's genome.

Genetic engineering is similar to biotechnology in that there is an alteration of an organism's characteristics. In contrast to biotechnology, the process of genetic engineering denotes the intentional alteration of the actual DNA by using applications of new scientific technology that make changes at a molecular level. This means that a change is made in the actual genetic constitution of a cell by introducing, modifying, or eliminating specific genes by applying modern molecular-biologic techniques.

Another distinction is that biotechnology has traditionally been applied to agriculture for improving food products and livestock, whereas genetic engineering has more applications in medicine and anthropology. However, modern biotechnology has integrated genetic-engineering techniques as opposed to just utilizing breeding strategies to achieve those improvements. Due to the fact that biotechnology currently applies genetic-engineering techniques, the two terms are now frequently used interchangeably.

An alternative way to view the effects that biotechnology and genetic engineering could have on a modern population requires the natural manipulation of individuals through human intervention (using eugenics

and euthenics or proliferagenics). The desired or beneficial genetic results can now be accelerated with genetic engineering.

From a historical perspective, humankind long ago began to alter the process of natural selection of animals and plants to yield beneficial results. Now, with the advent of genetic engineering, humankind has the ability to accelerate that process even more. In fact, one can speculate that humankind may eventually possess control over its own evolution.

The possibility that humankind may have direct control over its own evolution, by using genetic engineering and DNA nanotechnology, is known as *emerging teleology*. Emerging teleology is the theory that scientists can direct evolution by using genetic engineering and DNA nanotechnology—a technique that uses molecular recognition to create self-assembling branched DNA complexes, which in turn yields the engineering of functional systems at a molecular level. This concept of emerging teleology was first proposed by philosopher and anthropologist H. James Bix in 1991.

In conclusion, we have to ask ourselves, what is genetic engineering expected to accomplish for humankind?

Or what has genetic engineering accomplished for humankind already? As mentioned earlier, understanding DNA can potentially help anthropologists to better understand the genetic relationships among species. Currently, several genetic-engineering techniques are already in use. Modern genetic-engineering applications include the use of genetically modified cells or microorganisms that can accomplish three major benefits:

1. Cells or organisms can be engineered to produce medically beneficial substances. The most common example of this is the production of insulin (see Box 8.2).
2. Genetically modified organisms can be engineered that will help in the study of human diseases. An example of this is the use of “knockout mice,” which has helped scientists to understand diseases like cancer (see Box 8.3).
3. Gene therapy allows the possibility of curing genetically inherited diseases by making corrections to the genetic defect at the level of the gene responsible. This can be achieved by inserting the correct gene(s) or by deleting the defective gene(s).

In 1987, the FDA approved the use of the first genetically engineered vaccine, which was used for Hepatitis B.

BOX 8.2 INSULIN

In 1978, a biotechnology company called Genentech produced the first synthetic human insulin. This synthetic insulin was produced by bacteria called *Escheria coli* using recombinant DNA techniques, which inserted a human insulin-producing gene into *E. coli*. This was the very first genetically engineered product made for human consumption and was approved for use by the Food and Drug Administration in 1982. The insulin-producing *E. coli* is an example of a transgenic organism. A transgenic organism is an organism with artificially inserted DNA from a different organism.

Prior to this, insulin was obtained from pigs and cows (bovine insulin actually differs from human insulin by three amino acid sequences). This type of insulin was associated with many allergic reactions and side effects. The genetically engineered insulin is identical to human insulin because it is manufactured by a human gene inserted into a bacterium; therefore, it is associated with fewer side effects and allergic reactions.

BOX 8.3 KNOCKOUT MICE

A knockout mouse is a mouse that has been genetically engineered to have a particular gene (or genes) turned off or “knocked out.” Knocking out or inactivating a particular gene can provide a research model, which can then provide information on what that gene normally does functionally. This is important because it is now known that 85% of human genes are shared with mice. Therefore, information about a particular gene in a mouse can be extrapolated to provide provisional information in relation to many human genes.

The first knockout mouse was engineered by Mario R. Capecchi, Martin Evans, and Oliver Smithies in 1989, for which they received a Nobel Prize in Medicine in 2007.

Knockout mice (also known as transgenic mice) can provide models to study genetic diseases (e.g., cystic fibrosis and neurofibromatosis). These knockout mouse models are known as disease analogues, which are used to create genetic databases that are collected by experiments on knockout mice. Results of the Mouse Genome Project (MGP) were published in 2001, and because humans share many genes in common, it is possible to accurately compare these similar sequences of genes to study disease.

This technology could be very significant in anthropology for the study of primates. It is conceivable that knockout chimpanzees or gorillas could be engineered.

Although these three major benefits offer the potential to help millions of people—and already have—controversy will ultimately arise over the direct, nonmedical application of genetic engineering to enhance normal physiological functions in humans.

Genomics is the study of the genetic makeup of a species. A genome project of a species is a comprehensive identification and classification of a species’s genetic makeup. Genome projects of several microorganisms have been completed including many viral and bacterial

genomes (e.g., *Haemophilus influenza* and *Mycoplasma genitalium* genomes were sequenced and completed in 1995). In addition, the Mouse Genome Project was completed in 1996 and the Human Genome Project was completed in 2003. Currently, other primate genome projects are underway, including the Chimpanzee Genome Project and the Neanderthal Genome Project.

In order to understand and conceptualize how understanding the DNA molecule and genetic engineering will impact many areas, including medicine and anthropology, one needs to first appreciate the history leading up to this marvelous technology. In addition, we need to stop and think about how the DNA molecule was discovered and what new technology enabled humankind to accomplish that important discovery. Finally, we need to be aware of the ideas that were proposed to be responsible for the phenomenon of inheritance before the discovery of the DNA molecule.

Early Concepts of Inheritance

Before the DNA molecule was discovered, there were only ideas and theories about heredity and inheritance. The most enduring dogma was the idea of “pangenesis,” which held that all of the cells throughout the human body shed *gemmules*. These *gemmules* were believed to be able to collect in the reproductive organs periodically before fertilization and reproduction.

The term *pangenesis* came from the Greek word *pan*, meaning whole or encompassing, and *genesis/genos*, meaning birth/origin. Pangenesis was found in Greek writings in the 5th century BCE and was advocated (and in some ways espoused) by Hippocrates (460–370 BCE). This idea was accepted by fellow Greek thinkers Plato (428–347 BCE) and Aristotle (384–322 BCE). However, Aristotle later attempted to refute pangenesis with his idea of *entelechy*.

Aristotle proposed the concept of *entelechy* to explain the manner in which an organism inherits and expresses its traits, which according to this idea are determined by a “vital inner force.” He also noted the idea of “having one’s end within,” meaning that an organism’s essential potential can be actualized by its own vital inner force, or *entelechy*. Aristotle also believed that this vital force was possessed by males in their semen and that females merely possessed the raw material to be formed.

Pangenesis and *entelechy* were both prevalent and accepted as facts throughout the Middle Ages by great thinkers such as Albertus Magnus (1193–1280), his student Thomas Aquinas (1225–1274), and Roger Bacon (1220–1294). In the later part of the Middle Ages, a physician named Paracelsus (1493–1541), also known by the name Philippus Theophrastus Aureolus Bombastus von Hohenheim, proposed that semen was actually an extract of the human body, which contained all of the

organs in what he called an “ideal form.” He believed that this was the biological link between parent and offspring. He was close.

Jean-Baptiste de Lamarck (1744–1829) proposed a theory that he called inheritance of acquired characters through use and disuse. In his theory, he proposed that changes in an organism’s physiology (over the course of its life span) were acquired and modified through the use of a particular function and then became a permanent and adaptable modification in what he called the germ-line. According to Lamarck, this modification was impressed on the parent form and then transmitted to the offspring, who would, as a result of this process, express this modification as a permanent characteristic that could be altered subsequently through use or disuse.

The acceptance of pangenesis and *gemmules* appeared as a provisional hypothesis by Charles Darwin (1809–1882) in his publication *On the Origin of Species* (1859), and later again in *The Variation of Animals and Plants Under Domestication* (1868). However, Darwin was unaware of the DNA molecule (which was not yet discovered) or of the works of Gregor Mendel (which were published during Darwin’s lifetime, and received but never read by him); therefore Darwin continued to comprehend his theory of evolution according to those concepts of his time—pangenesis and *gemmules*.

Thus, before any scientific explanation could account for the phenomenon of inheritance (or evolution), there were several unfounded ideas that were accepted. These ideas were mainly pangenesis, *gemmules*, and *entelechy*. Later theories such as the use and disuse of acquired characteristics were proposed and gained some popularity, but no theoretical model existed that could scientifically or mathematically account for how characteristics were inherited.

Gregor Mendel: The Father of Genetics

Gregor Johann Mendel (1822–1884) was a monk and a mathematician, and known as “the father of genetics” because his seminal works inspired others to study the phenomenon of inheritance. In 1857, he began conducting experiments using pea plants, *Pisum sativum*. He bred particular plants together and then he meticulously recorded the characteristics of the resulting offspring.

Mendel’s term *character* was a description of what we now call a phenotype (see Box 8.4). Typical characters that Mendel studied and measured were the height of the plants and the color of the pea plant’s flowers. Each character possessed different traits; for example, height was measured as tall, normal, or short; and color was measured as white, pink, or red. Therefore, traits were different varieties of phenotype (i.e., the measurable or observable characteristics of the plants).

BOX 8.4 GENOTYPE AND PHENOTYPE

The study of genetics uses the terms *genotype* and *phenotype*. An organism's genotype is the actual genetic constitution, or its DNA. The term *phenotype* is used to describe the observable, tangible, and measurable physical properties of an organism. The phenotype of any characteristic is a result of the interaction between the organism's genes with each other and also with those genes' interaction with the environment over time:

$$\text{Phenotype (expressed characteristics)} = \text{Genotype (genes/DNA)} \times \text{Environment} \times \text{Time}$$

A phenotype has a genetic and environmental component that affects how it is expressed. The genotype contains the information that is expressed.

Mendel's experiments demonstrated that the traits of a character were distributed in a mathematically predictable pattern. He used these mathematically predictable patterns to devise two important laws known as Mendel's laws, which he called the law of segregation and the law of independent assortment.

In general, the first law, which was the Mendelian law of segregation (of genetic factors), was hypothesized by Mendel to mean that each trait (e.g., height or color) must have two "factors." Mendel would later call these factors "alleles." One factor, or allele, was inherited from each parent, one from the mother and one from the father. Although two alleles are inherited, only one of the alleles was expressed, and therefore, according to Mendel, they were segregated. Today it is known that *gametes* are sperm and egg cells, which combine their genetic material during fertilization.

Mendel did not know the underlying biological process in cell replication and division at that time. However, it is now known that during the cell cycle, the DNA replicates itself and divides, yielding two identical cells, each with two sets of chromosomes, known as diploids. This process is known as mitosis. In addition, a specialized version of mitosis takes place with the production of the gametes, in which the gametes, known as haploids, have one set of chromosomes each. This process is known as meiosis. When the two separate gametes (or haploids) are joined during fertilization—one from the mother and one from the father—to form a zygote, the alleles (i.e., the DNA) then recombine.

During the course of his experiments, Mendel found that each allele was either dominant or recessive for a specific trait. He elaborated that there were three possibilities. First, if the two alleles were both dominant, then the trait inherited was considered to be *homozygous dominant* (AA). Second, if the two alleles were both recessive, then the inherited trait was considered to be *homozygous recessive* (aa). Third, if the two alleles were different, one dominant and one recessive, then the inherited trait was considered to be *heterozygous* (Aa), or a hybrid. The homozygous dominant, homozygous recessive, and heterozygous combinations could be crossbred and those

results could be used to mathematically predict the probability of what type of offspring would result.

The Punnett square was devised by British geneticist Reginald Punnett (1875–1967), who published the first textbook on genetics, *Mendelism* (1905). He used these Punnett squares to predict the mathematical probability of the outcome of a particular breeding experiment. The results of the Punnett square could be used to predict the probability of possible genotypes of the offspring in a particular cohort given the genotype of the maternal allele and the makeup of the paternal allele.

Mendel's second law, the Mendelian law of independent assortment (of genetic factors), is where he hypothesized that the inheritance pattern of one trait does not affect the inheritance pattern of another trait (i.e., they assort independently). He justified this with his concept that alleles segregate during gamete formation and then recombine independently of one another. He was incorrect in this assumption. It is now known that there is a multigene interaction and what is known as the blending of inherited traits. This was proven in the early 1900s by Thomas Hunt Morgan (1915/1978) and his colleagues in experiments involving fruit flies.

In essence, Mendel's second law worked with pea plants because they are much simpler organisms, genetically, than mammals. In addition, the characteristics that he was measuring were not complicated. However, Mendel himself speculated that these laws may only apply to certain species, but he didn't know why, because the DNA molecule had not been discovered yet. This is the reason why Mendel and others at his time could only study what was being expressed genetically. They did not understand or appreciate the genetic material itself.

In Example 1 (see Figure 8.1), a trait that is homozygous dominant (YY) is crossed with a trait that is homozygous recessive (yy). This example yields 100% heterozygous/hybrid offspring (Yy). In Example 2, two hybrid traits are crossed. This example yields 50% heterozygous offspring, 25% homozygous dominant offspring, and 25% homozygous recessive offspring. This is a classical and simplified example of Punnett squares.

	y	y
Y	Yy	Yy
Y	Yy	Yy

Example 1

	Y	y
Y	YY	Yy
y	Yy	yy

Example 2

Figure 8.1 Punnett Squares

In addition to the two laws that Mendel devised, there are three other elements that made his work significant. First, he demonstrated the value of conducting controlled experiments. Second, he was a mathematician and applied mathematics to analyze and interpret his data. Third, he published his results, which is probably the most significant of all because his findings were not widely acknowledged during his time. However, his works were rediscovered after his death and had a profound effect on the study of inheritance and genetics. His work was of particular significance because this was the first successful mathematical model that had been proposed to explain inheritance.

Hugo DeVries: The Mutation Theory of Evolution

Hugo Marie DeVries (1848–1935) was a Dutch botanist and is considered to be one of the first geneticists. He is known for his mutation theory of evolution, which was chiefly influenced by Gregor Mendel's laws of heredity, which he rediscovered in the 1890s, and Charles Darwin's theory of evolution.

DeVries's (1905/2007) mutation theory of evolution speculated that new varieties of a species could appear in sudden, single jumps as opposed to slowly changing over time. His theory proposed that differences in an organism's phenotype could change rapidly from one generation to the next; this also became known as *saltationism*. He based this theory on his experiments, which involved hybridizing plants. One particular observation was made by DeVries during these experiments that influenced and compelled his mutation theory of evolution. Occasionally an offspring appeared that had different characteristics than both the parents and was also different from the other offspring. Based on this finding, he postulated that new varieties of species could appear in nature spontaneously. By this, he in essence proposed that a mutated gene could equal a new species (i.e., mutation equals speciation). This was opposed to Darwin's theory of gradualism.

DeVries's mutation theory of evolution was supplanted in the late 1930s by modern evolutionary synthesis, initiated by Julian Huxley (1887–1975). Huxley first introduced

this theory in his book *Evolution: The Modern Synthesis* (1942). At this time, he attempted to rationalize a unification of several biological specialties (e.g., genetics, systematics, morphology, cytology, botany, paleontology, and ecology) in order to postulate a more rational account of evolution. Julian Huxley's work was stimulated by population genetics and served to clear up confusion and miscommunication between specialties existing at that time. In addition, modern evolutionary synthesis defended the notion that Mendelian genetics was more consistent with Darwin's gradualism (and natural selection), as opposed to DeVries's hypothesis of the mutation theory.

The mutation theory of evolution proposed by DeVries had nothing to do with what we currently acknowledge as genetic mutations. The current definition of a mutation is the process by which a gene undergoes a structural change to create a different form of the original allele, which results in a completely new allele. Therefore, spontaneous changes can occur in the DNA that can (but sometimes do not) cause changes in an organism's physiology. This change does not give rise to the sudden appearance of a new species; rather it can produce a modification of the erstwhile species. This was later supported by genetic research done on white-eyed and red-eyed fruit flies by Thomas Morgan and colleagues (1915/1978).

DeVries was known for another accomplishment that arose from his experiments when he speculated that the inheritance of specific traits of an organism occurred through a transfer of particles, which he termed *pangenes* (derived from the word pangenesis). The term *pangenes* was shortened 20 years later by Wilhelm Johannsen (1857–1927) to *genes*. The term *gene* is currently defined as a basic unit of inheritance.

There was some debate that surrounded the "rediscovery" of Mendel's work. In DeVries's publication on the topic of inheritance, he mentioned Mendel in a footnote but took credit for the concept of particles of inheritance with his idea of pangenes. It was Carl Erich Correns (1864–1933), a German botanist and geneticist, who pointed out Mendel's priority, which DeVries eventually publicly acknowledged.

As it turned out, Carl Corren was a student of Karl Wilhelm von Nageli (1817–1891), a famous Swiss botanist, who had corresponded with Mendel regarding his findings years earlier. Corren was familiar with Mendel's work as a result of this association. An even stranger twist to this was that when Nageli and Mendel were collaborating, Nageli had actually discouraged Mendel from doing any future work studying genetics, for what he considered religious and ethical reasons.

Morgan and Muller: The First Genetic Experiments

Thomas Morgan (1866–1945) was a geneticist who performed experiments on fruit flies (*Drosophila melanogaster*).

He chose to conduct experiments on fruit flies because they required few resources, reproduced quickly, had observable characteristics that could be measured, and had only four chromosomes, which made them ideal for genetic research.

As a result of his experiments in the “fruit-fly lab,” Morgan established that genes were arranged in a line on what is known as a chromosome, which is present in every living cell. Since genes were believed to be responsible for inheritance and were now shown to exist on chromosomes, this became known as the chromosomal theory of inheritance, which had been alluded to prior to Morgan but had not been supported scientifically. He also noted that there was recombination of inherited characteristics resulting from the exchange of genes between two chromosomes of a pair, which he called “crossing over.” This of course disproved Mendel’s second law of independent assortment.

Morgan collaborated with three of his very important students: Hermann Muller, Alfred Sturtevant, and Calvin Bridges, all of whom continued performing genetic research on fruit flies. Collectively, from around 1908 to 1914, they were able to establish that chromosomes carry genes, those genes are distinct physical objects that are arranged on the chromosomes, the genes also could change place on the chromosomes, the genes could be mutated, and those mutated genes could be reliably inherited in future generations.

Morgan’s experimental proof that genes were discrete physical objects carried on chromosomes and they govern the patterns of inheritance was of major significance. Prior to this, the gene was a speculation with no scientific evidence to support it. Morgan’s research also illustrated that the sex of a species was inherited just as all other characteristics are inherited. He became aware that it was the chromosomal differences between the sperm and egg cells that correlated with the determination of gender. This was proven by his famous experiments with white-eyed male fruit flies and red-eyed female fruit flies.

A significant discovery, made by Hermann Muller (1890–1967), was that mutations could be caused by exposure to high-energy radiation. This technique enabled them to perform those significant genetic experiments, and to give validity to the chromosomal theory of heredity. Hermann Muller received a Noble Prize for physiology and medicine for his discovery that X-rays induced mutations. He was also the first to visualize genes as the origin of life. The reason he believed this was because genes (or chromosomes) can replicate themselves. He further speculated that all of natural selection and evolution acted at the level of the gene.

Prior to Morgan and Muller, the first proof that chromosomes carried hereditary material came from American physician and geneticist Walter Sutton (1877–1916), based on his research on grasshopper cells. Sutton was the first to speculate that the Mendelian laws could be applied to the chromosomes at a cellular level, which is now known as the Boveri-Sutton chromosome theory. However, it was

Morgan’s genetic research that provided enough reproducible scientific data to support the chromosomal theory of heredity, which became generally accepted by around 1915 (even though some geneticists, such as William Bateson, continued questioning it until about 1921).

The Discovery of the DNA Molecule

In the early 1920s, it was generally accepted that genes were arranged on chromosomes and that this is how the inheritance of characteristics arose. However, no one was sure what chromosomes were chemically made of or how they worked.

In 1928, a British scientist named Frederick Griffith (1871–1941), who was influenced by Mendel’s hypothesis of units of inheritance, theorized that a molecule of inheritance must exist. He began conducting experiments on *Streptococcus pneumonia* and proposed that an inheritance molecule existed and could be passed on from one bacterium to another by a process called transformation. Griffith’s research on transformation proved how an inheritance molecule could be transferred from one bacterium to another; however Griffith never discovered what the inheritance molecule was. Nevertheless, his work in turn inspired others to continue looking.

During this time, it was known that genes were arranged on chromosomes responsible for the phenomena of inheritance, but no one was able to prove their makeup. This dispute narrowed down to proteins, lipids, carbohydrates, and nucleic acids. The popular belief was that the inheritance molecule was protein because there were more proteins in existence, whereas only four nucleic acids were known (later a fifth nucleotide would be discovered in RNA). Some postulated that it was proteins and nucleic acids that made up the inheritance molecule, but there was no scientific proof to support any of these arguments.

Friedrich Miescher (1844–1895) discovered nucleic acids in 1868, while studying white blood cells. He called them *nuclein* because they were located in the nucleus, but no proof existed to support the fact that nucleic acids were responsible for the inheritance of characteristics.

In the early 1940s, a scientist named Oswald Avery (1877–1955) rediscovered Griffith’s work on transformation. Avery had the advantage of newer technology and advances in cellular biology. Avery had begun to conduct experiments that selectively destroyed different components (carbohydrates, proteins, lipids, and deoxyribonucleic acids) of a virulent bacterium, which he injected into a mouse. If the mouse died, he concluded that the bacterium had maintained its virulence (i.e., it was able to replicate its virulence). During his experiments, he found the bacteria were able to maintain their virulence when the carbohydrates, proteins, or lipids were destroyed. However, the bacteria were unable to be virulent when their deoxyribonucleic acids were destroyed. Therefore, Avery was the

first scientist to prove that the genetic material responsible for inheritance was composed of nucleic acids.

Avery's findings were very significant because they proved that genes, which are made out of nucleic acids (i.e., deoxyribonucleic acids or DNA), are responsible for the genetic inheritance of all organisms' characteristics. However, at this time, no one knew what DNA's structure was or how it functioned.

In 1952, Erwin Chargaff (1905–2002) published results based on his experiments involving the isolation of nucleic acids from three microorganisms: *Serratia marcescens*, *Bacillus schatz*, and *Hemophilus influenza* type C. He was able to separate the nucleic acids using a technique called adsorption chromatography. He discovered that DNA was composed of two purines, adenine (A) and guanine (G), and two pyrimidines, thymine (T) and cytosine (C).

In addition, Chargaff also pointed out that in any section of DNA, the number of A residues was always equal the number of T residues and that the number of C residues were always equal to the number of G residues. This became known as Chargaff's rule. Later, Watson and Crick (1953) would correctly propose that A and T actually pair together and that G and C pair together (due to hydrogen bonding), which is known as Watson-Crick base pairing. By analyzing the chemical structures of these molecules, Watson and Crick pointed out that A and T both have two hydrogen bonds available, which is why they pair together. C and G have three hydrogen bonds available, which is the reason they pair together. Therefore, Watson and Crick were able to find the molecular explanation of Chargaff's rule (A=T and C=G), but they went a step further with Watson-Crick base pairing to explain why this is true.

Shortly after Chargaff was making his discovery, another significant discovery was being made by scientists Maurice Wilkins (1916–2004) and Rosalind Franklin (1920–1958). Their research illustrated that the DNA molecule had a helical shape and was made up of two strands that were connected by ladderlike rungs. They were able to prove this by studying crystallized X-ray patterns of DNA.

On April 25, 1953, Watson and Crick published an article proposing a molecular structure of DNA. They had incorporated the findings of Chargaff, Wilkins, and Franklin, as well as their own, to propose that the helical strands were the sugar-phosphate backbone and that the ladderlike rungs were pairs of nucleotides (A=T and G=C). Therefore, Watson and Crick established that the molecular structure of DNA was in fact a double helix. This was significant because they were then able to explore and propose a model to explain how DNA worked.

It should be pointed out that the structure of DNA was discovered based on the research and results of many scientists. Watson and Crick definitely made this significant discovery, but they gained much insight from the works of Chargaff, Wilkins, and Franklin.

Chromosomes: Compact DNA

A *chromosome* is a long, single piece of DNA that contains several genes; in some species 10 to 40 genes and in other species thousands or more genes can be present in just one chromosome. In eukaryotes, the chromosomes are organized structures that consist of DNA and special structural proteins called *histones* that wind, coil, and compact large DNA sequences so that they fit efficiently in the nucleus. The chromosome does not always stay condensed, but periodically relaxes and uncoils for replication and for the transcription of proteins. *Topoisomerase II* is a DNA-nicking-closing enzyme that allows the uncoiling of the DNA supercoils during DNA replication and translation.

In prokaryotic cells, the DNA is either organized in clusters with no nucleus or into small circular DNA molecules called *plasmids*, which do not contain histones. In viral genomes, very simple chromosomes are found and can be made out of DNA or RNA, which are short, linear or circular chromosomes that usually lack structural proteins.

In all animals, DNA in the chromosomes is packed by histones into globular aggregates known as a *nucleosome*. The amino-acid sequence of histones shows almost 100% homology across all species, which illustrates their importance in maintaining chromosomal integrity, structure, and function. In addition, it is now known that the genes that code for histones have no introns.

The DNA strand is wound up and packed with eight histones to form a nucleosome, or what is sometimes called "beaded strings." These units are further coiled into what is called a solenoid, which contains five to six nucleosomes. The solenoids are then condensed into a chromatin fiber, which has histone H1 holding the core together. The chromatin fiber then folds into a series of loops that are held together by a central scaffold (made of nonhistone chromosomal protein), and this configuration is called a looped fiber. The looped fiber is then coiled to form the fully condensed heterochromatin of the chromosomes.

The coiled and condensed heterochromatin pairs up with an identical copy of itself, and each of the two are referred to as a *chromatid*. Two identical chromatids are attached to each other by a *centromere*. The centromere divides both chromatids into a long arm and a short arm. During cell division, microtubules attach to the centromere and align the chromosomes in the center of the dividing cell. The chromosomes are then split, yielding two identical cells—each with its own set of chromosomes. This process is known as *mitosis*.

All four arms of the chromosome (two long arms and two short arms) have a specialized cap known as a *telomere*, which has several functions (e.g., preventing the ends from sticking together). The chromosomes also show a distribution of two types of bands. G-bands are A-T rich regions and R-bands are G-C rich regions.

DNA Structure: The Double Helix

As mentioned earlier, the DNA molecule is composed of two purines (A and G) and two pyrimidines (T and C), and all four are nitrogenous bases. These nitrogenous bases are attached to a deoxyribose sugar, which is attached to a phosphate group to form a nucleotide (see Figure 8.2).

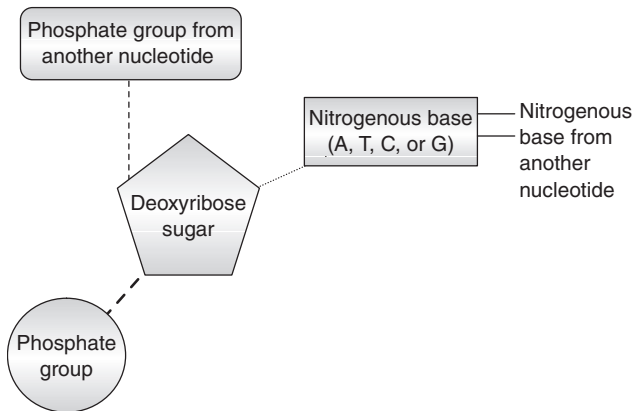


Figure 8.2 Nucleotide

In DNA, a nucleotide is any of the four nitrogenous bases attached to a deoxyribose sugar, which, as explained, is attached to a phosphate group. Because there are four different nitrogenous bases (A, T, G, and C) in DNA, there are four different nucleotides. The deoxyribose sugar can bond with a phosphate group from another nucleotide to form a chain. The nitrogenous base portion of the nucleotide can bond with the nitrogenous base from another nucleotide.

Nucleotides attach side by side to make long strands of DNA. They are able to attach in this fashion by the phosphate group of one nucleotide to the deoxyribose sugar of another nucleotide. This strand is formed in what is known as the 5 prime to 3 prime direction and opposite of this strand is a complementary chain which goes in the 3 prime to 5 prime direction. The original strand is attached to the complementary strand by the hydrogen bond discussed earlier: A=T and C=G. Therefore if the original strand is

5 prime-ATGCTC-3 prime,

the complementary stand is

3 prime-TACGAG-5 prime.

When Watson and Crick proposed the structure of the DNA molecule, they stated that the molecule was a double helix held together by ladderlike projections. The backbone of the helix is the deoxyribose sugar and phosphate group. The ladderlike projections are the base pairs A=T, G=C, T=A, and C=G.

DNA Replication

One of the phenomenal characteristics of the DNA molecule is that it not only stores genetic information but replicates itself. This process is simply known as *replication*. Replication starts when the double strand is opened up by a *helicase enzyme*, which exposes the base sequences. While the base pairs are exposed along the template strand, a new strand of DNA (a complementary strand) is synthesized by DNA polymerase.

Replication occurs continuously from the origin of one strand, called the leading strand, which follows the 3 prime to 5 prime direction. The other strand on the DNA molecule replicated is called the lagging strand and does not replicate continuously, but rather in small sections (~100–200 bases), which are called *Okazaki fragments*. These fragments are linked together by DNA ligase. The leading strand replicates a complementary strand with DNA polymerase delta, while the lagging strand makes a complementary strand using DNA polymerase alpha.

The process of replication results in two identical copies (called daughter duplexes) of the original strand of DNA. Each daughter duplex contains one parental strand from the original DNA molecule and one newly synthesized strand. This is known as a semiconservative model. In 1958, Matthew Meselson and Franklin Stahl used a scientific technique with radio-labeled nitrogen bases to prove that the DNA molecule replicates using a semiconservative model.

In healthy cells, there is a set of postreplication-repair enzymes and base-mismatch proofreading systems. These systems remove and replace mistakes made during replication (e.g., a wrong base being inserted into a growing strand). Occasionally, a change in the nucleotide sequence takes place; this is known as a *mutation*.

In 1977, two scientists, Richard Roberts and Phil Sharp, discovered that there were many regions in the DNA that did not code for anything. Roberts and Sharp called these noncoding interruptions *introns* (short for *intervening sequences*), and the sections that are coding regions are referred to as *exons*. They also found that mRNA, which was thought to be an exact copy of a transcribed section of DNA during protein synthesis, was actually missing these intron regions.

Introns are believed by some to be “junk DNA” or filler sequences. However, others believe that the extra sequences may stabilize the DNA molecule, or that the introns may be genetic remnants of evolution (vestigial DNA) and may have been expressed in the past but now lies dormant. In addition, it is conceivable that introns may have a function that presently eludes us.

The RNA Molecule

RNA (ribonucleic acid) is a small, single-stranded nucleic acid that is involved in protein synthesis. Single-stranded

RNA (and in rare cases double-stranded RNA) are also found in viruses. Besides being single stranded, RNA differs from DNA in two other important ways. First, DNA contains deoxyribose sugar in its backbone, whereas RNA contains ribose sugar. Secondly, in RNA there is no thymine; rather it is replaced with a different nitrogenous base called uracil, which pairs with A on the DNA molecule during protein synthesis (U=A), just as thymine does.

In the early 1980s, Thomas Cech did a significant amount of research on RNA. At that time it was believed that only proteins could act as biological catalysts. Cech was able to prove that RNA could function as a biological catalyst as well. He even discovered what he called *ribozymes* (later classified as species of RNA), which take part in the synthesis of mRNA, tRNA, and rRNA. Currently nine types of RNA have been identified:

1. *Heterogeneous nuclear RNA* (hnRNA) is transcribed directly from DNA by an enzyme called RNA polymerase. This form of RNA contains all the coding regions (exons) and noncoding regions (introns). Then, hnRNA is processed to yield mRNA for protein synthesis.
2. *Messenger RNA* (mRNA) is the modified version of hnRNA, which has had all of the introns removed, and possesses only the coding regions, which contain a code (the triplet code or codons) that is used for transcribing proteins.
3. *Transfer RNA* (tRNA) is transcribed from coding sequences on the DNA molecule by RNA polymerase III. This type of RNA possesses an anticodon on one of its ends, which matches a particular section of mRNA. On the other end, tRNA has an amino acid attached. In a basic sense, tRNA serves as an adaptor between mRNA and amino acids during protein synthesis.
4. *Ribosomal RNA* (rRNA) exists as several species of rRNA, which are categorized by their sedimentation coefficients that are recorded in Svedberg units (S). A ribosome is composed of two subunits: a large subunit (5S, 5.8S, and 28S) and a small subunit (18S). The ribosome's function involves holding mRNA in place while the corresponding tRNA attaches amino acids together during protein synthesis.
5. *Small nuclear RNA* (snRNA) is found in RNA-protein complexes called spliceosomes. Their function is to remove introns from hnRNA to produce mRNA. In the disease systemic lupus erythematus, the body produces antibodies to snRNA molecules.
6. *Small nucleolar RNA* (snoRNA) functions in site-specific base modifications in rRNA and snRNA. These modifications include methylation and pseudouridylation.
7. *Signal recognition particle RNA* functions by recognizing particular signal sequences on some proteins and assists in transporting them outside the cell, a process known as exocytosis.
8. *Micro-RNA* (miRNA) is believed to control the translation of structural genes. They are proposed to do this by binding to the complementary sequences in the 3 prime untranslated regions of the mRNA.
9. *Mitochondrial RNA* replicates and transcribes independently of the other nuclear DNA and RNA.

However, mitochondrial DNA exists as a double-stranded loop (or circle) with an outer, heavy strand and an inner, light strand. Both strands are transcribed by mitochondrial-specific RNA polymerase to produce 37 separate mitochondrial RNA species (mitochondrial rRNA, mitochondrial tRNA, and mitochondrial mRNA).

Many scientists believe that RNA existed before DNA. This is mostly because small forms of RNA can support life (e.g., a virus). However, a virus needs to infect other cells to replicate itself and this is why viruses are known as “obligate intracellular parasites.” Small species of RNA (explained above) are also able to perform biologic activities independently (e.g., they are responsible for protein synthesis from strands of DNA). However, the DNA molecule is a far more stable repository for genetic information and it produces RNA. Therefore, the question of how RNA can exist without DNA to produce it arises. Finally, there is the possibility that both molecules arose at the same time, forming a symbiotic relationship.

Transcription: DNA to RNA

The question now arises, how does DNA make RNA? *Transcription* is the process by which DNA makes a copy of a section of itself; that copy is RNA and is used for protein synthesis. In the DNA molecule, there are genes known as structural genes that code for proteins. Transcription begins when protein transcription factors attach to a promoter site on the DNA molecule. Next, RNA polymerase Pol II attaches to the transcription factors and then “unzips” the double helix. The complex of transcription factors and RNA polymerase Pol II move downstream (3 prime to 5 prime) along the template strand of the DNA, unzipping it as it moves forward and reconnecting the back portion of the double helix, and forming what is called a *transcription bubble*. During this process, nucleotides are linked together to form a complementary RNA copy of the coding strand of DNA. This is an exact copy of the DNA called hnRNA.

The hnRNA molecule is modified into mRNA, through ribonucleoprotein complexes called spliceosomes, which are several snRNA molecules that remove introns from hnRNA. The new mRNA molecule is then transported from the nucleus to the cytoplasm, where it will be used to make a peptide or peptides, which are used to make proteins and enzymes.

Translation: Protein Synthesis

Translation is the process in which a strand of mRNA in conjunction with tRNA and rRNA produces peptides and polypeptides. The old central dogma of molecular biology was that DNA makes mRNA, and mRNA makes proteins.

The current theme is that DNA makes hnRNA, and that becomes mRNA (with the help of snRNA), which works with tRNA and rRNA to make polypeptides that are used to make proteins.

On a strand of mRNA, nucleotides pair up in sets of three (e.g., AUG and AAA, which are called triplet codons or codons). Each codon corresponds to an amino acid (e.g., GCA = alanine). There are 64 possible combinations of codons, but several codons represent the same amino acid (e.g., GCA, GCC, GCU, and GCG all represent alanine). Three of the codons—UAA, UAG, and UGA—represent a “stop” signal on the mRNA. AUG represents methionine, which is a “start” signal. The codons make up what is known as the genetic code. It works on the basis of tRNA, which contains and anticodon on one end and an amino acid on the other end.

A strand of mRNA is composed of a start signal (AUG), a coding region of codons, and a stop signal. Translation takes place in the cytoplasm within the endoplasmic reticulum. This process takes place in three main steps:

1. *Initiation:* During this phase, the small rRNA subunit (which contains initiation factors) and tRNA, with the methionine (MET) amino acid, both attach to the start signal (AUG) on the mRNA. Then the large rRNA subunit attaches to the mRNA. When the small and large subunits are attached together they are referred to as a ribosome.
2. *Elongation:* After initiation is complete and the first tRNA is attached to the strand of mRNA, a second tRNA attaches to the mRNA on the next codon. The second tRNA will correspond to that codon (e.g., the mRNA codon ACG would have tRNA with the anticodon [UGC] and the amino acid threonine [THR] attached). The existing MET amino acid on the mRNA would then form a bond to THR. This bond is a peptidyl transferase reaction, which creates a peptide bond between MET and THR. After that, a third, fourth (and possibly more) amino acids will be connected in this fashion, yielding an elongated chain of amino acids. This process continues throughout the entire coding message of the mRNA molecule.
3. *Termination:* In this final phase, elongation continues until a stop codon is reached and enters into the ribosome (rRNA large and small subunits). When this takes place, a release factor disconnects the amino acid chain (called a peptide or polypeptide), and the ribosome splits into a small and large subunit, both of which separate from the mRNA molecule.

After translation is completed, posttranslational modification occurs, which involves the removal of methionine and peptide cleavage.

DNA Sequencing

DNA sequencing is a scientific method for determining the order of the nucleotide bases in an unknown strand of

DNA. The original method was devised in the early 1970s by Walter Gilbert and Allan Maxam, and called Maxam-Gilbert sequencing. Their method was very labor-intensive and involved the use of hazardous chemicals. In 1975, Frederick Sanger developed a quicker, more reliable, and less hazardous method of DNA sequencing called the Sanger method or chain-termination method. This method involves the use of dideoxynucleotides (ddATP, ddTTP, ddCTP, and ddGTP), which are different from normal nucleotides in that they lack a hydroxyl group. Because they lack a hydroxyl group, they interrupt and stop the normal sequence being produced in the complementary strand from the template DNA, which causes a termination in the chain. This termination takes place at that dideoxynucleotide's spot (A, T, C, or G). This method is sometimes called the dideoxynucleotide DNA sequencing method, or chain-termination sequencing.

Utilizing this technology, a strand of unknown DNA can be taken, amplified using PCR (PCR is a process that rapidly replicates a piece of DNA), and sequenced. The single-stranded DNA of unknown sequence is used as the template and a complementary strand is made using radioactively labeled nucleotides. Next, the radioactively labeled complementary strand is placed in four separated mixes, each containing DNA polymerase and one of each of the four dideoxynucleotides. The four separate mixes are then run through a polyacrylamide gel electrophoresis in four separate rows, which separates the small fragments of DNA. These four rows of fragments correspond to the particular dideoxynucleotide used. From this, a deduced sequence of the original template strand can be made. Currently a method using automated sequencing, which uses fluorescent markers instead of radioactively labeled markers, is used.

The groundbreaking technology of PCR and DNA sequencing made sequencing a genome a reality. Without this technology, the Human Genome Project would have taken several decades to complete or may have even been unattainable. DNA sequencing also has applications in diagnostic testing and forensics. It can also be used to identify a specific pathogenic mutation that causes a particular genetic disease.

The Human Genome Project: Living in the Postgenomic Era

The Human Genome Project (HGP) was completed in 2003. It had originated as an international project initiated in 1990 by the U.S. Department of Energy and the National Institute of Health. This project had six major goals:

1. To identify all 20,000 to 25,000 genes in the human genome.
2. To determine all of the sequences of the chemical base pairs that constitute the entire human genome. The approximate number of chemical pairs is estimated at

around 3 billion. It is known that there is a large amount of repetition of these base pairs, and therefore an exact number of chemical base pairs at this time can only be estimated.

3. To store all of this information and make it available in databases.
4. To make improvements on computer-based tools for data analysis of biological problems. The field that

currently deals with these issues is called bioinformatics (see Box 8.5).

5. To transfer these related technologies to private biotechnology and genetic engineering sectors to stimulate further research and product development.
6. To address the legal, social, and ethical issues that will appear as a result of the completion of the HGP and also the application of genetic engineering.

BOX 8.5 BIOINFORMATICS

Bioinformatics combines the mathematical, statistical, and computational methods that are directed toward solving various biological problems. It involves the manipulation, searching, and data mining of DNA sequences. Without the field of bioinformatics, it is unlikely that the Human Genome Project or any other genome project would have been completed or that the information attained could be analyzed in a timely fashion.

The completion of the HGP is significant for the field of anthropology because it will improve the study of topics such as germ-line mutations and assist in determining our genetic relationship with Cro-Magnons and Neanderthals, as well as establish the relationship between those two species. The Neanderthal Genome Project was launched in 2006 and upon its completion the Cro-Magnon Genome Project is likely to ensue.

With the completion of the HGP, there are many anticipated improvements in anthropology, medicine, energy, and the environment. However, many ethical and legal concerns will arise as well.

The Origin of Genetic Engineering

The first experiments involving genetic-engineering techniques were made possible by seminal works of three individuals: Paul Berg, Stanley Cohen, and Herbert Boyer. All three scientists were separately working on research and experiments involving DNA. Eventually, they collaborated, using all of their techniques to coordinate the very first experiments involving removal of a gene from one species and inserting it into the genome of another species.

During the years 1972 to 1973, Paul Berg at Stanford University was the first scientist to complete a successful gene splicing experiment. This research involved the removal of a gene from a viral genome called Simian Virus 40 (SV40), which was a monkey virus. He was initially interested in studying a particular gene because he found that SV40 could cause cancer in mice. The advantage of studying a viral genome was that it was very small—approximately a few hundred genes. This allowed him to easily identify and isolate this gene. He then attached this gene to the DNA of a lambda virus (known as a biological vector), which would then insert this gene into another cell. This was the very first time that a gene or genetic material from one organism, in this case a virus, was removed and spliced into the DNA of another organism, in

this case a second virus. The new DNA, which had its original DNA along with the spliced DNA, would continue to function as normal and is known as recombinant DNA.

Recombinant DNA is the artificial or synthetic production of DNA, engineered by combining one or more strands of DNA from one source and attaching it to the strand of DNA of another source. This process yields a novel strand of DNA, known as recombinant DNA, that would normally not have existed. The recombinant DNA can then function normally, replicating itself and producing its sequenced products as all other DNA normally does.

Stanley Cohen was another scientist at Stanford University. His initial research was investigating how the genes in plasmids could make bacteria develop resistance to antibiotics. He implemented techniques allowing him to remove a plasmid, which was a small ring of DNA, from one bacterium and insert it into another bacterium. Once the plasmid was inside the other bacterium it could then produce the products that it normally made in the original bacterium. This process happens naturally between bacteria and was originally observed by Fredrick Griffith, who called it called transformation. However, Cohen was able to intentionally and selectively make this process take place.

Herbert Boyer, a scientist at the University of California, was doing research on a bacterium called *Escherichia coli* (or *E. coli*), which is normally found in the human intestine. His research involved the use of restriction endonucleases (RE), which were originally discovered by Werner Arber, Daniel Nathans, and Hamilton Smith (they received a Nobel Prize in 1978 for isolating RE). It was discovered that bacteria produce RE to defend themselves against viruses, which work by snipping viral DNA into smaller pieces rendering the virus ineffective. Today there are over 800 RE that are used in laboratories for gene splicing and the production of recombinant DNA. The RE attach to very specific sites on the DNA and can be used to isolate and remove specific sections of DNA. After this technique was refined, Boyer later went on to genetically engineer human insulin (see Box 8.2), which

was the first genetically engineered product approved by the FDA in 1978.

In 1973, the first animal gene was cloned, using the techniques refined by Berg, Cohen, and Boyer. Using Boyer's RE, Cohen's technique for removing plasmids, and Berg's splicing techniques, they were then able to successfully remove and fuse a segment of DNA, which contained a gene from a frog (*Xenopus*) with the DNA of the bacterium *E. coli*.

In a basic sense, the frog gene was removed using RE, then spliced into a plasmid, and then inserted into *E. coli*. After the resulting DNA was inserted into *E. coli*, the frog gene was transcribed, producing a specific frog protein that was not previously produced by *E. coli*. This was the very first time that an animal's gene was removed, inserted into a bacterial genome, and the product of that animal gene successfully produced.

The transfer of DNA from one organism into another organism is possible because DNA is universal among all organisms and cells on this planet. This means that the DNA in a bacterial cell is made up of the same components as the DNA in a human cell. The organism (*E. coli*) that successfully receives DNA from another organism (the frog gene) is known as a *transgenic organism*.

Modern Genetic Engineering

The fundamental steps in genetic engineering include the isolation of the DNA, the amplification of the DNA, and the transfer of that DNA into another cell. It is a very complicated process, but a simplification has been made here in order to establish an understanding of the process.

The DNA section of interest is called *donor DNA* and needs to be isolated from the rest of the DNA. This is done using restriction enzymes, which cut up the DNA into fragments. The restriction enzymes are very specific and cut the DNA at very specific points. Therefore, the DNA of interest can be located and removed.

After the desired section of DNA is isolated, it then needs to be amplified because the amount originally acquired is usually not enough to be effectively transferred. The donor DNA is amplified by a process called the polymerase chain reaction (PCR), invented by Kary Mullis. PCR is a process that rapidly replicates a piece of DNA by using *Taq* DNA polymerase.

Finally, the isolated and amplified DNA needs to be introduced into the host cell. This is accomplished with biological vectors and nonbiological vectors. Biological vectors are either plasmids or viruses, which were used in the original genetic engineering experiments by Berg and colleagues. Nonbiological vectors include electrochemical poration, biolistics, microinjections, and recombinase-mediated cassette exchange (RMCE).

As mentioned, the DNA in all organisms and cells is made out of the same material (nucleotides and sugar

phosphates). This is why it is possible to transfer DNA from one organism's cells into another organism's cells and this is also why DNA is able to produce its products normally within the new cell after this process is complete.

There are two types of genetic modifications; one involves the addition of genetic material and the other involves the deletion of genetic material or the products it expresses. Deletion is done in one of two ways: knockout and antisense genes.

Gene therapy is classified in one of two ways:

1. *Germ-line gene therapy*: This is a genetic modification done on the sperm or the egg (germ cells), which are known as a haploids because they only contain one set of chromosomes, whereas all other cells in the body (somatic cells) contain two identical sets of chromosomes (two chromatids connected by a centromere). When this type of gene therapy occurs, the defective genes are no longer inherited (i.e., the genetic change is passed on from one generation to the next).

2. *Non-germ-line gene therapy*: This is a genetic modification that is performed on the somatic cells as opposed to the germ cells. This is also called somatic gene therapy. When this type of gene therapy occurs the genetic disease can still be inherited by future generations. This is because the DNA from somatic cells is altered and these cells are not used for reproduction; therefore the defective genetic material in the haploid germ cells will continue to be passed on to future generations.

In addition to modifying germ cells and somatic cells, the techniques of genetic engineering can also be used to genetically clone species. *Cloning* is when two (and sometimes more) individuals or cells are produced from one genome.

On July 5, 1996, two scientists, Ian Wilmut and Keith Campbell, cloned the first animal from an adult somatic cell by using a technique called nuclear transfer. The animal was a ewe they named "Dolly." This showed that one cell could be removed from the body of an animal and be used to re-create a second, identical individual animal.

Individualized Medicine

Other projected use of genetic engineering is the possibility of individualized or genetic medicine. *Individualized medicine* is a futuristic style of medicine in which treatment will be tailored to the unique genetic needs of the patient. This is also known as personalized medicine. There are two major fields involved with the development of individualized medicine—pharmacogenetics and pharmacogenomics. Pharmacogenetics is an aspect of genetic medicine that studies the genetic sensitivity and differential response of a medication for a patient population. Pharmacogenomics is

another aspect that is geared toward the manufacturing of pharmaceuticals with methods of genetic engineering.

In the near future, these two fields will change the way medicine is practiced. It is conceivable that during a typical office visit less time could be spent on deciphering somatic complaints and performing a physical exam, and more time on examining the genetics of the patient.

DNA Consciousness

There is the possibility that the DNA molecule may in fact have a form of consciousness of its own, known as *DNA consciousness* or molecular/chemical consciousness (Grandy, 2006b, 2009a). This form of consciousness would of course be very different from neurological consciousness or human consciousness. In fact, DNA consciousness may underlie our very own conscious process.

This is a realistic possibility considering certain families of gene clusters; *Hox* and *Pax* genes are responsible for and oversee the development of our neurological consciousness. If those genes are altered or deleted, neurological consciousness does not develop.

Other ideas that support DNA consciousness are that the DNA molecule replicates itself, produces proteins freely, communicates chemically with other parts of the cell, and interacts with the external environment of the cell. It performs all of these functions independently. In addition, it is the first known molecule to discover itself (i.e., through *Homo sapiens sapiens*).

Genetic-engineering techniques may help us to explore this area by enabling scientists to explore how DNA interacts with itself, other molecules, and the environment; how it is able to freely self-replicate, and how it *knows* when and when not to produce certain products.

Future Directions

The future applications of genetic engineering are numerous indeed. Most of the immediate impact will be seen in the fields of anthropology and medicine. In medicine, there will be improvements in clinical therapeutics and individualized medicine. This will improve life spans and harness the potential to halt or reverse the aging process.

In anthropology, the completion of genome projects will assist in establishing genetic relationships between humankind and other species. In addition to studying our evolution, we could potentially control our evolution. Therefore, emerging teleology could become a reality.

The potential to alter human genomes could create the first transgenic *Homo sapiens* and provide the appearance of new species on this planet and elsewhere, a concept known as *transhumanism*. This could also give rise to new species such as *Homo sapiens futurensis* (the human of the

future as proposed by Birx) or *Homo sapiens genomicus* (the transgenic human as proposed by Grandy).

It is also conceivable that genetic engineering could potentially equip our species with genes that could improve our ability to survive in outer space. This could give rise to *Homo sapiens extraterrestrials*. During space travel, there is also the likelihood of encountering alien microorganisms as well as new types of diseases and ailments secondary to space exposure (Grandy, 2009d). This would open a new area of space medicine.

Ethical questions and fears will arise as well. We should be very cautious while considering the modification of our genome because we only understand a small fraction of the interworkings of the DNA molecule. Currently, scientists do not know how altering or modifying a gene in a genome as complicated as the human genome could affect us or future generations. Other ethical concerns will be raised; for example, what are good genes and what are bad genes? Who will make that determination? Originally, nature was in charge of deciding these issues. However, humankind began circumventing natural selection long ago without being prepared to address these questions.

In addition, our environment is not as dangerous (in a predatory sense) as it once was, and advances in medicine have increased human life spans while also allowing individuals—who would normally have died and not passed on their DNA to future generations—to survive and pass on inferior genes. This has given rise to a weaker gene pool or a failure to improve the species (Grandy, 2009c). Genetic engineering could potentially be a remedy to this situation. However, questions will arise over the nonmedical use of genome improvement.

With all of these possibilities on the horizon, we should always stop to remember the many great scientists and their pioneering research that made this a possibility. We should also keep our own humanity in mind as we attempt to tamper with something that we are only beginning to understand.

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PART II

ARCHAEOLOGY

ARCHAEOLOGY

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Archaeology is the study of human cultures through the study of material and environmental remains. The word, derived from ancient Greek, means “the study of antiquity.” Archaeology is one of the four sub-fields of anthropology, together with biological anthropology, linguistic anthropology, and social/cultural anthropology. Archaeological remains can take many forms, two of the basic ones being artifacts (any object altered by human hands) and faunal remains, or midden (food remnants such as bone and shell). Artifacts can be anything from simple flaked stone tools and pottery sherds to the most elaborate and priceless objects found in such treasure troves as the tomb of Tutankhamun. These finds constitute the *archaeological record*, which archaeologists then piece together to interpret as much as they can about the cultures they are studying.

Archaeology can be further subdivided into prehistoric archaeology and historic archaeology. Prehistoric archaeology refers to cultures that did not develop writing. Historic archaeology, or text-aided archaeology, is assisted by documentation such as the cuneiform of the ancient Near East, Egyptian hieroglyphic documents and inscriptions, and so forth. These often help immensely when it comes to dating a site or sites accurately. A site is the place in which archaeological remains exist, and different archaeologists have different definitions of what constitutes a *site*; this can vary from an entire human-modified landscape, to a city, a house foundation, or a buried fire pit.

Archaeologists can work in a variety of institutions, from universities and museums (which usually require the archaeologist to hold a PhD) to cultural resource management (CRM) organizations and firms, which are responsible for making sure that sites are not destroyed in the wake of modern development such as construction. Many archaeologists working in this important area do not necessarily need higher degrees, with a BA or MA often being sufficient. Although archaeology is not a “hard science,” like chemistry, biology, or physics, it usually employs hard scientific methods for greater accuracy, which will be discussed in more detail below. Archaeologists now commonly work together with palynologists (who study the pollen record to reconstruct past environments), geologists, and other specialists. As technology advances, so do the tools available to archaeology that could not even have been imagined when it was first recognized as a discipline in the late 1800s.

The Fundamentals of Archaeology

To begin with, how are archaeological finds preserved? This depends entirely on the environment. The best-preserved organic finds are in arid places such as the deserts of Egypt, frozen places such as Siberia, and waterlogged swamps and bogs where the anaerobic environment minimizes decay. Stone is virtually eternal, and metals such as copper, bronze,

tin, and iron tend to oxidize and deteriorate. Gold, however, preserves intact, but, because of its intrinsic value, golden objects are often the rarest—either plundered in antiquity and melted down, or else stolen in past or modern times.

Archaeology can involve the excavation of a single site, such as a house or camp, or the survey of an entire settlement, which studies the spatial relationships between human occupation and activities. *Settlement pattern* archaeology works on the basis that no settlement exists in total isolation, and examines the relationship between settlements and the surrounding environment. The archaeological study of warfare examines the interrelationship between settlements, and evidence includes such things as fortifications and the remnants of palisades. Objects such as bullets, musket balls, arrowheads, and sling stones are also clues, as are skeletons that have suffered trauma.

Burials are often the richest archaeological finds in terms of preserved artifacts in the form of grave goods, which often hold great aesthetic value. Usually, archaeologists work with broken fragments of artifacts such as stone tools or pottery, which were discarded as garbage by the people who used them; intact finds outside of burials are very rare indeed. Burials also prove invaluable insights into ritual practices and the biology of the individuals, including nutrition, average mortality rates, disease, and so forth. Burial excavation, however, is an increasingly sensitive issue, and often forbidden by the modern populations whose ancestors are interred.

Underwater archaeology, of shipwrecks and structures, offers its own difficulties but can yield tremendous finds that have lain undisturbed for hundreds, if not thousands, of years. Special training and equipment is required for such work, and preservation measures are essential for objects that have been underwater for so long. Such conservation can often take years before the objects are ready to be exposed to air and thus avoid disintegration.

Archaeologists also try to understand the subsistence strategies of the people under question, analyzing the food remains to determine their diet. This is essential in understanding the origins of human food production, including staple crops such as wheat and barely in the Old World, and corn and potatoes in the New World, as well as the domestication of animals. In sum, archaeologists have a very wide array of choices and research questions. Now let us examine how archaeology developed as a discipline.

Archaeology: Historical Beginnings in the Western World

The first historically recorded personage to have expressed an interest in the remains of the past was the last king of the Neo-Babylonian (or Chaldean) Empire, Nabonidus, to who reigned from 556–538 BCE. He actively had people excavate and search for the inscriptions of previous kings and rebuilt the ruins of ancient Babylon. This interest in the past is, to our knowledge, the first such example of

“archaeology” on record. The Greeks—and later, the Romans—relied on myths and legends (many of which could have been grounded in fact) to chronicle their countries’ prehistoric or undocumented past, of which the Trojan War is one such example. However, they never sought material proof of these events.

The willingness to accept the present as distinct from the ancient past continued throughout Europe until the Renaissance, when scholars and artists “rediscovered” their classical roots in antiquity. The first great scholar to look to the past as an inspiration was the Italian humanist and poet Francesco Petrarca (known commonly as Petrarch), who lived from 1304 to 1374 CE. His use of the Italian language later influenced writers such as Dante and Boccaccio, who were largely responsible for codifying it as the standard. Petrarch studied the classical past to find perfection in his present, a pursuit that spread to other scholars throughout Italy and then beyond. For example, Boccaccio (1313–1375 CE), a friend of his, wrote essays on the classical past as a result of Petrarch’s influence. The first scholar credited with the study of the archaeological monuments of ancient Rome was the pioneering clockmaker Giovanni de’Dondi (1318–1389 CE); his father, Jacopo, was also a pioneering clockmaker, hence perhaps the interest in time.

In the 15th century, the first true *proto-archaeologist* emerged; he was the Italian humanist and antiquarian Ciriaco de’ Pizzicolli (or Cyriacus of Ancona [1391–1453/55]). (An antiquarian is someone who collects and studies objects for their own sake, not necessarily making an effort to understand the cultures that produced them.) Having studied Latin in Rome, Cyriacus began by translating inscriptions on monuments and then took his interests a great step further, by traveling throughout the eastern Mediterranean, and observing, describing, recording, and illustrating archaeological remains, which eventually filled a six-volume work called the *Commentarii*. He went as far as southern Italy, Dalmatia, Epirus, the Morea, Egypt, Chios, Rhodes, Beirut, Anatolia, and Constantinople. He documented and mapped the ancient city of Eretria, a Greek *polis* active in the fifth and fourth centuries BCE on the island of Euboea off of mainland Greece. He also described the remains of the Bronze Age citadel of Mycenae on mainland Greece hundreds of years before Heinrich Schliemann excavated the site for the first time (discussed in a subsequent section). Cyriacus’s fascination with inscriptions and ancient documents drove him to amass a large collection, which he eventually incorporated into his *Commentarii*, which was unfortunately destroyed in a fire shortly after his death sometime between 1453 and 1455, but was circulated in manuscript form.

Pompeii and Herculaneum: The Nursery of Western Archaeology

Italy was also the scene of the first subsurface archaeological discoveries proper. In 1599, the architect

Domenico Fontana was digging a new course for the river Sarno when he accidentally discovered the remains of the cities of Pompeii and Herculaneum, buried by the ash of Mount Vesuvius's eruption in 79 CE. A century and a half later, workmen building foundations for the King of Naples's (Charles of Bourbon) summer palace happened upon the ruins of Herculaneum. Charles, who later became King of Spain, used the recovered antiquities to reinforce Naples's importance. A Spanish military engineer, Rocque Joaquín de Alcubierre, then rediscovered the ruins of Pompeii in 1748.

The first true and organized excavations of Pompeii and Herculaneum were undertaken under the direction of the Swiss architect Karl Jacob Weber (1712–1764) through the patronage of King Charles III of Naples. He produced finely illustrated folios, *Le Antichità di Ercolano esposte* (the Antiquities discovered in Herculaneum), which circulated throughout Europe and brought awareness of these great finds to intellectuals throughout the continent. The Spanish architect and military engineer Francisco La Vega took up where Weber left off in 1764 under the patronage of Ferdinand, the Bourbon King of Naples. Vega's brother Pietro, also a military engineer and cartographer, continued the excavations, also under Ferdinand's patronage.

From 1860 to 1875, the Neapolitan archaeologist Giuseppe Fiorelli (1823–1896) directed the excavations at Pompeii. Fiorelli pioneered the method of excavating and studying sites layer by layer, digging from the top down rather than the previous method of finding the streets and revealing the houses from the bottom up. As a result, he established a school to train people in these archaeological techniques. It was also Fiorelli who invented the process of casting the incinerated bodies of the city's victims by pouring plaster into the cavities left within the hardened lava. Additionally, he mapped the city's topography, dividing it into subsections, and his work helped preserve the city itself. In 1863, he became the director of the Naples National Archaeological Museum (founded by King Charles III of Spain in the 1750s), and then director general of Italian Antiquities and Fine Arts in 1875, a position he held for the rest of his life.

Following Fiorelli's work, the Italian archaeologists Michele Ruggiero, Giulio De Petra, Ettore Pais, and Antonio Sogliano worked on the city, restoring many of the houses' roofs in order to preserve the fragile mosaics and wall paintings that are so identified with the city. Another important archaeologist to work in Pompeii was August Mau, who in 1882 developed a classification for the decorative styles of the paintings. In the early 20th century, Vittorio Spinazzola carefully excavated houses in order to understand how they had been buried, and then to reconstruct their facades as they had been before the catastrophe. In sum, the work done at Pompeii set an example of archaeology for the Western world and opened up new horizons of thinking.

Egypt: Napoleon's Intellectual Triumph

Napoleon Bonaparte launched his Egyptian Campaign in both Egypt and Syria in 1798. His goal was to protect French trade interests and undermine British access to its Indian colonies. The campaign was unsuccessful overall, and in 1801 he was forced to withdraw and surrender to the British. The campaign was, however, an intellectual triumph as it heralded the discipline of Egyptology, which is so vast that it is considered a separate field from archaeology or anthropology. Napoleon did something that no military leader had ever done before: He brought along a large group of scholars, the savants, in order to record and collect as much as possible of the Egyptian monuments and antiquities. Prior to this, illustrations of Egyptian monuments were often highly fanciful, drawn by people who had never even seen them.

The savants amassed a tremendous amount of information, and an Egyptology craze swept throughout France and England. When Napoleon's forces eventually surrendered to the British in 1801, they were forced to turn over a number of antiquities, including the most famous of all, the Rosetta Stone, which eventually provided the key to the decipherment of the Egyptian language, being a triple inscription written in hieroglyphic, hieratic (a late cursive form of hieroglyphs), and ancient Greek (the only one which could be read). It took over 30 years to crack the code, despite constant efforts. In 1822, the French scholar and linguist Jean-François Champollion (1790–1832) succeeded, opening up an entire new world of written history.

Beyond the Bible: The Western World Discovers Its True Antiquity

Despite the developments in archaeological thought that began in the Renaissance and continued into the 19th century, the West still considered the world and humanity's origins to be grounded in the Old Testament. Nothing in the discoveries of classical antiquity challenged or refuted anything in the Bible, as the events took place centuries after the Old Testament's accounts and then contemporaneous with those of the New Testament. The world was considered to have been only around 6,000 years old, due in great part to the meticulous calculations of the Archbishop of Amagh, James Ussher (1581–1656), who was also primate of all Ireland and vice chancellor of Dublin's Trinity College. Using all available accounts in the Bible and other manuscripts, in 1650, he arrived at the conclusion that God created the world on Saturday, October 22, 4004 BCE. As Ussher's theological and scholarly credentials were beyond any doubt, his calculation was accepted universally. However, beginning in the mid-19th century, discoveries began to be made that were seemingly incongruous with the view that humanity's origins were so recent.

One notable challenge to the belief in humanity's recentness was made by the French geologist and naturalist Jacques Boucher de Crèvecœur de Perthes (1788–1868), often known as Boucher de Perthes. In the 1830s he discovered Paleolithic hand axes in association with long-extinct mammals in the gravels of the Somme River valley. Being rightly convinced that the axes were made by humans, he devoted his time to the study of *antediluvian man*, but did not make his findings public until 1846, followed by the publication of a three-volume work, *Antiquités Celtiques et Antédiluviennes* (Celtic and Antediluvian Antiquities), the first such work that proposed that humanity existed far earlier than commonly supposed, a view that received little serious attention. Many believed that the tools were what today are called *geofacts*, or stones that have been modified by natural events. Some even considered them meteorites, or the products of supernatural creatures. It took more than another decade before additional experts confirmed that the tools were indeed made by humans and that their association with extinct mammal remains was beyond question. Similar finds were made in southern England and France, notably the hand axes at the site of the gravel pits of St. Acheul near Abbeville (from which we derive the term *Acheulian*, early Paleolithic, stone tools).

In the late 1850s and early 1860s, scholars finally began to accept the antiquity of humanity. In 1859, Charles Darwin published *On the Origin of Species*, which, although it did not directly deal with the subject of human evolution and the antiquity of humanity itself, revolutionized scientific thinking. Sir Charles Lyell (1797–1875), a lawyer and the foremost geologist of his day (and also a great influence on Charles Darwin), published *The Geological Evidence for the Antiquity of Man* in 1863, in which he discussed glaciers, evolution, and the age of the human race during the Quaternary Period (1.805 ± 0.005 million years ago). Researchers into humanity's origins could at last go beyond the Bible and recorded history to delve far deeper into the past than ever thought possible.

Mythology Comes to Life: The Quest for the Trojan War

Perhaps no other archaeological endeavor has been as surrounded by mystery and controversy as the search for Troy. Heinrich Schliemann (1822–1890) was a German entrepreneur. Born into a relatively poor family, he struck off on his own as a young man and made considerable money in St. Petersburg in the 1840s. From there, he made a fortune in California during the Gold Rush. During all this time, he educated himself in the classics. He then returned to Russia where he made an additional fortune in indigo, and then, during the Crimean War, on sulfur, saltpeter, and lead, which he sold to the Russians to make ammunition.

Schliemann basically retired from active business in the 1850s and began traveling avidly. He developed a passionate

interest in archaeology that, combined with a love for Homer's *Iliad* and *Odyssey*, led him on a path to disprove the skeptics of the academic world. The skeptics, for the most part, believed that these epic poems largely recounted myths and legends. In 1868 Schliemann began excavating the mound of Hissarlik in northwestern Turkey, a site that had been previously identified as the site of Troy (which had been rebuilt many times over since the Trojan War's supposed date of around 1200 BCE). The city was a classical one in the Greco-Roman era, visited by such people as Alexander the Great. An expatriate Englishman and amateur archaeologist, Frank Calvert (1828–1908), had excavated parts of the site prior to Schliemann's arrival. Calvert advised Schliemann to dig slowly and carefully. However, as archaeological methods were still in their infancy and the discipline was not yet a professional field, when it came to excavating tells (mounds composed of superimposed cities, rebuilt one on top of the other over thousands of years), Schliemann had little learning to go on. His impatience and limited knowledge led him to blast his way through the later cities, recording little about what was found, until he reached what he thought must have been Homer's Troy. To his dismay, it was a small and primitive settlement without any of the riches he had expected to find. What in fact had happened is that he dug too deep, too quickly, and had actually destroyed much of what composed the city (or cities) contemporaneous with Homer's Troy, which lay around five cities (now called Troy VIIa and VIIb) above Schliemann's (now called Troy II).

Schliemann's published works followed, but the academic community was still skeptical given the nonresemblance of Troy II to Homer's great city. Schliemann's countermeasures appear to have been less than honest, as he seemingly conjured out of nowhere a cache of golden jewelry that he dubbed "Priam's Treasure" and had his new wife, a young Greek woman named Sophie, photographed wearing the "Jewels of Helen." Where and when these jewels were found remains a mystery surrounded by inconsistencies in Schliemann's own writings and those of Sophie. He also smuggled some of his finds out of Turkey, breaking the arrangement he had with the Turkish government, which then refused him further permission to dig; the objects still remain the subject of controversy. However, Schliemann learned from his mistakes and went on to excavate Mycenae (the kingdom of Agamemnon) in the Peloponnesian peninsula, the nearby Mycenaean-era (ca. 1200 BCE) city of Tiryns, and then Orchomenos on the Greek mainland. His methods had advanced considerably by the 1870s and his finds were spectacular, although the golden treasures he found, especially the so-called Mask of Agamemnon at Mycenae, proved to be hundreds of years earlier than the accepted date of the Trojan War and perhaps even proto-Greek. He returned to Troy in the late 1870s and early 1880s, dismayed by the knowledge that he had in fact destroyed much of what he set out to find, and died before he was

able to continue work there. Despite his much-criticized methods, Schliemann remains a pioneer in archaeology, perhaps the most famous and controversial of them all. Since his time, excavations have rarely ceased at Troy, and show little sign of ever losing the interest of the world.

Egyptology Resurrected: The Discovery of the Tomb of Tutankhamun

The image that most people have when the word *archaeologist* or *archaeology* is mentioned is that of a man opening up an Egyptian tomb full of golden treasures and containing the mummy of a king. In fact, this event has only really occurred once in Egyptian archaeology, but it captured the world's imagination more than any other find in the discipline's history. The man responsible for this was Howard Carter (1874–1939), an English Egyptologist who began his training in Egypt at the age of 17. He studied Egyptian art and inscriptions and later became a student of the renowned archaeologist William Flinders Petrie (1853–1942), who excavated sites in Britain and all over the Near East. Carter assisted in excavating the grave site of Beni Hassan that contained the tombs of the royalty of the Middle Kingdom, and later went on to discover the tomb of Queen Hatshepsut (looted and without her mummy) in Deir el-Bahri. In 1899 he was engaged by the Egyptian Antiquities Service, a post from which he resigned 6 years later because of a quarrel that spiraled of out control between a group of French tourists and local Egyptian site guards.

In 1907, Carter had the fortune to gain the patronage of the 5th Earl of Carnarvon (1866–1923), an English aristocrat with an avid interest in antiquities. Carnarvon funded Carter's quest for the undiscovered tomb of King Tutankhamun, a short-lived king of the New Kingdom, and son of the "heretic" King Akhenaten. Carter hoped that this would prove the one most intact tomb left in Egypt that had escaped the tomb robbers who had been active ever since the reigns of the kings themselves. Carter spent years searching for it in vain in the Valley of the Kings, and Carnarvon was about to pull his funding by 1922, when Carter convinced him to finance one more season. Their gamble paid off, and on November 4, 1922, the steps leading down to the tomb were found. Carter held off (supposedly) looking inside the tomb until Carnarvon came to Egypt for the revelation.

Amid great fanfare Carter made a small hole in the doorway of the tomb, and when Carnarvon asked if he saw anything, Carter uttered the most famous phrase in archaeological history: "Yes, wonderful things." Part of the tomb had been disturbed in antiquity, but the contents were intact. Priceless objects of gold, ebony, and alabaster filled the chambers, and the king's mummy was there within its sarcophagus. Tutankhamun's golden mask is perhaps the most famous Egyptian piece of art in the world, which could only be removed by severing the king's head because it was stuck

to his face by the resin used for preservation in the mummification process.

Carter spent years removing and cataloguing the objects, which are housed in the Egyptian Museum in Cairo. The world was gripped by the story, and became even more so when the "Curse of Tutankhamun's Tomb" weaved its way into popular culture because of the death of Lord Carnarvon shortly after the tomb was discovered. Carnarvon, in poor health at the time, nicked a mosquito bite while shaving and died shortly thereafter of blood poisoning in 1923. The "Mummy's Curse" has ever since, and forever will be, a part of archaeology's—and especially Egypt's—mystique, although wholly unfounded since Carter himself died of lymphoma 17 years after opening the tomb. The living mummy, a concept completely absent in ancient Egypt, became a horror movie icon beginning in the early 1930s, which it remains to this day and will no doubt continue to do for as long as movies and literature exist.

The Development of Archaeological Theory in the 20th Century

Let us now turn to the internal growth of archaeology as a discipline in the 20th century. During the past 100 years, archaeology evolved from what could be broadly termed in many cases a methodological antiquarian approach, to a refined social science. Essential to understanding how archaeology is practiced today is its history as a branch of anthropology. While various universities differ from country to country in having separate anthropology and archaeology departments, few archaeologists would deny that the discipline is inextricably linked with anthropology as a whole, that is, the study of humanity.

We may refer to this as anthropological archaeology, which had its roots in early 20th-century America. While European archaeologists were primarily studying their own roots in their own countries, or the cultural roots of the Western world in countries such as Greece, Italy, and those of the Near East, American archaeologists had to contend with a different situation. The origins of the Native American Indian populations were, in the 19th century and even into the 20th, largely unknown. Furthermore, the evolution of such complex civilizations as the Aztecs and Maya in Mexico and Central America, and the Inca in Peru, was a puzzle. In North America, archaeologists began to see the connection between modern populations of Native Americans and the archaeological remnants of their past. They reasoned that by studying what was left of Native American culture, that is, its ethnography, the ancient past might become illuminated. It is important to keep in mind that the American archaeologists studying American archaeology were dealing with cultures and civilizations completely alien to their own European ancestry. This latter point has never ceased to be a subject of controversy between the Native American populations and the American archaeologists who study their ancestors.

In the early to mid-20th century, archaeologists practiced what today we call culture history. Its goal was not necessarily to reconstruct the society under study, because not enough excavation had yet occurred to provide sufficient bodies of material evidence to examine the anthropology of the cultures themselves. Culture history was concerned with documenting the development of material culture within and between cultures to understand changes and the diffusion of ideas between them. Culture history was, and still is, essential in certain cases in which sufficient material data does not exist. It is the foundation onto which more subtle hypotheses and broader theories can be superimposed.

Culture history came under its first major attack when Walter Taylor (1913–1997) published *A Study of Archaeology* in 1948. He mercilessly criticized his senior colleagues in archaeology professing they were practicing anthropology; to Taylor, they were doing no such thing. One of his main accusations was that his colleagues were simply collecting artifacts and documenting spectacular ruins, such as those of the Maya, without getting to the heart of the cultures themselves. Taylor called the classification and description of one artifact after another and the development of timelines an exercise without a greater purpose. Understanding chronology and changes in material culture was essential, but archaeologists, Taylor maintained, had to probe deeper to get at how the people actually lived. He advocated less extensive excavations in favor of more intense ones aimed at completely understanding each individual site. Instead of simply documenting only the more spectacular finds, archaeologists should also do the less glamorous work of studying faunal remains, and so forth. However, it was some years before his revolutionary views were embraced and put into practice, even by Taylor himself.

Taylor's mantle was not really picked up until the 1960s and 1970s, when the archaeologist Lewis Binford spearheaded what was later termed *new archaeology* and then redubbed *processual archaeology*. Binford and his students advocated using scientific methods to test hypotheses about the cultures they were studying and, as Taylor had advised almost two decades prior, not to rely upon the artifacts themselves to tell the story. They argued that one must study the environment of the region under question to explain how humans adapted to their external conditions, which might be called cultural evolutionism. The name *processual archaeology* derives from the idea that cultures change according to evolutionary processes.

At the root of processual archaeology is the paradigm of *cultural materialism*, which is based on the importance of tangible, material factors, such as environment, population density, subsistence strategies, and technology, to explain the processes by which cultures adapt and evolve. As such, processual archaeology concentrates on broader evolutionary implications rather than simple historical ones, ultimately to formulate generalized “laws” to explain human

society as a whole. (As such, the role of the individual is downplayed.) Ideally, such processes should be scientifically predictable so that hypotheses can be tested. Ethnohistorical research, which was far closer to true anthropology than how archaeology was practiced up until the advent of processual archaeology, was seen as critical to gain perspectives on the past. Processual archaeology, which associated itself with the other social sciences such as political economy and sociology, tried to be as scientifically objective as possible when observing and reporting data.

In the 1980s, some archaeologists, especially in Great Britain, decided that processual archaeology had serious drawbacks and developed what was called postprocessual archaeology. Postprocessual archaeology emphasized the political ramifications of research, examining itself from a detached, third-person point of view to demonstrate that how archaeological research was presented was just as critical as the research itself. The postmodern viewpoint rejected the processual idea that universal laws could apply to humanity. Furthermore, the roles of the individual, families, social classes, and the like were brought back to the forefront in opposition to the generalist universal viewpoint of processual archaeology. Postprocessual archaeology also claimed that strictly empirical and scientific observation was not possible and, in attempting to practice processual archaeology, archaeologists trapped themselves into a single closed-minded perspective. There are of course many other archaeological paradigms, but these major trends serve to demonstrate the complex evolution that the discipline has undergone in the past century. Now, in the late 20th and early 21st century, processualism and postprocessualism have backed off from their former extremist viewpoints, leaving archaeologists more freedom than to adhere dogmatically to one school of thought or another.

The Basics and Growth of Archaeological Methods

Archaeological methods have evolved alongside modern technology. From the picks, shovels, and blasting materials of the 19th century, far subtler and less destructive approaches have been increasingly refined. Archaeological excavation is a destructive process; once a site is dug, it no longer exists, and we must essentially rely on the archaeologists' word as to what was found, where, when, and how. Therefore, taking notes is essential so that any given site should theoretically be able to be “re-excavated” by future archaeologists seeking data that was perhaps not originally published, or to offer reinterpretations of said data. Consequently, archaeologists make the effort to preserve and conserve as much of the excavated material as possible, placing it in a repository such as a museum for safekeeping.

The technology the archaeologist uses depends entirely on his research questions. These research questions, or hypotheses, which processual archaeology advocated, still

lie at the heart of archaeological research. Archaeologists no longer dig a site simply to collect as many artifacts as possible, but choose and dig a site to answer specific questions. Ground-penetrating radar can prove useful in locating significant anomalies underground, but it will be many years before subsurface “photographs” can be taken. It is unlikely that such technology will ever replace excavation. Excavation itself, however, remains almost as basic as it has always been, utilizing picks, shovels, and sometime bulldozers and backhoes to get at deep cultural layers. The simple handheld trowel, commonly used for cementing and plastering, is the primary tool of excavation, used in order to damage as few finds as possible and to find as many as possible in situ so that their exact location within the site can be recorded before they are removed. Brushes and finer tools such as dental picks are also used.

The archaeologist seeking a site that is not visible on the surface is taking a chance. He must either dig a series of test pits or trenches to locate cultural deposits, or else rely on local knowledge or the chance that someone before located the site either accidentally or intentionally. The metric system is used universally now, and a typical unit is a 1 × 1 meter square, which can then be expanded and the site eventually mapped onto an easily readable grid. Tape measures and line levels are standard tools, and many sites can be excavated without any electronic technology. On the other hand, an archaeologist seeking to understand the settlement pattern of a past society might concentrate less on subsurface excavation and more on mapping as many structures as possible in relation to the surrounding environment, such as the proximity of food resources and relations to other settlements in the vicinity. Modern conveniences such as aerial survey, satellite imagery, and the Global Positioning System (GPS) provide improved accuracy for this kind of work. Transits and theodolites are still used, but total stations, which use laser technology, can pinpoint positions in three-dimensional space far more accurately and the data are fed into computers. Technology such as portable three-dimensional scanners can virtually record anything from an artifact to a monumental structure, thus preserving these in computerized form. For archaeologists concerned with human remains, CT scans offer unparalleled insight into the biology of populations. Egyptian mummies that had to be unwrapped in the past can now be left intact and seen in full through this method. Archaeologists must, however, beware of the overuse of these modern marvels and not let their research be led astray by flashy technical displays.

Another important development in methodology is the increasing multidisciplinary approach to research. Archaeologists now collaborate more than ever before with other disciplines. This could be with palynologists to learn about ancient vegetation; with geologists to learn, for example, where the stone or clay used for toolmaking and pottery originated, thus permitting the documentation of

patterns of exchange between regions; and with geomorphologists to aid in the interpretation of sediment formation. Archaeologists may also work closely with experts in various branches of zoology and marine biology, and increasingly with geneticists. These are but a few examples of how archaeology has expanded to acquire as much information as possible about a given site and to address very specific research questions.

Dating Archaeological Finds

Once scholars had rejected the biblical timeline in the 19th century, other means of dating archaeological sites were needed. The observation of stratigraphy, which simply means that lower strata are older than the successive higher strata, was an early form of relative dating. The concept of the Three Ages also took hold. Scientists subdivided advances in technology into the Stone Age, the Bronze Age, and the Iron Age—terms that are still used today. The Stone Age was then divided into the Paleolithic, or Old Stone Age, which dated from human ancestors’ earliest flaked stone tool use around 2.5 million years ago, to the advent of agriculture, pottery, and ground as well as flaked stone tools representing the Neolithic, or New Stone Age.

The simplest method of dating a site is by historical records, or evidence of writing. An Egyptian monument that contains the date that such-and-such a king constructed it can be correlated with reasonable accuracy to our modern calendar, though becoming increasingly open to a margin of error the further back in time we go. Similarly, we can date a site if a simple object such as a coin with the portrait of, say, a Roman emperor is found within; if the stratigraphy is intact in which the coin is found, the layer cannot predate the production of the coin, thus providing a baseline date.

In the 20th century, significant advances in dating were made. Dendrochronology, or tree-ring dating, analyzes the patterns of annually produced tree rings of long-lived species. These growth rings vary in thickness depending on climate fluctuations. By looking at the patterns of living species of a given tree, scientists can gradually overlap extant patterns to older ones until a match to the piece of wood under question is found. In such a way the exact year the tree was felled can be determined, and thus the year in which a wooden tool or wooden structure was made. These rings can be preserved for many hundreds of years given the right arid conditions such as in the American Southwest. Thermoluminescence (TL) dating is used for ceramic objects of fired clay. Clay contains low levels of radioactivity, which traps the electrons within until the clay is fired, when the electrons are then released as light. The analysis process involves reheating the object to measure the amount of electron light that it emits, thus revealing how long it has been since the object was originally fired. Radiocarbon, or ¹⁴C (Carbon-14) dating, is a technique that

was developed in 1949 and is indispensable to archaeologists who excavate sites without pottery or wooden artifacts. Radiocarbon dating can only be used on organic matter, that is, something which has once been alive. Bone, shell, plant matter, wood, and charcoal (burned wood) can now be dated with a standard deviation of around ± 30 to 50 years. The technique has been, and still is, becoming increasingly refined since its inception, when the fluctuation in cosmic rays was not used to calibrate dates.

Radiocarbon dating works as follows: every living thing absorbs Carbon-14, a carbon isotope that is generated by cosmic rays. When the organism dies it stops absorbing the isotope. The isotope disintegrates at a known rate, having a half-life of 5,730 years. By measuring the amount of Carbon-14 left in the sample, it is possible to estimate when it died. Thus, we can obtain an approximation of when a tree was felled (and thus killed) to be used as firewood, or when an animal was killed to be eaten. This technique has, in certain areas of the world where dendrochronology is possible, been refined even further and the dates more accurately calibrated. The only drawback to radiocarbon dating is that the Carbon-14, present in a very limited quantity, is impossible to detect beyond around 40,000 years.

Accelerator mass spectrometry (AMS) radiocarbon dating, a technique developed in 1983, has the advantage of needing a much smaller sample (around 1,000 times smaller) than previously required. Small objects such as seeds can therefore now be dated, which is especially useful for the study of early human food production. AMS dating works by counting the number of Carbon-14 atoms left over in the sample, rather than measuring the decay events themselves. This technique also cannot be used for objects more than around 40,000 years old. For sites older than around 100,000 years to volcanic rocks 2 billion years old (beyond the purview of archaeologists, naturally), a technique called Potassium-Argon (K-Ar) dating is used, which was developed in the 1950s.

Early fossilized hominid remains are often found in association with roughly contemporary volcanic stone formations. The element potassium (K) is found throughout the earth's crust and has a long half-life (1,250 million years), thus allowing the dating of such material. Potassium contains a small amount of radioactive potassium-40 (^{40}K) atoms, which decay at a given rate. For every 100 potassium-40 atoms, 11% become the inert gas argon-40. Argon-40 is only able to escape from molten rock. When solidified, the argon-40 can no longer escape. Mass spectrometry is used to count the number of argon-40 atoms in ratio to the potassium-40 atoms. By determining how much of the original potassium-40 has decayed, this allows an estimate of how much time elapsed since the lava solidified. Aside from historical records and stratigraphy, archaeologists have to turn samples for dating over to specialized laboratories. This can prove very costly, especially when a large number of dates are needed. The scientific methods used for dating

these materials are a good example of how archaeology, which is not a hard science, works in collaboration with hard scientific methods to provide the most empirical and accurate data possible.

Future Directions

As we move forward into the 21st century, archaeology has lost none of its significance and wonder since its inception as a formal academic discipline in the late 19th century. There are still unexcavated cities and settlements all over the world, from the jungles of Mesoamerica to the sands of Egypt. Future archaeologists, therefore, have nothing to worry about in terms of finding new discoveries. It is just as difficult to imagine the tools that will become available to future generations as it was for the earliest archaeologists to envision those of today. Cultural resource management (CRM) increases in importance, and its practitioners are more than ever before becoming recognized as authorities equal to their colleagues in academia. With the never-ending expansion of the human population and the necessity of building more and more houses and buildings, and of finding farms and pastureland to grow more food, archaeological sites all over the world are in peril, and some would say that archaeologists are racing against time in some areas to salvage what they can for posterity. A site, once lost, can never be recovered.

In addition to development and urban expansion, the problem of illegal excavations and looting continues as it has done for hundreds, if not thousands, of years. Today's antiquities' markets are always selling or auctioning off pieces of the past whose provenance is unknown, most likely looted from a grave. Without provenance the artifact itself can tell us only a fraction of what it could have if found in a proper archaeological excavation. Most such objects acquired by museums in the great age of collecting during the 18th and 19th centuries are the results of such activities, and nowadays the countries of origin are increasingly demanding the repatriation of many such artifacts. This is a very thorny issue, and is unlikely to be universally resolved, as many of the objects were acquired before there were any laws governing the exportation of antiquities from countries such as Egypt. Modern collectors fuel the illegal trade in artifacts, but we must remember that the looters themselves have far different motives from the wealthy collectors to whom their finds are ultimately sold. A poor Peruvian farmer, for example, who finds a series of graves with goods such as pottery and other valuables, may sell them to a middleman and make enough money to feed his family for years. They are, after all, dealing with the graves of their own ancestors, and, in some ways, are more entitled to these objects than foreign archaeologists.

This is not to advocate looting or pot hunting, but merely to remind us that cultural sensitivity is a key requirement of archaeologists, who must increasingly

work in conjunction with the local governments and landowners in whose countries they are guests. Cooperation is essential, and archaeologists should always keep in mind that their findings must not only be published, but also relayed to the very people that hosted them; not only the government, but even the towns and villages that supported their efforts. After all, it is their past, and it belongs to them. The archaeologists' responsibility is to reveal and interpret their findings to the world.

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EXCAVATION AND PRESERVATION

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Excaavation and survey are central topics in archaeology, and they constitute the main if not the only way in which the discipline of archaeology collects new data (Roskams, 2001). Our objectives in this chapter are to explore the development of modern archaeological fieldwork and to project a picture of the discipline's future. To this end, this chapter is structured in the following manner. First, we review the historical development of archaeological excavation and survey. Subsequently, we explain the organization of typical excavation and survey projects and their activities in the field. Third, we focus on specifying core claims and criticisms pertaining to processual archaeology and its response to the challenges. Fourth, we suggest an integrated paradigm approach to excavation and survey for future fieldwork, incorporating the identified fundamentals and merits of both processual and post-processual archaeology. Finally, we close by discussing central issues on conservation and preservation and developing an agenda for future discussion.

Development of Archaeological Theory and Method

Archaeology has a rather short history as an academic discipline. This also holds true for excavation and survey. During the 17th and 18th centuries, public interest in ancient ruins and history first began to evolve, and the

19th century saw an upsurge in explorations of ancient ruins. However, it was near the end of this century that true scientific excavation methodology was adopted (Renfrew & Bahn, 2008).

Several archaeologists have contributed to the early development of scientific fieldwork. Augustus Pitt-Rivers introduced a scientific, precise recording system into the discipline through his excavation of Cranborne Chase in southern England. He was concerned with not only discovering spectacular treasures, but also recovering "everything," recording and describing all items, no matter how ordinary they were. One of Pitt-Rivers's contemporaries was William Petrie, who devised his own method of *sequence dating* in order to accurately date multiperiod settlements in Egypt and Palestine. The most influential of the early excavation methodologists, however, was Mortimer Wheeler, who brought a strict grid-square system into the archaeological discipline through his famed excavations in England and India. Later, Kathleen Kenyon brought Wheeler's method to the Middle East and made it the standard tool of modern scientific excavation projects (Joukowsky, 1980). However, in recent years many European excavators have shifted toward the total-excavation techniques of Philip Barker (1996) involving the exposure of large areas of a site and giving careful attention to site drawing and preservation.

About the same time that Wheeler was developing his grid-square system to study Old World history, Alfred

Maudslay, Max Uhie, and Alfred Kidder were putting the New World on the archaeological map with their excavations in Peru, Mexico, and the southwest of the United States (Renfrew & Bahn, 2008). In addition, Kidder developed a regional approach to the study of archaeological sites. He recognized the vital link between a particular archaeological site and its surrounding areas, and suggested the employment of reconnaissance methods as a way to create a more detailed regional survey to explore cogent relationships. Several other methodological and theoretical developments also contributed to the birth of scientific field archaeology including underwater archaeology (George Bass), prehistoric archaeology (Gordon Childe), preservation and conservation of cultural heritage, collection and classification of anthropological data (Franz Boas), historical critical archaeology (Martin Hall and Stephen W. Silliman), urban archaeology (Sheppard Frere), ecological archaeology (Julian Steward and Grahame Clark), invention of radiocarbon dating (Willard Libby), and computerized recording systems.

Development is a building process. A discipline grows larger as the radius of significant theoretical and methodological perspectives expands and as the achievements of earlier periods are integrated into those of the next era of development. Likewise, in field archaeology, the 1960s was marked by induction of the “new” archaeology (hereafter processual archaeology) into the discipline under the leadership of Binford (1972) and Clarke (1968). According to O’Brien, Lyman, and Schiffer (2005), any discussion pertaining to modern excavations and surveys must address the issues raised by processual archaeology.

In the past, traditional field archaeology was largely concerned with how to explain the past and how people had lived; processual field archaeology attempted to explain the past based on an explicit theoretical framework, as well as to make valid generalizations based on sampling data. Processual archaeology advocated deductive field reasoning in that researchers began with advancing a hypothesis, collected data to test it, and reflected on whether or not the theory was confirmed by the outcome of the study. In contrast, traditional field archaeology was typical of an inductive approach in that archaeologists became involved in “piecing together the past” based on observation of a limited number of related events or archaeological sites and data. The research methodology of processual field archaeology usually employed quantitative data collection and centered on answering specific research questions, rather than attempting to address general issues with verbal and narrative data.

One important outcome of the processual archaeology movement was the growth of field projects that included well-defined research objectives and sophisticated regional surveys. That is to say that regional surveys had come of age as an important part of archaeological research under the auspices of processual archaeology. Researchers for the first time began to systematically conduct intensive field

surveys and selective soundings coupled with sophisticated statistical sampling strategies and improved conservation methods. The influence of the movement was also reflected in the development of world archaeology. A case in point was the field research dealing with the origins of human species and activities, such as Braidwood’s fieldwork in the Middle East for the origins of agriculture and Louis Leakey’s efforts in Africa to understand the early phases of human history.

Applications: Elements of Excavation and Survey

The overall method of excavations used by modern archaeological projects is still closely allied with the original template developed by Wheeler and Kenyon. Even so, the readers must be aware of the fact that there are many variations to this standard and oft-practiced methodology depending on research aims, field conditions, and technical and ideological factors (see Barker, 1996; Roskams, 2001).

Modern excavation teams are composed of a variety of personnel. In general, project directors are responsible for managing an excavation. They develop research goals by studying relevant documents, old maps and drawings, and previous work on the site. Project directors also conduct pre-excavation surveys of the site by examining aerial photographs, studying geophysical surveys, and walking the site. Once the excavation begins, they supervise the excavation in the field, oversee the budget, and guide the publication of the excavation results.

Field supervisors are trained archaeologists who work under the project director. They are responsible for a single area or field of excavation. Their responsibilities are broad and include devising fieldwork strategies for their squares; establishing a coherent stratigraphic picture of the finds from the field; organizing square supervisors and workers into an effective work force; supervising excavations; coordinating balk drawing and field photography; collaborating with the project directors, architects, and other specialists in the field; and keeping the records of the excavation results and findings. They are assisted by square supervisors who excavate and record the single-square data and organize the work of volunteers and paid workers in the square. In charge of initial extracting and recording of raw data, the square supervisor’s work is vital to the success of excavation.

The proper scientific methods for conducting an archaeological excavation and recording archaeological data are found in excavation handbooks and field manuals (e.g., Barker, 1996; Blakely & Toombs, 1982; Collis, 2001; Herr & Christopherson, 1998; Joukowsky, 1980; Kipfer, 2007; Roskams, 2001). These field manuals and handbooks allow project directors to choose a recording method that best represents the archaeological goals of the project. Before an excavation can begin, a surveyor must establish

the location of each square according to the general grid pattern of the site. Then, supervisors and volunteers prepare the squares prior to the actual excavation by removing debris from the square, setting up a benchmark for taking levels, and reviewing the final records of the previous seasons if a formerly excavated square is reopened. When the excavation does begin, volunteers and workers use a variety of tools such as hand picks, trowels, hoes, dustpans, brushes, ladders, and sieves according to the methodologies outlined in the handbook.

To maintain control within an excavation, archaeologists using the Wheeler method establish balks between squares. A balk is a cross section of the excavated areas within a square. In order for the balks to be useful, they must be trimmed regularly. A hand trowel or pick is used to create a vertical surface that reveals the various soil layers, architectural features, or intrusive elements. Usually, the square supervisor will label the various features in a balk with locus tags. Then the various layer and other features are drawn on a cross-section map called a balk drawing. At the end of the season, these cross sections are photographed to keep a permanent record of their location.

Archaeological discoveries, no matter how small, must be handled with great care in order not to lose any data. Pottery pails must be labeled appropriately in order to process them while avoiding pottery contamination. Pottery sherds need to be washed of soil debris so they can be analyzed. Floral, faunal, and bone samples must be placed in paper bags to prevent the introduction of mold spores. Radiocarbon samples are usually placed in aluminum foil to prevent contamination, while the contents of jars and bowl are processed through flotation to separate soil granules from seeds or other organic material.

Each discovery—from the smallest grains of sand to the architecture within a square—must be recorded accurately. The basic unit of an excavation is a locus, which represents an area being investigated within a square. Locus numbers are assigned to each area and generally recorded on individual locus sheets; these may represent soil, architectural features, or installations. In order to identify pits, burials, foundation trenches, surfaces, and other features, careful excavation is necessary. When archaeological data are collected correctly, new discoveries can be synthesized into existing historical evidence for the evolution of adequate site history and general sociohistorical theories of the site and its vicinity.

Apart from excavations, another important technique for understanding how an ancient settlement originated and thrived is the regional survey (Banning, 2002). Surveys are used as either ad hoc or pre-excavation preparation activities. Two of the most common survey methods are salvage surveys and reconnaissance surveys. A salvage survey looks for and documents as many ancient sites as possible before they are destroyed by modern and natural events and developments. A reconnaissance survey is usually employed when a field archaeologist intends to locate potential excavation sites or to acquire a broad picture of

settlement history in relation to the site under consideration for excavation. Following the birth of processual archaeology, archaeologists extended this line of work to develop more extensive and intensive regional surveys. They now can acquire large-scale perspectives on changes in settlement, occupation, and land use through time.

A survey team is regularly made up of four to eight persons, including a field director, an artist, a photographer, and volunteers, although its size and personnel may vary depending on the survey goal and resources of the project. Ideally, the purpose of a survey strategy is to undertake an intensive survey of all parts of the research area in a systematic manner. For example, from 1996 to 2000, Ji (2007) undertook an intensive systematic survey of the entire area of the Dhiban Plateau in Jordan, an area approximately 250 sq. km. The survey area was divided into about 250 parcels of 1 km × 1 km using a 1:50,000 scale Universal Transverse Mercator map. Each square was then assigned a sequence number. To increase the precision in locating the selected parcels, a Global Positioning System (GPS) device was used and each 1 × 1 sq. km was then surveyed in a systematic way, employing a series of 200 m spaced traverses; that is, each square was divided into five 0.2 × 1.0 km sectors through which the survey team walked or drove systematically. In this way, no part of the area was either under- or overrepresented in the survey. When a survey square contained previously known or conspicuous archaeological ruins, these sites were examined first and then their vicinity explored. At each site, a major effort was given to the collection of pottery sherds and artifacts on the surface. The survey team recorded and took photos of each archaeological feature in the site, while artists made field sketches of the site and any significant features. In addition, off-site features (e.g., rock-cut installations, cisterns, tombs, quarries, terraces, water channels, caves) were located and documented. Surface soil was also collected at some selected sites for geological and landscape studies.

In addition to the survey techniques used on the Dhiban Plateau, the *non-site* or *off-site* survey is also used to survey large areas. Thomas (1975) conducted the first non-site survey in the Reese River Valley of central Nevada. Here, Thomas collected artifacts across 140 spatial units (each 500 × 500 m in size), instead of surveying sites, to study how hunter-gatherers dovetailed their economic activities into the environment in the Great Basin area. Similar to Thomas's study was Foley's research (1981) in Kenya, where he studied the relationship between an off-site artifact distribution and the formation of central sites in the area. These surveys heralded the advance of landscape archaeology (see subsequent section), an approach that considers the distribution of material remains such as potsherds, fishing holes, stone tools, hunting grounds, seasonal shelters, and pathways as an investigation in their own right, with their own ends (Tilley, 1994).

A more recent example of non-site survey is Christopherson's random-square survey (Herr & Christopherson,

1998) in the Madaba Plains in Jordan. Here, the surveyor first divided his project area into about 2,000 survey plots, each measuring 200 × 200 m, and then randomly selected 100 out of these squares, roughly 5% of the total area of the region. Christopherson then used a GPS device to locate the random squares. Christopherson's project shows how Thomas's and Foley's early efforts led to the current evolution of a survey method fully grounded in the analysis of spatial units such as random quadrates (see Banning, 2002).

Beyond Processual Archaeology

The concept and movement of processual archaeology grew in popularity in the early 1970s, but soon it came under attack from multiple quarters. Some structuralist scholars argue that ideas and symbolic concepts of past societies are critical in understanding their actions and determining which cultural elements of their civilization survive and thrive (Arnold, 1983; Glassie, 1975). Along with this, some argue that archaeologists should study the structure of ideas in the minds of the ancients who made pottery and artifacts. Recurrent patterns on the material cultures are reflective of human and social thoughts behind the design elements. Hodder and Hutson (2004), on the other hand, viewed all data and knowledge as subjective and thus any attempt to find objective knowledge as illusive (see also Shanks & Tilley, 1987). Here, there is no such thing as objective hypothesis testing. Archaeology, in this perspective, is intrinsically linked with history, and field research needs to be primarily designed for historical inquiries rather than to promote a general sociological and cultural theory for different societies. On the other hand, neo-Marxist archaeologists emphasized the ideology of the elites and their desire to control the society as significant in shaping changes and developments of the society (Leone, 1984). This view emphasized ideology as a powerful force within ancient societies. Accordingly, archaeologists should give relevant attention to the weight of ideology not only in the process of data interpretation, but also at the stages of research design and actual fieldwork.

Processualist archaeologists responded to this wave of criticism by creating a new approach to landscape studies (Roskams, 2001). Formerly, a landscape was nothing more than a physical environment where archaeologists carried out reconnaissance in search of ancient evidence of archaeological sites. It is now perceived as a cultural construct that warrants a careful analysis in relation to an excavation site. The emergence of contextual data collection is also notable, demanding that archaeologists provide detailed, contextualized information in relation to their finds to promote fuller social explanation of the archaeological data.

Postprocessualist challenges, however, were most evident in the area of interpretation and theory evaluation as

it ushered in a cognitive-processual approach to archaeological data (Renfrew & Bahn, 2008). This new interpretive framework is different in several ways from the functional approach of conventional processual archaeology. The new processual archaeology now recognizes both ideology and internal conflict as important forces within past societies. Similarly, material culture is defined as having had an integral place within the construction of the early societies, helping later generations understand the cognitive and symbolic aspects of those societies. The new framework also gives increased attention to the historical approach of traditional archaeology, seeking to explain the ideological and socioeconomic evolution of early societies in their context of cyclical change and underlying long-term trends. Cognitive processualist excavators and surveyors continue to reject the extreme relativism of postprocessualist archaeology and Hodder's critical theory, but acknowledge the linkage between fact and theory as more ambivalent and complex than previously presumed in the 1960s and 1970s.

To Renfrew and Bahn (2008), cognitive processualists currently focus their research agenda in two main directions: (1) inspecting the bearing of symbols in social changes and transformation structure and (2) examining the conventional areas of research interest such as agriculture development and state formation. For example, the work of Flannery and Marcus (1983) in the Oaxaca Valley, Mexico, examined the evidence for religion and social division in addition to traditional issues such as diet, state formation, environment, and technology. Their ethnographic research shows some gender division of work areas in the household. The excavations also yielded evidence for ritual activities at the community and household levels. People were buried according to certain religious beliefs; variations in grave size and quality pointed to the presence of distinctive class division among those who were buried in the valley. The structure of social transformation is another current focus in that some processualists actively incorporate various new concepts such as positive feedback, punctual equilibrium, catastrophe, and self-organizations. The incorporation of these new concepts is designed to generate more effective and complete formal models of social change and cultural transformation. Within these models, human ideas and symbolic elements of human society bear prominent roles.

Future Directions of Archaeological Fieldwork

All archaeological inquiries ultimately involve a decision to describe something from the past—to ask questions and seek answers about earlier societies, requiring that data of some kind be collected, that the data be analyzed in some way, and that the researchers come to some conclusion or interpretation. However, fieldwork is not necessarily

a uniform application of the scientific method. Depending on research paradigm, substantive variances can exist between the types of questions, the form of data collection and analysis, and the meaningful conclusions that field archaeologists can draw with validity.

A question then arises as to how many paradigms currently exist in the discipline of archaeological fieldwork. Renfrew and Bahn (2008) advanced four major models: (1) structuralism, (2) critical theory, (3) neo-Marxism, and (4) cognitive-processual archaeology. Others see at least several methods of carrying out fieldwork including functionalism, Marxism, feminism, phenomenology, evolutionism, historicism, and cultural-historicism (Johnson, 1999; Trigger, 2006).

Most archaeologists, however, would agree on the salience of two broad research paradigms behind archaeological fieldwork: inductive and deductive (Roskams, 2001). The inductive paradigm proceeds from particular facts or empirical data to a general conclusion; the deductive paradigm involves essentially the reverse process—setting a hypothesis and then testing this assumption with data in order to arrive at a conclusion. The 20th century began with the rule of an inductive approach to archaeological fieldwork and ended with the ascendancy of a deductive approach. This change unfolded during the first half of the century but became dramatically embodied with the movement of processual archaeology in the 1960s and 1970s. The development of this phenomenon, however, was not a case of a deductive approach replacing an inductive approach. An inductive approach to fieldwork is still very much prevalent and it has strong support from many quarters of traditional and postprocessual archaeological communities.

Whether archaeological excavations and surveys can be “purely” deductive/processual or “purely” inductive/traditional/postprocessual, and as such be guided by one of two opposing approaches, remains uncertain, however. For example, archaeologists with a specific research agenda on the development of Iron Age religious rituals may uncover a variety of architectures and artifacts related to periods other than the Iron Age. In this case, the excavators have moral and academic obligations to gather all the data, albeit unrelated to their research focus, in a systematic manner and eventually describe and explain what has happened across all the periods in their field reports. This example illustrates how one field project can consist of deductive/processual and inductive/traditional components, although in this case the emphasis of the fieldwork may remain weighed toward one end of the continuum if the excavators continue to center their excavation efforts and resources on the collection of Iron Age cultic data.

In addition, archaeologists should be aware of the danger of the domination of one single paradigmatic view. Research projects that grow out of only one specific perspective tend to illustrate some part of the fieldwork while ignoring the rest. Indeed, what would occur if advocates of deductive processual archaeology paid more attention to

the broad range of historical issues and questions that traditional field archaeologists have generated for them? And what if inductive historiographic archaeologists spent more time exploring the range of socioeconomic phenomena that processual archaeology has sought to define and test?

The discipline of archaeological fieldwork may need to move beyond inductive/traditional versus deductive/processual archaeology arguments because both research paradigms are useful and important. In this context, it is encouraging to note that a mixed-paradigm approach to social science has recently gained favor as an alternative to the exclusive reliance on either a deductive or an inductive framework (Creswell, 2003; Johnson & Onwuegbuzie, 2004). For archaeology, a case in point is cognitive-processual archaeology, which seeks to incorporate the research questions of traditional and postprocessual archaeologists about ideology, internal conflicts, historical events, and chronology without giving up their positivist views on theory and data. By doing that, cognitive processualists attempt to bridge the schism between traditional and processual archaeology, as well as to eschew the incompatibility distinctions of those who assert fundamental discrepancies between inductive and deductive research.

In the 21st century, however, archaeologists may need to go further by adopting a more integrated paradigm. This approach is more appropriate for field archaeologists whose primary goal is not to search for a simple corroboration of processual, traditional, Marxist, or historiographic archaeology but rather to expand their understanding. In other words, the aim of integrated research is not to supplant either the inductive/traditional or deductive/processual archaeology paradigm, but rather to draw from their strengths and minimize the frailties of single-paradigm field studies. Its logic of inquiry requires the skillful use of both induction and deduction in order to uncover and rely on the best of a set of explanations for understanding one's results (de Waal, 2001). To this end, excavators and surveyors must collect multiple forms of data using divergent strategies and methods in such a way that historical and socioeconomic questions are both best and most fully answered through different data sets.

In an integrated fieldwork model, researchers first need to decide whether to give the inductive/traditional and deductive/processual archaeology components equal eminence or to give one paradigm the dominant position (see Johnson & Onwuegbuzie, 2004, pp. 19–20). A second dimension to consider is time ordering of the inductive/traditional and deductive/processual phases within or across research, with the phases operating in a simultaneous or consecutive manner. Another dimension to cogitate is where integration would take place: at the stage of research question, data collection, analysis, or interpretation.

Due to these multiple assorted dimensions, the potential number of manners in which archaeological research can integrate inductive/traditional and deductive/processual methods is immense. For example, a variety of research

paradigm models can evolve depending on how inductive/traditional and deductive/processual paradigms are arranged along the research procedure of research objective, data collection, and data analysis. Figure 10.1 presents six integrated designs, which may be called across-research-process-paradigm designs. For another example, once a researcher employs an integrated paradigm approach, he or she should make two principal decisions: whether or not to operate chiefly within one paradigm and whether to blend the two paradigms

simultaneously or sequentially. Figure 10.2 illustrates nine of many possible designs that can be constructed based on these decisions. We can easily come up with more creative and more sophisticated fieldwork designs than those illustrated in Figures 10.1 and 10.2. For instance, archaeologists may choose to increase the number of repetitions between deductive and inductive data collection and analysis or formulate a fieldwork design that combines both integrated paradigm design features in Figures 10.1 and 10.2.

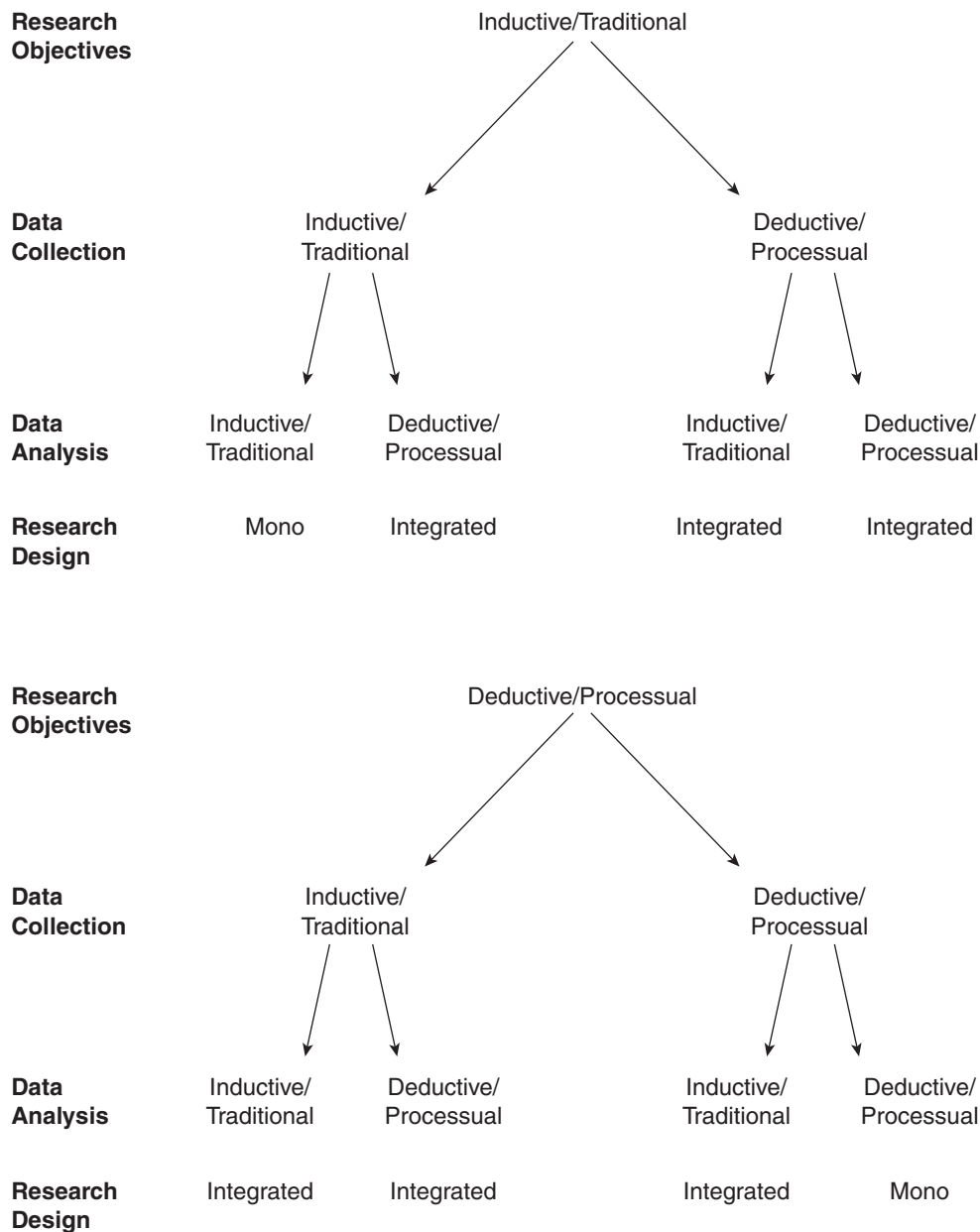


Figure 10.1 Integrated Research-Sequence Paradigm Designs

SOURCE: Adapted from Johnson and Onwuegbuzie (2004). Figure prepared by Chang-Ho Ji.

		Time Order Decision	
		Concurrent	Sequential
Orientation Emphasis Decision	Equal Weight	Ind/Trad + Ded/Proc	Ind/Trad → Ded/Proc Ded/Proc → Ind/Trad
	Unequal Weight	Ind/Trad + Ded/Proc Ded/Proc + Ind/Trad	Ind/Trad → Ded/Proc Ind/Trad → Ded/Proc Ded/Proc → Ind/Trad Ded/Proc → Ind/Trad

Figure 10.2 A Factorial Model of Integrated Research Designs With Research Emphasis Decision and Time Order Decision

SOURCE: Adapted from Johnson and Onwuegbuzie (2004). Figure prepared by Chang-Ho Ji.

NOTE: Bold letters in table denote high priority or weight, and nonbold letters denote lower priority or weight.

A key point is that the potential for variation is limitless. A variety of integrated methods, research designs are feasible; excavators and surveyors can be innovative, rather than constrained by one dominant orientation once integrated methods research is employed. In integrated methods research, excavators and surveyors should be able to generate designs that more adequately and efficiently address their research questions than the routine conventional fieldwork where one operates completely within either an inductive/traditional or deductive/processual paradigm orientation.

Revolutionizing the archaeological community to ensure that the research designs of all field projects are predominantly integrated-paradigm oriented is an ambitious goal. Yet, the discipline as a whole is apparently transitioning from a strictly hypothetico-deductive method of processual archaeology to a future of an elastic field archaeology that is more inclusive, synthetic, and diverse in scope. For fieldwork paradigms, as stated above, it could mean the integration of inductive/traditional and deductive/processual excavations and surveys. In regard to field technique, it also could lead to incorporating various new technologies into excavations and field surveys (Roskams, 2001). Many important advances have indeed been made

in relation to information technology, ranging from (but by no means limited to) geographical information systems to statistical software programs, geophysical engineering, and aerial and satellite photography. If excavations and surveys are to be truly cutting-edge, then archaeologists must incorporate these techniques and use them for data collection and presentation. There is little doubt that information technology will have a major impact on archaeological fieldwork in the coming decades.

Finally, there are potential problems that field archaeologists should avoid; each is a trap that relates to the complexity and technical bases of fieldwork itself. First, archaeologists should avert the “a priori purposeful” trap because fieldwork is not a latent activity and because the process of excavation and survey demands that archaeologists let research goals and designs evolve with them. Good field research needs working goals, hypotheses, and designs that are not static. Second, excavators and surveyors should be careful not to engage in the “evaluative” trap by interfering with the normative dispute over the inductive/traditional and deductive/processual paradigms and because both processual archaeology and postprocessual archaeology are consequences of rather similar vigorous scientific processes. The archaeological fieldwork paradigm is, therefore,

“both” or “relative” rather than “good” or “bad.” Finally, field archaeologists should avoid the “verification” trap. The goal of archaeology is not merely to “interpret the past but to change the manner in which the past is interpreted in service of social reconstruction in the present” (Shanks & Tilley, 1987, p. 195). It is fundamentally “a political practice” under the influence of dominant political and ideological forces (Palus, Leone, & Cochran, 2006, p. 86). Archaeologists must be aware of the political conditions and the wider ideological battle over power and their influence on archaeological scholarship. Scientific fieldwork may yield knowledge about the nature of an ancient community, but it cannot comment on what are “true or false” political, ideological, or religious claims.

Conservation

Once an integrated model has been selected and the artifacts have been excavated, archaeologists face the problem of how to prevent the artifacts from further deterioration while they are being studied. When artifacts are *in situ*, they chemically interact with the environment around them. In dryer climates like Egypt and Chile, some artifacts are less likely to be affected by their surroundings. In moist climates like northern England or the Amazon, deterioration can accelerate through contact with bacteria, insects, animals, salts, or minerals, depending on the type of artifacts. Even the most stable artifacts, such as highly fired ceramics or stone bowls, can develop stains and calcification that make them difficult to analyze. Once artifacts are removed from their *in situ* environment, they begin to interact with their new environment in ways that may be harmful to the artifacts. Removing some types of artifacts, then, can cause permanent damage (Cornyn, 1990).

Artifact conservation is a relatively new phenomenon; its basic purpose is to stabilize artifacts without a negative effect on the archaeological evidence (Banning, 2000, p. 126; Pye, 2001, pp. 9–10). Some archaeologists use an aggressive approach that attempts to remove all corrosion, especially from metal or glass objects that might continue to deteriorate with oxidation. Unfortunately, this approach may render the artifacts useless for certain types of archaeological analyses such as noninvasive spectrography, archaeometry, metallurgical testing, or UV and ultraviolet examination. It may also prevent the application of future technologies for the study of the artifact. Therefore, most archaeologists prefer a less invasive approach that interferes as little as possible with the archaeological evidence preserved on the artifact. Archaeologists should always attempt to create an environment that will not accelerate deterioration.

There are several principles that should be considered when dealing with artifacts. First, wherever possible, archaeologists should consult a conservator throughout the process of conservation. Conservators are professionals who are trained in the art of preserving artifacts and can

help create guidelines for their collection, handling, cleaning, repair, and storage. Many specialize in specific material such as bronze, glass, or textiles and should be consulted before entertaining the use of any invasive conservation methods on these materials. Second, most artifacts are fragile; before beginning conservation a plan should be outlined identifying any problems with the artifacts, the objectives for dealing with those problems, the types of conservation techniques that are available, and any risks to the artifacts. It may be that some artifacts have more immediate needs and will benefit from conservation, while others may not need immediate attention or may not benefit at all from conservation (Banning, 2000, pp. 126–127).

Third, all conservation projects should include accurate and well-maintained records. A system for assessing and recording information about each artifact and exactly what conservation methods will be used should be in place prior to conservation. Labels should be securely attached, reliable, and stable. A database or other computer program can be used to record artifacts’ information and should be backed up regularly to ensure long-term preservation. Fourth, any conservation project should be a collaborative effort. Archaeologists, curators, and other specialists may have very different criteria for determining if an artifact should receive special conservation methods. An archaeologist might treat an object because it contributes to an understanding of the stratigraphic sequence within an excavation, a curator might see an artifact for its value as a display piece, and a specialist might need to preserve organic residue for further testing. All interested parties should work together to stabilize an artifact without negatively impacting its archaeological contribution (Pye, 2001, pp. 34–35).

While protecting artifacts from further decay is an important consideration, there may be ethical issues to consider before undertaking a conservation project. Most excavated artifacts belong to the host country. Although archaeologists may take them from that country to be studied outside of the region, they are expected to return the artifacts in a timely manner as specified in the permit. Even artifacts excavated by nationals may be claimed by indigenous peoples if they were found on native lands or have ritual significance. Such groups may have a stake in whether or not a conservation project is undertaken, and archaeologists and curators may need to consider whether conservation is worth the expense if in the end the artifact is returned to the host community. In any event, culturally sensitive artifacts and human remains need to be treated with respect. It is no longer acceptable to display burial artifacts or the bones of someone’s ancestors without permission from or consideration of the interests of indigenous peoples. Wherever possible, excavated sacred remains need to be repatriated—museums and universities with bone collections likely collected in the 19th century should create appropriate protocols for the return of these artifacts to their respective cultures. Archaeologists should

always seek to respect the laws of the host countries as outlined in the permits and any international laws and conventions that may apply.

Preservation

Where conservation seeks to stabilize artifacts, archaeological preservation attempts to maintain artifacts in that state indefinitely. Until recently, archaeological preservation was the responsibility of museum curators and specialists. In the past, archaeologists were only interested in what data artifacts could contribute to their understanding of a culture or a civilization. For archaeologists, conservation served the purpose of maintaining an artifact in a state that would allow it to be studied in depth for as long as was necessary. Once the scientific research was completed, artifacts were put into the care of museum curators and archaeologists were no longer involved. Likewise, archaeological sites were turned over to cultural resource managers, indigenous populations, or antiquities authorities to decide whether resources should be allocated for long-term preservation. In recent years, archaeologists have begun to see the value of preserving artifacts not only for their own research or that of future scholars, but also for the contribution to informing and educating the general public (Pearce, 1990, pp. 1–3).

Several factors have contributed to the need for archaeologists to preserve not only artifacts, but also the sites from which they were excavated. Recent destruction of archaeological sites in Iraq and the vandalism of the Iraqi National Museum have served as a wake-up call to those who have a vested interest in archaeological preservation (Emberling & Hanson, 2008). Widespread looting throughout the world has emphasized how fragile archaeological and cultural heritage sites are becoming. With little protection from local authorities, many ancient sites are seriously threatened. Even archaeological sites currently being excavated are at risk of vandalism, forcing archaeologists to re-evaluate their preservation strategies.

Although archaeological and cultural heritage sites are increasingly threatened, archaeology as a discipline has gained widespread popularity. Movies and documentaries have glamorized the role of the archaeologist, and some archaeologists have become pseudo-celebrities, appearing in numerous television shows and documentaries. Television channels such as Discovery, National Geographic, the History Channel, and others have inspired many people to take an interest in archaeology. Many shows have highlighted the threats that historical sites face and brought the need for action into the public conscience. In addition, historical tourism has also risen in popularity. For more than a century, visitors have flocked to exotic sites such as the Giza Plateau in Egypt, the Acropolis in Athens, and the ancient city of Machu Picchu in Peru. Most of these sites are well guarded and well preserved to prevent looting or destruction from

overuse. However, smaller sites (especially those en route to larger sites) are also attracting visitors and becoming tourist destinations. These sites are frequently unguarded and do not have the resources for long-term preservation. Archaeologists and cultural resource managers have found that attracting visitors to an archaeological site, even a small one, can help reduce looting and vandalism. Unfortunately, most small sites do not have the budget for the long-term preservation needed to prepare them for the general public. In order to preserve a historical site, archaeologists must engage the local community in the process. When local communities are involved in the management of a cultural resource, they often recognize the financial value that tourism brings and frequently take pride in hosting an archaeological site in their community (Hodder, 2004, pp. 164–166).

Conclusion

The future of archaeology is intimately related to the cultural heritage sites that archaeologists investigate and that now hang in the balance. On one hand, American audiences continue to be fascinated by what archaeologists do and what they discover. Although the media has portrayed archaeology in a sensationalist manner, it has provided a medium for archaeologists to correct misunderstanding, introduce new discoveries, and inspire a new generation of archaeologists. However, it has also come at a price. The added attention has not gone unnoticed by desperate communities who see cultural remains as a potential resource. In the face of poverty, many communities near cultural heritage sites have turned to looting as a way to survive. Little is being done to combat the destruction of archaeological sites throughout the world, and the appetite for looted antiquities has not abated. One can hardly blame these individuals and communities for taking advantage of this resource. Unfortunately, this destruction is so severe that some sites may never be excavated scientifically again. Indeed, the future and sustainability of any site lies in developing strategies that engage the local communities in the archaeological process. Local communities must become involved in all aspects of the archaeological process—from its planning and excavation to its management and security. These communities need to be encouraged to take ownership and pride in their cultural heritage and its archaeological sites. Only then will archaeology have a future.

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ARTIFACTS, BURIALS, AND RUINS

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In the 21st century, archaeology faces many challenges as field archaeologists balance traditional, current, and emerging concepts and techniques. They must apply these to site selection, excavation, recording, conservation, and analysis, for both individual artifacts and their broader matrix in mortuary through occupational contexts. This chapter outlines the broad range of traditional to current approaches for studying artifacts and their contexts, and incorporates selected issues and potential solutions for future archaeology.

As in many fields of study, the archaeology of diverse study areas/periods (e.g., Egyptology, classics, Mesoamerica) has splintered into numerous specialties (e.g., Egyptian archaeology, Egyptian language) and subspecialties (e.g., Old Kingdom Egypt, New Kingdom pottery). Such experts also rely on other fields and specialists for input (e.g., geology, paleobotany, zooarchaeology). This increasing diversification has challenged archaeologists to communicate more effectively than in the past—among themselves and with other disciplines, especially in cross-cultural studies and broader global issues (e.g., the 4.2 K BP event: a global climatic change that affected world cultures differently around 2200 BCE). To anticipate, remain competitive, and deal effectively with a seemingly infinite range of field-specific to site/period-specific requirements, current and future generations of archaeologists must now deal with an ever-growing and indispensable toolkit of varying expertise, technology, and analytical tools.

Archaeology also faces such major and increasing obstacles as global warming, population growth, a worldwide economic recession, political turmoil, urbanization, agricultural expansion, site destruction, and looting. These and other factors impact archaeological remains, whether by exposure of previously submerged, and naturally protected, waterlogged sites, or the targeting of sites for looting and destruction (e.g., the March 2001 destruction of the Bamiyan Buddhas and the 2003 looting of the Iraqi National Museum in Baghdad).

Rediscovering Our Past

The emergence of social stratification and inclusion of wealth in burials has been accompanied by persons interested in retrieving such items, initially mainly for personal gain, and in more recent centuries for material and intellectual enrichment. One of the earliest “archaeologists” was an Egyptian prince, Khaemwaset, who served King Ramesses II (ca. 1279–1213 BCE) and investigated and restored various ancient monuments (Kitchen, 1982, p. 107). King Nabonidus of Babylonia (ca. 555–539 BCE) was another pious individual who investigated, restored, and collected antiques from past monuments. In Europe, the Renaissance (14th–17th centuries CE) marked a revived interest in antiquities: wealthy persons collected antiquities for display in their homes; more meticulous

investigators studied and researched various monuments, such as Stonehenge (William Stuckley, 1687–1765 CE) and the Great Pyramid in Egypt (John Greaves, 1602–1652 CE) (Lehner, 1997).

Although digging began in the early to mid-1700s at sites such as Herculaneum and Pompeii, the first scientific excavation is generally credited to Thomas Jefferson's 1784 investigations of a burial mound on his estate in Virginia. The landmark publications of geological stratigraphy and evolution, including James Hutton's *Theory of the Earth* (1785), Charles Lyell's *Principles of Geology* (1833), and Charles Darwin's *On the Origin of Species* (1859), guided early archaeologists' concepts regarding the formation and antiquity of the archaeological record. During this period, Jacques Boucher de Perthes's discovery and publication (1841) of human hand axes alongside the remains of extinct animals slowly began to convince fellow scholars that humanity had appeared much earlier than the 4004 BCE date calculated by some theologians. C. J. Thomsen published the notion of a *Three Age System* between 1836 and 1848 CE, dating European artifacts to successive ages of Stone, Bronze, and Iron, which remain the basis for many relative chronologies across the world.

This *Age of Discovery* paralleled a resurgence of interest in the ancient civilizations of Egypt, Syria-Palestine, Anatolia, Mesopotamia, the Aegean, and elsewhere. The Napoleonic expedition to Egypt from 1798 to 1800 included over 100 scholars and discovered the Rosetta Stone, which Champollion deciphered in 1822, thereby enabling the translation of innumerable hieroglyphic texts. Botta and Layard led French and British expeditions to Mesopotamia in the 1840s, but cuneiform remained unreadable until Henry Rawlinson deciphered it in the 1850s (Lloyd, 1980). John Lloyd Stephens explored Mayan ruins in Central America in the 1840s, but Mayan texts remained undeciphered until the 1960s. In the 1870s and 1880s, Heinrich Schliemann rediscovered Homer's Troy at Hissarlik in Western Anatolia (Bryce, 2006). Archaeological skills matured during this period, most notably demonstrated between 1887 and 1898 by General Pitt-Rivers, whose excavations and full publications of Wor Barrow remain a peak achievement in archaeology.

The early to mid-1900s witnessed further developments in archaeology. W. M. F. Petrie introduced a more meticulous approach to excavating and recording in Egypt and is famed for inventing seriation dating at a predynastic cemetery at Naqada. He placed separate pottery groupings in relative chronological order by tracing the gradual devolution of a wavy-ledge handle on a particular longer-lived vessel form. Gordon Childe initiated revolutionary approaches to assessing the origins of cultures in prehistoric Europe, arguing for indigenous factors behind changes in material culture. Sir Mortimer Wheeler applied a grid-square technique of excavation, using vertical soil sections to trace and record stratigraphic layers and phases in relation to architecture at ancient settlements in India.

New scientific techniques for dating the past emerged after World War II, including radiocarbon dating in 1949. The increase in this and other technologies was paralleled by new theoretical and practical approaches to designing, implementing, and analyzing the excavation of sites, beginning with the *New Archaeology* (i.e., processual archaeology) in the 1960s. This approach was pioneered by Lewis Binford and others, who attempted to explain change and the processes of change in past cultures by using deductive reasoning, designing research questions, testing hypotheses, and quantifying data. This approach was modified in the 1980s and 1990s, using interpretive, or postprocessual, archaeology. This essentially emphasized that each past culture and circumstance requires a specific research design.

Mortuary and Occupation Contexts

The absolute most crucial point in archaeology remains defining and recording the context of all materials and artifacts as fully and accurately as possible. A *site* can be defined as a place containing traces of human activity that may range from a discarded or lost item along a trail (e.g., a jar) to an ancient city. It is the context that enables one to maximize reconstructions of past lifeways from innumerable components spanning microcontexts (e.g., a vessel's contents), to medium-scale matrixes (e.g., a chamber/dwelling, an altar/shrine, a body/tomb), and much broader-scale coverage of sites, regions, polities, cultures, continents, and the globe. To maintain this context, it is necessary to isolate and identify all (surviving) materials from a single depositional sequence, or a *locus*. A locus might reflect an individual act of depositing garbage in a midden, placing an offering on an altar, or interring a body.

By distinguishing contemporaneous materials from earlier worn, or broken, debris within such deposits, archaeologists can begin to make more meaningful assessments about the significance of artifacts within and across a single time frame. It becomes much trickier, however, to link multiple spatially separated deposits the further apart such loci lie within a structure or site, or between sites and across regions. For instance, the emergence of certain material cultural traits in one location may appear later in a more distant region. On the other hand, some artifacts may be retained longer as heirlooms (e.g., royal name seals), thereby generating an unnatural life span for an object that becomes less useful for dating.

Social Groupings

Any assessment of past settlements, burials, and artifacts will almost inevitably be guided by the nature of a given society. Past cultures and site types can be subdivided broadly according to several basic categories of social organization: hunter-gatherers (bands), segmentary

societies (tribes), chiefdoms, and early states (complex societies) (see Renfrew & Bahn, 2008). These social groupings often display distinct types of occupation, burials, and artifact types in the archaeological record that enable their differentiation, while other aspects may be more generic. In general, site complexity and social hierarchy increase continuously from prehistoric hunter-gatherers to early and modern complex state societies.

Hunter-Gatherers (Bands)

Archaeologists have applied systematic and unsystematic surface surveys to detect past hunter-gatherer sites: seasonally occupied base camps, transitory camps, wild vegetation gathering areas, animal migration routes and hunting zones, kill sites, butchery sites, and lithic sources and production sites. Ethnoarchaeological studies have been especially helpful in reconstructing past activities. For example, studies of the Kalahari !Kung San bushmen, Australian aborigines, and other bands reveal that most bands of hunter-gatherers number around 25 persons, with members rarely exceeding 100 people. Their mobile lifestyles and high infant mortality discourage large families. The !Kung San hunter-gatherers also have distinct patterns in their seasonal summer camps, displaying several hut clusters placed closer together according to kinship ties within an extended family. Each hut also has a hearth and an activity area per band member.

When examining ancient seasonal campsites, it is often impossible to distinguish single-occupation phases, which have frequently merged into an admixture of artifacts, bones, and other debris among various features (e.g., hearths), and hut circles. In such circumstances, archaeologists obtain a long-term idea of activity patterns, while a meticulous collation of conjoining bone and stone fragments aids in isolating a series of contemporary activity patterns across a site. For example, Lewis Binford resided among the Nunamiut Eskimo in Alaska to clarify the more generic seasonal movements and the use and discard patterns by modern hunter-gatherers in order to comprehend better the formation process behind past hunter-gatherer sites and material culture assemblages. His study isolated such generic hunter-gatherer actions as bone-fragment discard patterns.

Site catchment analysis represents a more recent approach to comprehending past hunter-gatherer territories. Ethnographic and archaeological research has demonstrated that the further the base camp, the less apt mobile bands are to exploit resources directly. A two-hour walk constitutes the general radial limit, but may extend between 5 and 10 km depending upon the traversability of the surrounding terrain. One study of a typical hunter-gatherer group's range (i.e., site exploitation territory), in the Amboseli region of Kenya, examined every 10 m square grid unit in a 600 square km area. The project collected a sample of 8,531 stone stools, and it was estimated that a band of 25 persons had discarded 163,000 artifacts

per year: a daily average of 18 items per person. The artifacts used by mobile hunter-gatherers tend to be less cumbersome and easily carried, often negating the adoption of such things as pottery containers.

Ethnographic and archaeological evidence also aid in clarifying the seasonal availability of food in relation to its exploitation by and the movements of hunter-gatherer bands. For instance, late Paleolithic hunter-gatherers at Wadi Kubaniya (northwest of Aswan) apparently collected tubers as a staple food (mid-October to mid-August), relied more on fish and mollusks when these sources were obscured during the flood season, and supplemented their diet with seeds and dom palm fruit in briefer periods (November to February and March to April, respectively) (see Midant-Reynes, 2000).

Separate hunter-gatherer bands are also known to meet occasionally for rituals, celebrations, competitions, and other shared activities. A recent example is an early Neolithic, nonresidential, *cultic* center at Gobekli Tepe in Anatolia, which has at least 20 circular structures with carved animals and insects.

In hunter-gatherer cave sites, where occupation layers are much better defined, it is possible to trace changes in hunting and gathering patterns over time. These can be influenced by changes in climate, sea level, and coastline location. For example, at Elands Bay Cave in South Africa, distinct modifications occur in a hunter-gatherer group during the late Ice Age to Neolithic period, ca. 11,000 to 3,000 BCE. The sequence of faunal debris and cave art revealed a gradual switch from hunting mostly open grassland fauna to exploiting mainly marine species in response to rising sea levels and an encroaching coastline and estuary.

Hunter-gatherers' burials also provide further information about their mortuary customs and past lifestyles. For instance, some seasonal hunter-gatherers in the Levant practiced defleshing (excarnation) followed by the eventual placement of disarticulated bones in a regional burial ground (Mazar, 1990). Neolithic males from Niger exhibit abnormally high lesions (i.e., mechanical stress, or joint disease) on their arms and feet, reflecting hyperactivity in specific muscles associated with running and probably operating bows and other projectiles in hunting. In contrast to settled populations, prehistoric hunter-gatherer bodies in temperate climates and open grassland tend to be free of parasites.

Segmentary Societies (Tribes)

Segmentary societies (tribes) are often recognizable in the archaeological record through traces of farming; animal husbandry (e.g., meat from livestock); exploitation of secondary products (e.g., milk, wool); a mostly sedentary lifestyle; household craft production (e.g., simple pottery); and a slightly more complex social organization, albeit a generally egalitarian lifestyle. A less visible affiliated

group includes nomadic pastoralists, who rely primarily on livestock. In general, a segmentary society may number up to a few thousand persons, and usually resides in either isolated dwellings (i.e., a *dispersed* settlement pattern) or small villages (i.e., a *nucleated* settlement pattern). Of the latter housing pattern, some villages represent *agglomerate settlements* with residential and other units placed adjacent to one another in a tightly packed community (e.g., Catal Hoyuk) (Hodder, 2006). Housing may vary widely, from more makeshift wattle-and-daub structures, evidenced via postholes, to sturdier mud-brick buildings. James Hill's ethnographic study of Pueblo Indian artifact distributions revealed three types of room use in similar structures to Catal Hoyuk: storage areas, cultic chambers, and domestic quarters (i.e., sleeping, interacting, cooking and consumption of food). He found further gender-oriented room usage, but did not incorporate architectural components into this assessment.

In general, many segmentary societies have a designated burial ground (e.g., long barrows in Wessex), albeit displaying relatively equal ranking in burial goods and status. Estimates reveal that an average barrow could easily be completed by an extended family of 20 persons working for 50 days. A careful scrutiny of funerary goods and burial types associated with different age and gender groupings suggests slight differences in ranking within the limited hierarchy. For instance, compiling a frequency distribution (i.e., a histogram) for the quantities of various artifact types from burials of infants to elderly people would enable one to gauge the role played by *ascribed status*. In other words, one can determine the quantity and quality of goods associated with key age-groups that could not have earned a sufficient income prior to their interment. Other types of this social organization lack central cemeteries, and may place bodies under various structures, including houses (e.g., Neolithic Palestine).

Many communities contain a focal point, such as a public monument, or ritual center of sorts, maintained by religious elders. For example, segmentary societies represent the most likely social grouping associated with the early megalithic monuments in Europe (Cunliffe, 1994). Renfrew and Bahn (2008, p. 204) calculated that an early Neolithic causewayed enclosure in Wessex (ca. 4000–3000 BCE) required about 250 persons working for six weeks (100,000 labor hours) to complete it. This falls well within the capabilities of a segmentary society. Excavations at these monuments also reveal evidence for public feasting, another component generally associated with such peoples. Adjacent segmentary societies may also contain various shared and distinct traits: Ethnoarchaeological studies at Lake Baringo (Kenya) have revealed that some modern regional cultures distinguish themselves by specific ear decorations, while sharing other items of material culture. Hence, this cautions archaeologists that certain cultural markers may or may not survive to differentiate population groupings.

Chieftoms

In chieftoms, physical remains tend to reveal a more visible hierarchy in settlement patterns, housing types, and burial wealth. Although chieftoms lack urban centers, the chieftain's settlement generally dominates the surrounding villages, which may contain a collective population of 5,000 to 20,000 or more persons. An example of this is the 14th- to 15th-century CE site at Moundville in Alabama. This type of social grouping is normally made up of multiple families (lineages), which are dominated by one family whose relations tend to hold various ranks under the chieftain. This social organization often contains warriors and some form of defense (e.g., a palisade). The central settlement is permanent and generally characterized by one or more cultic installations (shrines/temples), frequently affiliated with the chief's duties; the central settlement has elite residences for the chieftain, his entourage, and specialized craftsmen. There is also normally a redistribution of produce and finished products (similar to taxation) from outlying villages to the central village; the chieftain would redistribute choice items among his entourage. In more hierarchical societies, the surrounding landscape might yield more intensive farming, plowing, and possibly the subdivision of fields into smaller plots. Settlements also yield evidence for local-craft specialization (e.g., metalworking).

Another focal point for chieftoms may include a large-scale monument, such as the late Neolithic mound of Silbury Hill (ca. 2800 BCE) and Stonehenge. Renfrew and Bahn (2008, p. 205) suggest the former structure took 3,000 persons about 18,000,000 labor hours and 2 years to build; using an identical number of workers, Stonehenge would have required 30,000,000 labor hours in a 4-year period to complete.

Regarding burial assemblages, the chieftain and other members of society have much richer funerary goods than the average community member. For example, a chieftain's remains from ca. 550 BCE at Hochdorf, in Germany, rest in a wooden chamber with a wagon, a large cauldron, gold-decorated drinking horns, and other luxury items (Cunliffe, 1994, p. 347). Christopher Peebles's cluster analysis of 3,000 burials from Moundville (Alabama) also revealed a good example of a ranked segmentary society. The wealthiest burials occurred within and beside the mounds. They yielded specific artifacts, such as copper axes and ear spools, associated with mostly male burials; additional high-ranking males and children are nearby. The next social stratum in this cemetery is located a bit farther away from the mounds: These burials contain both genders and similar funerary items, with the exception of copper. Those of the lowest social ranking are buried along the periphery of the site, having few burial goods.

Early State Societies

Early state societies display greater diversification in social stratification, craft specializations, government, and

settlement patterns, with populations ranging from at least 20,000 to several million or more people. Such societies and their hierarchies are sufficiently large and too complex to be kin-dependant: They often contain serfs (agricultural laborers), craftsmen, officials, priests, and an elite and ruling family. There tends to be greater differentiation between rulers and religion, with the ruling elite residing in palaces separated from temples. In ancient Egypt, however, despite having a distinct residence and secular duties, the pharaoh retained close symbolic and functional ties in many aspects of religion, temples, and cults, acting as a mediator and chief priest for the populace. Early state religions are also mostly polytheistic with multiple temples or shrines, sanctuaries, and cult figures. A few monotheistic religions emerge, including the consolidation of Jewish monotheism and the Torah during the Babylonian exile (586–539 BCE) and the exiles' return to Jerusalem and rebuilding of the (Solomon's) Temple (Stern, 2001).

A distinct centralized government and capital emerges in early complex societies, displaying palatial residences, administrative offices, temples, public buildings (e.g., granaries, water reservoirs, wells), industrial areas for different crafts, and residences for the elite and lower classes. Some large centers also contain substantial public ceremonial areas: arenas for competitive games and sports (e.g., Greek Panhellenic games, Roman hippodromes and coliseums, Mayan and Aztec ball courts); structures for public performances (e.g., Greek and Roman theaters); and areas for the receipt of materials and products from long-distance expeditions, regional-foreign tribute, and the dispersal of rewards (e.g., Egyptian New Kingdom temple and palace forecourts, podiums in the desert near el-Amarna). Many agricultural resources and finished products are sent as taxation, and sometimes as tribute, to the capital for redistribution within it and to the population in general. In many state societies, writing evolves for facilitating administration, communicating across distances, formulating religious doctrine, and expressing other ideas (e.g., laws, king lists, literature).

Aside from their own immediate hinterland, state capitals usually dominate complex settlement patterns containing a ranked hierarchy of provincial centers, towns, villages, hamlets, and farmsteads. Provincial capitals and outlying towns often have 5,000 or more residents, and frequently represent a microcosm of the capital city, but have less emphasis on, or an absence of, certain features, such as major temples and palaces. In central place theory, such settlements are placed in a theoretical and idealized landscape containing neighboring identical hexagons, each of which encloses a central town surrounded by equidistant villages and hamlets. Although few real landscapes approximate this pattern, settlement-pattern studies often incorporate site hierarchy (and Thiessen polygons) in computerized simulation models to assess the significance behind the dispersal and spacing of different settlement sizes and types across widely varying landscapes.

The boundaries of both small and large states and empires are sometimes discernible by the dispersal of particular structures and artifacts. Some states built roadways or other transportation networks between outlying quarries and settlements (e.g., Rome, the Inca, Egypt) and established elaborate systems of frontier forts and walling systems (e.g., Hadrian's wall in Britain, the Great Wall of China, Egyptian Middle Kingdom forts in Nubia). The Roman empire's northeastern frontier had a distinct Celtic buffer zone between its monetary market economy and a nonmonetary and marketless economy in Germany. The Celtic region yielded both Roman coins and Germanic products, facilitating trade between two different economies.

Early state societies display many types of burial practices and frequent socioeconomic stratification in their burials. Ancient Egyptian pharaohs received distinct and elaborate burials, especially during the Old and Middle Kingdoms (2700–2200 BCE and 2050–1650 BCE). Their large pyramidal tombs had adjacent royal cult temples, a priestly staff, and associated estates for revenues (Dodson & Ikram, 2008). In contrast, the Egyptian elite and middle classes received a broad range of much smaller and less elaborate subterranean burial chambers and rectilinear superstructures (mastabas) with fewer funerary possessions.

Early complex societies also had varying customs regarding the treatment of the body (e.g., cremation, inhumation, mummification, exposure, secondary burial, and other practices). In Egypt, only the middle and upper classes could afford mummification, with three main gradations of techniques and quality; the poorest Egyptians often received a simple pit-grave burial with minimal if any possessions (Grajetzki, 2003). The location and orientation of the deceased's remains also varies widely in early states. For example, the ancient Egyptian elite often preferred burial on the Nile's western side (associated with the setting sun and land of the dead), and usually arranged bodies in an extended position, with the head to the north and face to the east toward the rising sun (associated with rebirth).

Preparations for death also vary widely per society. Middle- and upper-class Egyptian tombs and their furnishings yield a wide range of specific items: an appropriate tomb complex that could function as a *dwelling* for the spirits of the deceased and family members (some tombs include bathrooms); substitute model workers (shabtis) to work in the place of the tomb owner(s) during the afterlife; statuettes to house the deceased's *ka*-spirit in case the actual body perished; lists, models, depictions, and physical offerings of food to sustain the deceased during the afterlife; papyri and other media recording spells to aid the deceased in bypassing diverse netherworld obstacles and attaining a successful afterlife; various garments, textiles, furnishings, and other possessions for the deceased's comfort in the next life; and a professional mortuary cult, or family members, contracted to maintain the deceased's tomb complex and mortuary offerings.

Early complex societies also have differences between age-groups and gender in burials. In New Kingdom Egypt (1550–1069 BCE), elite male burials often have a set of three successive coffins placed in a rectilinear sarcophagus versus a set of two for females; the husband's coffins also generally hold a papyrus document enabling the deceased to achieve successful entry to the underworld. The stark difference between the funerary furnishings for various social strata is also emphasized by the thousands of artifacts found in the relatively minor and virtually intact burial of Tutankhamun (1336–1327 BCE), in contrast to contemporary, simple pit graves for peasants who lacked possessions.

Artifacts

The aforementioned social groupings and contexts have yielded many different types and quantities of artifacts. Various definitions have been applied as to what constitutes an *artifact*, ranging from all inclusive concepts indicating an item of any size that has been used, altered, or manufactured by human beings (e.g., a pyramid), to more size-specific notions: Renfrew and Bahn (2008) define an artifact as “any portable object used, modified, or made by humans; e.g., stone tools, pottery, and metal weapons” (p. 578). Archaeological organizations, protection agencies, and the public also vary widely regarding the specific age and definition for an (archaeological) artifact or *antique*. A 100-year benchmark is often used (e.g., the Egyptian Supreme Council of Antiquities). In reality, however, any item used, modified, or made by a human becomes an artifact upon the moment of its initial manufacture or application.

Today, especially in light of the increased global construction and destruction in our urban and rural landscapes, archaeologists should consider all artifacts and time periods equally important within a given site or site component under excavation. For instance, the “modern” debris ignored in excavations 100 years ago are now “antiques.” The following discussion outlines some of the more pertinent aspects of the life cycle of various artifacts (and related contexts), from their raw state to trade and transportation, production, usage, discarding and reuse, preservation, excavation, dating and analysis, and “final” context.

Materials and Sources

Biased preservation tends to place artifacts into organic and inorganic materials, ranging from single material to multicompositional items with specific macro- and micro-climatic conditions assisting in their preservation. The materials composing artifacts also become increasingly complex from prehistoric to recent societies. Aside from humans, human ancestors’ (and even some animals using natural cobbles/stones and pieces of bone, shell, and wood

as “tools”) earliest and longest-lived artifact is represented by stone tools (from 2.5 million years ago to the present). Despite the application of a broad range of sedimentary and igneous stones for utensils, flint forms a particularly popular material.

The desirability of flint for tools is emphasized by the intense effort put into mining it in Neolithic Europe and at other times and places. For example, the flint mines at Grimes Graves in Britain (ca. 2500 BCE) contain around 350 vertical shafts that were cut between 9 and 15 meters in depth to reach a subterranean layer of high-quality flint. This single mining site may have produced over 28 million flint axes. A similar effort was expended in the Neolithic flint mines at Rijckholt, in the Netherlands, which may have provided 153 million axe heads based on the excavated sample of mines within this area. The labor and technology invested to obtain such axe heads included excavation tools (e.g., stone and antler picks), soil and rock removal devices (e.g., ropes and baskets), mining technology (e.g., ladders, scaffolding, and tunnel supports), support systems (e.g., supplying food to the miners), and artisans (e.g., shaping axe heads and applying wooden handles and bindings).

More labor-intensive and large-scale techniques appear in various prehistoric to early state quarries and mines. For instance, Egypt quarried large to colossal pieces of granite at Aswan to make or embellish statuary, pyramids, temples, and other structures (Arnold, 1991). This quarry's famous unfinished obelisk measured 42 meters in length, weighed about 1,168 tons, and was quarried by a methodical application of dolerite balls to pound a channel around and under the obelisk. Other societies exhibited a similar dedication to building monuments (e.g., an Inca stone quarry at Rumiqolqa in Peru and a statue quarry at Rano Raraku on Easter Island). Assessing the full range of unfinished artifacts represents one of the best analytical techniques for understanding ancient mining, quarrying, and construction processes. Otherwise, various devices are available, or emerging, to enable a detailed examination of artifact surfaces and interiors (see next section).

Other materials required much less labor to obtain. For example, many past societies used raw and locally available faunal and floral components, such as wood, bone, and shell. These may appear unaltered as artifacts (e.g., cowry shell money, game pieces) and in architecture (e.g., driftwood construction, prehistoric bone shelters). More complex and modified organic materials could be processed further by physically shaping or heating such materials (e.g., timber-frame housing, bone-inlaid wooden furniture, perforated shell necklaces).

Trade and Transportation

Various prized materials and products have been transported from sources that range from the immediate hinterland to destinations hundreds to possibly thousands of

kilometers away. Such items could be obtained via direct exploitation, or through other means, from direct trade between adjacent regions to indirect down-the-line trade. An example of down-the-line trade occurs in the Near East: During the Neolithic, obsidian is exported from two distinct sources in central Anatolia and Armenia to two slightly overlapping contact zones in Syria-Palestine and Syria-Mesopotamia; Ethiopia supplied Egypt with obsidian from the Predynastic to Ptolemaic-Roman periods (Nicholson & Shaw, 2000). In periods of socioeconomic and political strength, early states dispatched long-distance expeditions to obtain raw materials directly: Egypt obtained turquoise from South Sinai and sent maritime missions to Punt in eastern Sudan to trade for aromatics and African products.

Recent and improving scientific techniques permit us to pinpoint the sources of various materials and theorize about the relations between different regions. A microscopic examination of pottery and stone thin sections helps identify specific minerals and their characteristics, narrowing down their probable source areas. Trace-element analysis, and in particular Neutron Activation Analysis (NAA) and inductively coupled plasma mass spectrometry (ICP-MS), provide more precision in detecting sources for pottery fabrics, obsidian, and other stones. Isotopic analysis, including lead isotopic analysis, is best applied to isolating the sources for lead, silver, and copper items. In some cases archaeological and textual-pictorial evidence identify the means by which such materials are transported: Djehutyhotep's tomb in Egypt illustrates laborers dragging his colossal statue on a sled. In other circumstances the routes and means of transportation are inferred (maritime trade between islands).

Means of Production

Past peoples have applied numerous techniques to make artifacts using diverse and composite materials (e.g., stone, bone, antler, shell, leather, wood, plant and animal fibers, pottery, faience, glass, and metals). Production centers and incomplete products are ideal for clarifying the different stages in the manufacturing process for a given artifact. Stone tools often incorporate flint knapping using stones or antlers to strike blade flakes from a core, sometimes removing smaller flakes to create a serrated edge. Lithics and other tools, in turn, are often applied to manufacture items from bone, antler, leather, and wood.

Further insight into stone tool production is gained by replicating a given artifact by flint knapping, or, if possible, by refitting flakes and pieces extracted from the original flint nodule. Past uses for plant and animal fibers often involved stripping or shearing the fibers from their source, and spinning and weaving them into textiles, garments, and other products. Identifying fiber types and weaving techniques yields much information on the manufacturing process. For pottery, past cultures gathered different clays for specific applications and augmented them by adding a

grit and straw temper (for strengthening). Clay was mostly used to make containers by adopting such techniques as pressing clay over a mold, coil building and paddling, and using a slow or fast wheel. The completed unbaked product would be fired using various firing kiln types and temperatures. Ancient potsherds can be refired until a change is noted, using a scanning electron microscope, in order to determine the original firing temperature. A petrographic analysis of a potsherd thin section identifies the fabric composition. The production of faience, glass, and metal items is equally complex. In early copper technology, naturally occurring copper could be cold-hammered, or heated and hammered into shape (annealing); copper ores could also be smelted, melted, or cast in open or more complex molds (e.g., *lost wax* technique); coppersmiths often combined (i.e., alloyed) copper with some tin to produce bronze. Thin sections of metal items also enable a metallographic examination to discern more details about the manufacturing process.

Usage

It is often difficult to extrapolate the general, if not the specific, usage of a given artifact. In some cases, certain stone items are debated as being entirely natural (geofacts) versus human-made/used artifacts. Microwear analysis aids this process of elucidating the potential uses of stone tools. For instance, experimental archaeology has revealed microwear distinctions between stone tools used to cut bone, antler, hide, meat, wood, or other nonwoodlike plants; other wear patterns may indicate whether a stone tool was used for piercing, cutting, or scraping. Similar wear pattern analyses also illustrate the potential applications for bone, antler, shell, leather, and floral artifacts. Plant and animal fiber artifacts, such as garments, retain traces of wear, stretching, damage, mending, and other use history. Such observations can determine whether a garment was made for or placed unworn in a burial, or if it had been used in daily life (Barber, 1991). Residue analysis assesses the contents and hence usage of such things as pottery containers. Ethnographic studies may clarify further our comprehension of past artifact usages by observing how recent and ideally similar populations use identical artifact types. Such studies must be used with extreme caution, however, if extrapolating back in time to a different people and time period.

Discarding and Reuse

All artifacts are ultimately discarded or lost. Some items are made for a specific and very brief use (e.g., an ancient Egyptian bread mold), while others are produced to last for "eternity" (e.g., Tutankhamun's gold funerary mask). Aside from ornate items produced for purposeful destruction (e.g., in a potlatch), most short-term, functional items exhibit a minimum amount of craftsmanship

to enable them to function sufficiently. Artifacts may break accidentally, or through regular wear and tear, only to be discarded on the spot or in an adjacent midden. In other situations, particularly valued, or sentimental, items may be repaired: Egyptian predynastic pottery displays repair holes for lacing; chipped statuary and masonry are also often patched. Already “discarded” antiques may regain a value: ancient Egyptian jewelry, statuary, and other valuable commodities often appear in later contexts as trade items; Early Dynastic and Middle Kingdom stone vessels were exported as “antiques” to a late Bronze Age site at Amman (Jordan) from 1400 to 1200 BCE. Some artifacts retain their value as heirlooms for decades to hundreds of years (e.g., Egyptian cultic and royal statuary dedicated to the Karnak Temple [ca. 2000 BCE to the Roman period]). In many cases, long-lived and valuable materials are reused, smelted, or recut for new purposes. For instance, the Assyrian ruler Sargon II (721–705 BCE) led a campaign into the Levant and removed cypress wood beams from the destroyed palace roof of Ursa. Likewise, the Egyptian New Kingdom royal tombs in the Valley of the Kings were systematically robbed for their gold, silver, and other valuables to replenish the state during the impoverished Third Intermediate Period (1069–664 BCE). Other reuse is evidenced by the sarcophagus lid from Merenptah’s burial reused in a Dynasty 21 burial at Tanis in northern Egypt. Older rubbish is also often reused for diverse purposes: Earlier potsherds often get mixed into the clay for mud-bricks, and subsequently become introduced into later contexts through the disintegration of mud-brick structures.

Preservation

The greatest impact upon past material culture assemblages is the inherent biased preservation of inorganic materials versus more frequently lost organic materials, especially in temperate climates. However, in sub-zero conditions (cold climates), arid regions (dry climates), and water-logged circumstances (wet sites), organic materials are often well-preserved, enabling a far more realistic assessment of prehistoric to more recent artifact assemblages. For instance, the permafrost in southern Siberia has preserved many organic remains in steppe burials, including tattooed human skin, clothing, food, animals, and other items. The arid conditions in Egypt’s adjacent deserts have helped preserve human bodies, skin and hair, wooden furnishings, textiles, and papyrus documents. Wet sites, which lack oxygen, also yield well-preserved organic materials (e.g., bog bodies). The artifacts from wet sites emphasize just how many artifacts may be lost from temperate conditions, with organic items frequently numbering in the thousands and forming 75% to 90% of some assemblages.

Along with climate conditions, certain natural disasters provide exceptional circumstances for preserving organic materials. The 79 CE eruption of Vesuvius engulfed Pompeii in ash, thereby aiding the physical preservation of

many organic substances and the formation of encasing *molds* that retained the exterior morphology of many otherwise disintegrated items (Zanker, 1998). Early excavators poured plaster into such hollows to obtain casts of the exterior features, clothing, and other aspects of the victims and artifacts; more recently, injection of a clear liquid fiberglass enables the observation of both the exterior interface and the interior remains of artifacts and skeletal debris in these hollows.

Detection, Excavation, and Conservation

The available methods for detection, excavation, recording, and conservation have improved dramatically in archaeology over the past few centuries. Remote sensing and other techniques yield increasingly detailed images of artifacts and features beneath the soil, or within contexts that either cannot be excavated or are preferably left undisturbed or undestroyed (e.g., mummified bodies, cartonnage coffins). For example, fiber-optic cameras and similar devices enable a microscopic to macroscopic examination of ancient human remains and larger features (e.g., ancient Egyptian sealed boat burials at Giza [Lehner, 1997]). Diverse satellite-, aerial-, and ground-based remote sensing and other technologies detect sub-surface architecture, large features, and some artifacts. The technology includes diverse satellite imagery (e.g., Landsat, QuickBird); aerial remote sensing (e.g., Light Detection and Ranging [LIDAR], side-looking airborne radar [SLAR]); acoustic and seismic methods (e.g., bosing, sonar); electromagnetic devices (e.g., ground penetrating radar [GPR]); electrical resistivity; magnetometer surveys (e.g., fluxgate and alkali-metal vapor instruments); metal detectors; and smaller-scale, nondestructive technologies (e.g., X-rays, xeroradiography, computerized axial tomography [CAT scanner], magnetic resonance imaging [MRI], fiber-optic endoscope).

Although physical excavation should remain a viable technique for recovering artifacts and their broader contexts, the development and refinement of many nondestructive remote sensing technologies offers increasing alternate means to obtain ever more accurate, high resolution three-dimensional images and interior cross sections of archaeological sites, features, and artifacts. If such technology becomes sufficiently detailed and inexpensive for archaeology, then a point at which excavation becomes largely reduced to specific sites and circumstances is likely, leaving the retrieval of selected artifacts, features, and physical samples for salvage purposes, or further physical and visual analysis.

Dating and Analysis

The introduction of radiocarbon dating, dendrochronology, thermoluminescence, potassium-argon dating, and other techniques enables the placement of absolute dates on past

strata, features, and material culture assemblages, including refinement of date ranges previously assigned to more historical periods (e.g., pharaonic Egypt). The growing compilation of long and accurate sequences of annual tree-ring dates (dendrochronology) across the globe, especially in less temperate zones with contrasting seasons, promises to narrow the absolute date ranges currently available through high precision, calibrated radiocarbon dating. The latter technique currently yields date ranges from a few decades to over a century in accuracy. The ongoing refinement of other dating techniques, such as cation-ratios, should refine the dating of rock art and other more elusive contexts that lack better-dated or well-associated artifacts.

Archaeology has also developed increasingly better approaches to analyzing the data from survey and excavation work. Aside from formulating artifact typologies and providing simple descriptions of excavation results, more recent investigations emphasize assessing and explaining broader and more diverse aspects of the past, such as the nature of and changes to the past climate, environment, and landscape, land use, subsistence, health, diet, and beliefs in association with ancient settlements, burials, and their artifact assemblages. To clarify some of these aspects of past lifeways, archaeologists examine such things as textual-pictorial evidence (if present); fecal matter; stomach contents; bones (e.g., teeth, collagen); utensils and containers (e.g., associated with food preparation, consumption, and storage); microbotanical remains (e.g., pollen analysis, fossil cuticles, phytoliths, diatom analysis, rock varnishes, plant DNA), macrobotanical evidence (e.g., seeds, fruits, plant residues, wood); microfauna (e.g., insectivores, rodents, bats, birds, fish, land and marine mollusks, worms); and macrofauna (e.g., large animals). The refinement and emergence of new technology should only improve our abilities to assess human material culture, lifeways, behavior, and many other aspects.

Final Context

From an optimistic perspective, many excavated artifacts have reached their “final destinations,” namely in private and public storerooms or display cabinets. Most artifacts are displayed in isolation, however, being removed from, and conveying limited visual and written information about their original contexts. Ideally, archaeological site publications, electronic databases, archives, libraries, and other media should relay and preserve indefinitely the temporal, spatial, and inherent significance of each artifact and its original and varied past contexts. However, aside from the “obliteration” of a given artifact, such as pulverized stone, recycled metal, or decomposed organic materials, the “life cycles” of more durable artifacts in current archives and museum collections are actually still in transition. However, such happenings as the looting of the Iraqi National Museum and history’s lessons on the inevitable rise and fall of past and present civilizations

emphasize just how transitory museums can be, leaving open the future contexts and fate of already excavated and displayed artifacts.

Conclusion

In a world fraught with increasing threats to our past global heritage, archaeologists must liaise more effectively with other specialists and the public to optimize the long-term preservation of material culture assemblages and their contexts. One way is to pursue the full publication of excavation and survey results both on a global scale and in a durable format to survive potential local, national, and international disasters affecting and threatening our global community. The emergence of diverse and high-memory electronic storage media and the World Wide Web have also begun to permit the less expensive publication and dissemination of immense quantities of archaeological records and data previously not feasible for most archaeologists. Yet, such rapidly emerging and changing technologies also require either the maintenance of specific machine-readable devices, or the continual transfer of electronic data into new media to keep pace with both emerging and obsolete technologies (e.g., microfiche). Ironically, archaeology is entering into an increasingly more complex world, ripe with expanding technological opportunities, but now also facing rapidly growing and innumerable threats to archaeological sites and materials. Today’s archaeology is becoming more salvage work and highly selective in nature, especially with the opportunities afforded by more accurate remote sensing technologies. Are the more adventurous and romantic days of archaeology over? Is the more traditional archaeologist (“Indiana Jones” to many) doomed to hang up his hat, don a lab coat, and take a “desk job”? Only time will tell.

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12

AZTECS, INCAS, AND MAYANS

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The Aztecs, Incas, and Mayans are considered to have developed the most complex civilizations in Latin America during pre-Columbian times. They were not the only complex civilizations in this region, generally called Nuclear America (the area of most complex civilizations in pre-Columbian America), nor were they the first. (See Figure 12.1.)

Nonetheless, the Aztecs, Incas, and Mayans have been primary subjects of intense archaeological, ethnohistoric, ethnographic, and art historical research—and many controversial issues have surrounded each of them. These issues, for example, have ranged from the extent of Aztec human sacrifice, to the meaning of historical kingships among the Inca, to the causes of the ancient Mayan collapse. While some of these issues are unique to one group, others are shared; taken together, a look at all three of these civilizations highlights these commonalities. Common issues include matters such as their rise to statehood, their styles of political integration, the role of ethnicity, the role of ideology in political and social change, and the nature of writing in each civilization. Similarly, methodological issues have arisen in the investigation of all three groups, especially in terms of the integration of archaeological, ethnohistorical, epigraphic, and ethnographic research.



Figure 12.1 Aztecs, Incas, and Mayans

SOURCE: Map by Jennifer Berdan.

Aztecs

Background

The Aztecs were the last of the great civilizations to emerge in Mesoamerica in pre-Columbian times. Their precocious predecessors had developed intensive agricultural techniques, planned urban settlements, successful styles of statecraft, vast commercial networks, social hierarchies, warfare, and polytheistic religions with intense theatrical ceremonies. A hybrid culture, the Aztecs (or Mexica) were originally one of many nomadic groups that migrated south from the northern Mexican deserts from at least the 12th century CE; they settled in the Basin of Mexico and rapidly acquired the cultural attributes of the local peoples. In the year 1325 they established their city of Tenochtitlan, and by 1430 they had become sufficiently powerful to gain dominance within the Basin by forming an important military alliance with two neighboring city-states. They spent the next 90 years forging a conquest empire extending throughout much of central and into southern Mexico. Their political and military dominance abruptly terminated with the Spanish conquest in 1521.

Theoretical Issues

Complexity, City-States, and Urbanism

As victims of the theory of unilineal evolution, the Aztecs were denied the status of “civilization” until well into the 20th century. Lacking iron tools and alphabetic writing, they were considered “barbarians” at a tribal level of social complexity, and their empire was viewed as a confederacy of tribes. However, by the mid-20th century, scholars were well on the way to revising this view, recognizing that Aztec life was highly specialized, intensely hierarchical, politically centralized, and religiously complex (Bernal, 1980, pp. 143–144). This view has since been consistently reflected in a number of ethnographic-style studies of the Aztecs (e.g., Berdan, 2005; Clendinnen, 1991) as well as works with a greater emphasis on art history (e.g., Townsend, 2000) and archaeology (e.g., Smith, 2003).

However, this did not mean that the debates about Aztec social complexity were over; they simply became more refined and focused. As documentary evidence was amassed to support a caste-like view of Aztec social and political hierarchies (especially toward the end of the empire’s history), archaeological research cast a somewhat different light on the noble-commoner chasm. For instance, research in commoner settings in Morelos (just to the south of the Basin of Mexico) has revealed that commoners were perhaps not so desperately separated from their elite overlords. Indeed, remains of material goods (such as fine polychrome ceramics and bronze goods) previously thought to be restricted to nobles have been found in commoner dwellings (Smith, 2003, p. 136). Commoners’ access to a wide range of imported goods along with documentary evidence for

extensive market activity suggests some material affluence and a strong commercial economy, balancing the view of a more politically controlled economy (D. Carrasco, 1999). Both perspectives are essential to an understanding of overall imperial dynamics, and—although it is clear that rulers and nobles set themselves visually and effectively above the remainder of the population—questions of the degree of the noble-commoner division, and the extent and potency of the political power of the Aztec elite, continue to be debated.

Decades of intense settlement pattern surveys have contributed to a better understanding of the spatial arrangements of Aztec communities (Sanders, Parsons, & Santley, 1979; Nichols, 2004). Historical sources clarify that there were a large number (50 or so) of city-states in the Basin of Mexico alone (Gibson, 1964; Lockhart, 1992). These were distinct territorial and political units consisting of a main settlement and surrounding related communities, often small hamlets. Each city-state boasted its own dynastic ruler, founding legend, patron deity, and market, and often an economic specialization and primary ethnicity. Unless conquered by some more powerful city-state, city-states were politically autonomous. Recognizing these city-states as the essential building blocks of Aztec political structures, a particularly important focus of research has been delineating the boundaries of these units and unraveling their internal and external relations (Hodge, 1994). One significant finding allows the linkage among settlements within a city-state as based more on social and political obligations than on strict geography—city-state boundaries were not always territorially neat, but were often based on historical relationships that superceded geographic contiguity.

The mid-1900s saw a shift in emphasis from questions about the formation of states, urbanism, and the development of social stratification to questions about the lives of Aztecs in rural settings. George Vaillant’s partial excavation of a noble palace was the extent of Aztec household excavations up until the groundbreaking Basin of Mexico regional settlement pattern survey (Sanders et al., 1979). More recently, excavations by Michael E. Smith (2003, 2008) in Morelos have tackled a range of lifestyles, from commoner houses to noble dwellings; these studies provide valuable insights into matters of social stratification, standards of living, and the effect of imperial conquest on provincial inhabitants.

Tenochtitlan, the Aztec (Mexica) imperial capital, has been long considered “urban” due to its inordinate size and overall monumentality. But can (or should) the other city-states in the Basin of Mexico be considered urban? The vast demographic divide between Tenochtitlan’s 200,000+ population and the estimated 10,000 to 25,000 population for the next largest settlements in the Basin have typically resulted in nonurban designations for these smaller communities. Smith (2008) recently argued convincingly for the “urban-ness” of these settlements based more on function than on strict population size. Yet arguments persist regarding the nature of these cities. David Carrasco (1999) argues for the primacy of religious functions in these urban

settings, while Smith (2008) proposes the supremacy of political over religious roles in defining the nature of these cities. Few such cities have been excavated in any representative fashion, since in almost all cases Spanish cities were built directly atop the Aztec ones.

The Nature of Empire and Empire Building

One persistent problem in understanding the nature and extent of the Aztec empire is its relative “invisibility” in the archaeological record. It has been often enough repeated that without an extensive ethnohistoric record documenting Aztec conquests and tribute, the idea of an Aztec empire would be unsupportable. Yet Aztec material remains are found in some abundance at a major fortress (Oztoma in the south) and administrative center (Quauhtochco in the east), and linguistic evidence suggests the presence of Nahuatl (Aztec)-speaking peoples scattered throughout the documented imperial domain.

Excavations at and around the Aztec Great Temple (Templo Mayor) in downtown Mexico City (Tenochtitlan) since 1978 have solidified the vision of the Aztecs as a powerful empire (Matos Moctezuma, 1988). Not only did the structures themselves require extraordinary control over massive amounts of labor and building materials, but also the nearly 140 offertory caches throughout that ceremonial precinct have yielded thousands of culturally revealing artifacts. Taken together, some 80% of the artifacts in these offerings originated from outside the Basin of Mexico, an indication of the extent of tributary control and/or commercial wealth of the Aztec polity (López Luján, 1994). They also represent the highly significant investment in religion made by the Aztec political rulers and the interconnectedness between politics and religion in Aztec life.

The Aztec empire might best be described as hegemonic—a loose arrangement of conquered city-states required to yield to Aztec rule and to pay tribute on a regular schedule. If submissive, local rulers were typically left in place. In effect, relatively little changed in the provinces beyond the presence of haughty tribute collectors, the siphoning off of local production as tribute, and the occasional imposition of an imperial governor or garrison. The usual approach to understanding the nature and workings of this empire has been a top-down approach: what were the imperial goals, what was the imperial income, how did the emperors wage war, and so on. Yet a more recent approach entails a more bottom-up approach: understanding the effects of imperial conquest on the subjugated city-states (Berdan et al., 1996). This approach has also yielded a more refined understanding of imperial politics and strategies. These were not random conquest pursuits, but rather well-considered strategies of empire formation involving distinctions between *tributary provinces* with predictable tribute payments and “strategic provinces” that protected hostile borderlands and secured crucial trade routes.

Additional approaches reveal the strategies used by conquered peoples to gain the best possible advantage in these asymmetrical political and military situations. In concept,

this is not unlike recent trends in history and ethnohistory in understanding the roles and creative strategies used by native peoples in Mesoamerica under Spanish colonial rule (e.g., Berdan, 2007; Lockhart, 1992). These issues involve agency, and elevating decision-making processes to a more important role in imperial developments and changes.

The Extent of Human Sacrifice

Few issues sparked the Western imagination during the Age of Exploration more than the presence and idea of human sacrifice. The records of human sacrifice among the Aztecs derive primarily from ethnohistoric documents (pictorial and textual), but recent excavations have also revealed evidence for individuals sacrificed with their skulls strung on skull racks or their remains buried in offerings. The presence or absence of human sacrifice is no longer an issue, but its scale is.

Human sacrifice was deeply embedded in the Aztec way of life. It was supported by a complex mythology, and Aztec beliefs demanded that the people “pay their debts” to their gods with their most precious offering—human blood. Calendrical ceremonies (often using deity impersonators) and the almost constant autosacrifice by temple priests resulted in relatively low numbers of sacrificial deaths. However, it is the imperial sacrifices, following massive military campaigns, which are at issue here. Documentary sources suggest that thousands of captured enemy warriors were sacrificed in single ceremonies, one document recording a number of 80,400. These extraordinary figures are highly unlikely, but the numbers are not easily resolved, either historically or archaeologically.

Writing

In 1963, Ignace Gelb gave little credence to Aztec writing, describing it as a forerunner to actual writing. Since then, numerous ethnohistorians, art historians, and archaeologists have produced research that has revised this view and generated interesting arguments regarding the nature and use of “writing without words” (see especially Boone & Mignolo, 1994; Boone, 2000, 2007). This was not alphabetic writing, but rather a system meshing pictographic, ideographic, and phonetic symbols. A great many books were produced on native paper (*amatl*) treating economic, demographic, cartographic, historic, dynastic, and religious matters. Almost all of these, however, fell victim to the Spanish conquest and its attendant spiritual conquest.

Detailed studies of native and native-style codices such as the *Matricula de Tributos*, the *Codex Mendoza* (Berdan & Anawalt, 1992), and the *Codex Telleriano-Remensis* (Quiñones Keber, 1995) have stimulated arguments about the extent of phoneticism in Aztec glyphs, the application and use of symbols, and regional expressions of the writing system (Boone, 2000; Lacadena, 2008). These issues continue to be energetically debated.

Methodological Issues

Meshing Archaeological and Ethnohistoric Information

Ethnohistoric sources on the Aztecs are especially abundant and varied. They include native pictorial codices, indigenous narratives, accounts of Spanish conquerors, relations of Spanish friars and administrators, and everyday colonial records written in Nahuatl. These have become more and more available over the past half-century. A particularly significant milestone was the translation and publication, beginning in 1950, of the 12-volume Nahuatl “ethnographic” works of the Franciscan friar Bernardino de Sahagún (1950–82). This was followed by facsimile reproductions of several codices as well as translations of a wide range of colonial Nahuatl documents (e.g., Anderson, Berdan, & Lockhart, 1976; Lockhart, Schroeder, & Namala, 2006).

This plethora of historical sources has illustrated that until recently, reconstructions of Aztec life have depended almost entirely on the documentary record. With the spectacular Templo Mayor discoveries and the general increase in Aztec archaeological research, the problem (or better, opportunity) arises of meshing these types of information into a more complete and accurate reconstruction of Aztec culture and society. This profitable research direction is exemplified by studies such as that of Guillem Olivier (2003), which links textual sources on religion with physical artifacts. Art history (e.g., Umberger, 1996) and ethnoarchaeology (e.g., Parsons, 2006) are also making complementary contributions to rounding out this picture.

Chronology

Chronological issues involve (1) correlating ethnohistoric and archaeological dates and (2) developing chronologies with meaningful divisions, particularly a chronological scheme that delineates the Aztec imperial period. Regarding the first issue, ethnohistoric dates tend to be very specific while archaeological dates fall within a “range.” Thus, correlations between historical and archaeological dates are necessarily imprecise. Yet some significant insights have been gained by pursuing such chronological correlations. For instance, the year Two House (or 1325) records historically as the founding date for Tenochtitlan, the Mexica (Aztec) capital city, and the documents clarify that their new little island setting was uninhabited. But archaeological evidence indicates that the site was indeed inhabited. Concerning the second chronological issue, recent research questions focus on the impact of imperial power in conquered cities and regions. For instance, did imperial conquest affect the local standard of living? Did imperial conquest reroute established trading networks? Did imperial conquest upset the local political arrangements? Questions such as these require a chronological scheme that separates preconquest from postconquest times. Such a scheme has been developed by

Michael Smith (2003, 2008) for some Aztec sites in Morelos, providing a valuable model for future research.

Demography

The central issue in understanding Aztec demography is, quite simply, how many people there were. This is largely a methodological issue, since an understanding of Aztec demography rests on incomplete and ambiguous information. Spanish conquerors offered highly variable population figures, and colonial censuses only became widespread later in the 16th century when the native population had already been decimated by epidemic diseases. Nonetheless, time-of-conquest population estimates have been made based on this historical information and on archaeological surveys. The resulting estimates range widely: from 920,000 to 2.96 million for the Basin of Mexico alone (Smith, 2003, pp. 57–59). While the lower estimates are most likely, this area of research remains problematical.

The Problem of Generalizing

There has been a tendency in Aztec studies to make broad generalizations from specific pieces of information. This has derived, at least in part, from the fragmentary nature of the documentary and archaeological databases. Ethnohistoric documents, for instance, derive from specific locales and describe the specific histories, social arrangements, royal successions, economies, or other matters as they pertain to the locale in question (Boone, 2000). To what extent is it valid to generalize from these specific cases? Put another way, how extensive was cultural and social variation within the Aztec domain? Tenochtitlan is a good case in point. Because only scattered and uneven information exists on other Aztec cities, there has been a tendency to describe these other centers in terms of Tenochtitlan. Yet Tenochtitlan was atypical in its extraordinary size and unique in several of its features (such as a walled ceremonial precinct and a gridlike layout [Smith, 2008, p. 68]). It does not serve as a good prototype for other Aztec-period cities. Other examples of variation abound in matters as diverse as rules of royal succession, calendrical designations, glyphic writing conventions, the presence and meaning of noble houses, and the layouts of rural settlements. This suggests caution in making broad generalizations, at least at this time.

Future Directions

New data continues to be uncovered on the Aztec civilization. This includes the ongoing excavations in Tenochtitlan’s Templo Mayor precinct, excavations at neighboring Tlatelolco, and several archaeological projects in “the provinces.” In addition, more documents continue to be translated, and more artifacts photographed and described

by art historians and archaeologists alike. There seems to be an almost endless supply of data yet to be mined.

Scientific procedures providing compositional analyses and sourcing of materials are becoming more and more common, and should continue to be extremely useful in matters such as identifying trade networks and delineating political spheres of influence.

Based on these data and methods, more probing questions are being asked and more sophisticated interpretations have emerged. These include matters such as the nature of urbanism; the intertwining of specialization, trade, and tribute; the affect of Aztec conquest on the provinces; strategies used by conquered peoples; and the application of models such as world systems to the Aztec situation (e.g., Smith & Berdan, 2003). Also still on the table, since the beginning of Aztec studies, is the very definition of Aztec, which continues to be debated. In tackling these issues, the trend is toward more interdisciplinary research, especially blending the skills and approaches of archaeologists, ethnohistorians, and art historians, as well as potential contributions from ethnographic analogies.

Incas

Background

The height of the Inca empire coincided roughly with that of the Aztec empire. Histories record that the empire began in 1438 with the ascendancy of the Inca Pachacuti, and ended with Francisco Pizarro's Spanish conquest in 1532. In less than 100 years the Incas created the most extensive empire in the pre-Columbian Americas. The Inca empire encompassed six present-day countries, was approximately 4,000 kilometers long, traversed several of the world's ecological zones, and contained scores of ethnic and language groups. It is estimated that Inca control extended over some 10 million subjects divided into 80 provinces.

They called it *Tawantinsuyu*, or "the four parts together." Their universe was conceived as centered at their capital city of Cuzco, high in the Andes, and their imperial realm radiated out from Cuzco encompassing four directional domains. At Cuzco, the relatively small Inca lineage/ethnic group—estimated at 15,000 to 40,000 persons—achieved local, regional, and super-regional military dominance and held its diverse conquered peoples together through aggressive and sophisticated administrative strategies. They were remarkably successful in building an empire that involved the mobilization of enormous armies; required diverse strategies in confronting, dominating, and integrating a heterogeneous constellation of ethnic groups; and entailed the implementation of complex management policies to control and channel imperial labor and resources into elite Inca hands.

Evidence of their skills and artistry remain: their spectacular stonemasonry in extant buildings, their cunning

artistry in fine crafts and weavings, and their engineering prowess in roads (totaling 30,000–40,000 kilometers) and records of woven suspension bridges and hanging baskets designed to traverse deep, wide watercourses. In addition, they produced complex knotted cords called *quipu* (*kipu*), which are still not fully understood by scholars, and may have served as a form of writing. This was a way of life with a rich mythology and exquisite artisanship, where royal mummies advised the current ruler who mounted ambitious military expeditions and conquests throughout most of western South America.

Theoretical Issues

Inca History

Ethnohistoric documentation of Inca dynastic history comes from the Spanish, native, and mestizo worlds. From the Spanish world come six eyewitness accounts, an array of 16th- and 17th-century Spanish chronicles (e.g., Cieza de León, 1959; see Rowe, 1946), and large numbers of 16th-century administrative and legal documents. From the indigenous and mestizo worlds come historical accounts from Inca descendants and those of mixed heritage but deeply embedded in native life. These include two especially important documents, an extensive commentary by Garcilaso de la Vega (1966) and a lengthy illustrated letter by Felipe Guaman Poma de Ayala (1987). These documents have been variously subjected to questions and critiques of authenticity, reliability, bias, special interests, and embellishments.

In general, these ethnohistoric accounts of Inca history paint a picture of named royal personages progressively expanding the Inca imperial domain. One approach to interpreting these histories (the historicist approach) concludes that the documents accurately represent a linear, sequential history of Inca dynastic rule (Rowe, 1944, 1946). While advocating this view, historicists also recognize that Inca rulers had a propensity to recast history and historical events in their personal favor. An alternative to the historicist viewpoint has been forwarded by others who propose that the Spanish chroniclers misunderstood the nature of Inca rulership and molded the Inca information to fit into their known Spanish categories, resulting in the presentation of a Spanish-style monarchy of sequential dynastic rulers. These scholars (e.g., Zuidema, 1990; Rostworowski, 1999) suggest a *structural* model where rulership mirrored Inca lineage structure, and a *diarchy* model where two royal Incas ruled simultaneously, one from Upper Cuzco and the other from Lower Cuzco (representing a moiety system). These positions continue to be debated.

The Integration of Empire

Early conceptions of the Inca portrayed them as an enormous, exquisitely organized monolithic empire—the state oversaw all aspects of daily life, the religion was a

state religion, and the empire exercised intensive and pervasive control over its conquered subjects. Everything was very tightly controlled, all very neat and tidy. This view fostered “an image of uniform and ubiquitous control” that current scholarship no longer accepts (D’Altroy, 2003, p. 86). Instead, variation in Inca policies and local adaptations has emerged as a prominent, alternate theme.

The Inca brought a great many diverse ethnic groups under their imperial umbrella. It might be anticipated that they did not deal with all of these groups in the same manner, and this indeed appears to have been the case. However, the nature and extent of this variation is not fully understood and is still being explored. The two essential categories of information on the Inca, ethnohistoric and archaeological, are also inconclusive on this matter of the development and integration of the Inca empire. Ethnohistoric information is more complete for the northern extent of the empire, and weaker for the south; for whatever region, the documentary sources are singularly Cuzco-oriented and provide a top-down perspective on Inca-provincial relations.

Another perspective derives from the provinces, and asks questions of local responses and adaptations to Inca arrival, domination, and economic exploitation. Archaeological investigations have been especially productive in illuminating this bottom-up perspective. Particularly significant regional archaeological research (which also relies on historical sources) has been that conducted in the central highland Peruvian site of Huánaco Pampa (e.g., Morris & Thompson, 1985). Additional archaeological research has been conducted at other imperial sites, yielding an emerging picture of considerable variability in local histories and responses to Inca conquest, as well as the differential implementation of Inca imperial policies (see D’Altroy, 2003, pp. 249–262; articles by John Murra, Craig Morris, Franklin Pease, and others in Collier, Rosaldo, & Wirth, 1982).

Methodological Issues

Chronology and Archaeology

Large-scale chronological schemes for Andean prehistory began with the pioneering work of Max Uhle (1903), who provided the basis for subsequent sequential categories, especially the one devised by Rowe (1965). Under these chronological frameworks, the Inca empire falls within the final stage, or the Late Horizon (Inca-style phase to Uhle). This period, spanning the years 1438 to 1532, is useful in delineating the period of general Inca dominance, yet it is still too gross a category for scholars attempting to discern the effects of Inca subjugation on specific conquered regions and ethnic groups. This dating dilemma is not aided by methods of radiocarbon dating, which identify broader time spans than that experienced by the Inca empire.

Nonetheless, a great deal can be learned from archaeology. Scientific archaeological research among the Inca is still

relatively young, dating from the 1930s and not intensifying until the mid-1900s. Archaeological investigations in provincial areas can be enlightening by identifying Inca architecture and/or ceramics. But questions surround the meanings of these Inca indicators: Were they actually built or brought by the Inca as conquerors? Were these Inca objects and symbols copied by a local elite seeking prestige? Did the ceramics and other portables travel through exchange? While there are many productive archaeologists pursuing these and other Inca-related questions (especially in the provinces; see D’Altroy, 2003, p. 23), a nagging problem continues to be the difficulty in “trying to match the material objects in the archaeological record with the peoples [ethnic groups] mentioned in the Inca histories” (McEwan, 2006, p. 199).

The Elusive Quipu

Scholars have long marveled that the Inca could create and administer so vast an empire without a writing system. It is clear that they did not have an alphabetic system in the European manner—but what about other visual communication devices? Coded messages woven into textiles and painted onto wooden boards have been suggested as such devices, but the most persistent candidate for a writing system is the *quipu*. The quipu was an arrangement of dyed, knotted cords whose configuration conveyed specific information or messages to those who knew how to decode (or read) them. Whatever the information embedded in the quipu, the quipu-reader required a considerable amount of memorized knowledge. Lacking that knowledge, modern scholars must rely on cunning and inevitably controversial interpretations to unravel the types and extent of information contained in the many extant quipu (estimated at 600).

As they are currently understood, the quipu were particularly well-suited to recording specific information such as censuses, tax receipts, land measurements, harvests, and herd counts. It has been proposed that they could also have been used for more abstract purposes such as recording myths, stories, histories, and poetry. Progress in decoding the quipu began in 1923 when Leland Locke recognized a decimal-based system in the quipu. Ascher and Ascher (1981) followed, suggesting a more complex system based on the hierarchical ordering of information. Since then, Gary Urton (2003) has proposed that some quipu may have been based on a binary system resulting in up to 1,500 possible symbol combinations. Despite the current high interest in the topic, the uses, contexts, variations, and translations of quipu continue to puzzle investigators.

Future Directions

Questions persist concerning the development and nature of Inca empire building. The Inca gained military and political control over a geographically vast and ethnically diverse world in an extraordinarily short period

of time—less than 100 years. Did they draw on earlier models of statecraft?

There is a clear recognition of variation within the Inca empire, from both top-down and bottom-up perspectives. This involves variation in how the Inca approached and treated different provinces and ethnic groups, and how the different groups responded and adapted to the Inca presence. Archaeologically, the Inca imperial core, the region around Cuzco itself, has not yet been completely surveyed and therefore is imperfectly known (D'Altroy, 2003, p. 23). Farther afield, how can Inca conquests be recognized archaeologically? How can the impact of Inca conquest as well as the responses by the conquered peoples be measured in the archaeological record? Can effective chronologies be developed to date Inca conquests in particular areas, or indeed even the beginnings of the empire itself (McEwan, 2006, pp. 198–199; D'Altroy, 2003, p. 47)? Where possible, a meshing of ethnohistoric and archaeological (and to some extent ethnographic) sources of information can be particularly useful in reducing ambiguities in both types of sources and in unraveling the specifics of imperial dynamics and local ethnic variations.

Energetic debates continue on the nature and workings of the Inca state and empire. What was the nature of Inca kingship? How intense was the role of royal Inca mummies in imperial expansion—to what extent did their continuing control of resources serve as incentives for expansion and control of more and more external resources by each succeeding king (Conrad & Demarest, 1984; D'Altroy, 2003)? And how important was the role of ideology in serving the state and propelling the empire to such remarkable achievements?

Mayans

Background

Mesoamerican prehistory is traditionally divided into three periods: preclassic, classic, and postclassic. The Mayans of southern Mexico and northern Central America thrived during all these time frames. Of these periods, the classic is the most popularly known, most abundantly researched, and also the most enigmatic.

By the classic period, Mayans had developed extensive planned cities and other settlements, constructed massive masonry religious and political structures, erected impressive commemorative monuments, used a complex of calendars based on sophisticated astronomical knowledge, fashioned fine crafts using raw materials obtained through intricate trading networks, warred with their neighbors, maintained a strict social hierarchy, and supported kings who wielded great power locally and occasionally regionally. They accomplished all of this between approximately 250 CE and 900 CE in the rather unlikely rainforest setting of present-day southern Mexico, northern Guatemala, Belize, and adjacent areas. Comprising as many as 80 separate

political entities, most of this rainforest civilization declined during the 9th century and generally collapsed by 900. Following that collapse, Mayan civilization continued and even resurged in highland Guatemala, Belize, and northern Yucatan where Spanish voyagers encountered major centers in the early 16th century.

Theoretical Issues

Supporting and Sustaining Mayan Civilization

Early Western scholars looking at the ancient Mayans faced an enigma. How could a complex civilization develop in a rainforest environment? Rainforests were considered to only allow a slash-and-burn style of agriculture, by its very nature extensive and resulting in low population densities. This, in turn, led to interpretations of classic Mayan sites (in the southern Mayan lowlands) as empty or vacant ceremonial centers with low population densities (see Thompson, 1970).

However, intensive archaeological research (especially settlement surveys) since the 1960s and 1970s produce a demographic picture that did not agree with these assumptions. Population estimates at major classic Mayan centers have yielded numbers of up to 100,000 (for Tikal and Calakmul), and a widely dispersed population with inter-site densities of nearly 200 persons per square kilometer (Culbert & Rice, 1990). It thus became difficult to continue to consider these centers as “vacant ritual centers,” and they became elevated to urban status with large resident populations and centralized political, economic, social, and religious functions.

How, then, were these large cities and complex polities sustained and supported in their rainforest setting? The suggestion was that traditional slash-and-burn cultivation, as revealed in the ethnographic record, was insufficient to support such high population numbers and densities; this stimulated a search for more intensive agricultural methods and other food production strategies (see Harrison & Turner, 1978). Demarest (2004, pp. 127–146) suggests that the classic Maya mirrored their rainforest environment by building their agricultural systems and settlement patterns around themes of diversity and dispersal. Slash-and-burn systems were combined, variously at different sites, with household gardens, terraces, and raised fields and other hydraulic adaptations. The ancient Maya also made use of the considerable wild resources available in the rainforest. Combined, it appears that these food production activities were capable of sustaining the farming households as well as providing sufficient surpluses to support a demanding elite and other urban specialists.

Kingship, Politics, and Warfare

In 1841 John Lloyd Stephens published *Incidents of Travel in Central America, Chiapas and Yucatan*

(with Frederick Catherwood's illustrations). This popular publication sparked further explorations into the ancient Mayan world—explorations that became more and more scientific in approach. These included, importantly, the explorations, detailed reports, and precise images of Alfred Maudslay (1899). Taken together, these and other investigations and reports spawned early romantic visions of the Maya as a peaceful, tranquil people (e.g., Thompson, 1970). This was reinforced by the fact that in these early days, only calendric-related glyphs had been confidently translated. It was not until the 1950s and 1960s that additional hieroglyphs were translated, especially those documenting the great deeds of exalted divine kings of major Mayan cities (e.g., Proskouriakoff, 1960). These translations have progressed to the extent that now the major corpora of hieroglyphs consist of historical texts, and entire dynasties have been reconstructed (Martin & Grube, 2000).

These advances in hieroglyphic translations have been coupled with major scientific archaeological research projects beginning in the 1920s. Two important examples are the Carnegie Institution of Washington research projects at Chichén Itzá, Uaxactun, and Copan (1920s–1950s), and the University of Pennsylvania projects at Tikal (1950s–1960s); these and other major projects have provided groundbreaking archaeological results and encourage a continuing avalanche of research, especially on the classic Maya.

These and subsequent projects along archaeological and epigraphic fronts have dramatically transformed scholarly understanding of the Maya. The Maya are no longer viewed as strictly star-gazing, peaceful intellectuals. They clearly were brilliant astronomers, engineers, and artisans, but they were also ambitious kings, powerful warriors, and everyday people sowing crops, making pots, and trading for profit. In short, current research characterizes the ancient Maya as organized into forceful state-level polities with hereditary divine kings. These cities engaged in warfare with their neighbors, resulting in occasional actual conquests. Some scholars suggest that superstates had developed, although this is still controversial. Scholars are in general agreement, however, in recognizing a wide range of variation among the Mayan polities—in size, in subsistence, in history, in internal and external relations, and in the reasons for their demise and collapse.

Not all scholars have agreed with this interpretation of Mayan civilization consisting of states and urban centers. A classic example is the proposal by William Sanders and Barbara Price (1968) that the Mayans represented a chiefdom level of political and social organization, and that any increase in complexity was due to contact with the central Mexican urban center of Teotihuacan. Today, however, this view has been put aside by most Mayan scholars.

Environment or Ideology

The magnificent architecture and sculpted monuments left behind by the classic Maya and recorded by

early explorers and more recent scholars have led to a well-deserved appreciation of the artistic skills of the ancient Mayans. Lofty temples and sculptures impressed early investigators, much as they were surely intended to impress contemporary Mayans. These wonders of art and architecture have contributed to the notion of the Mayan elite as intellectual priests focused on matters of religion and cosmology. On the other hand, archaeological investigations have tended to lend primacy to ecological factors in the development and dynamics of the ancient Mayan civilization. These latter concepts consider religion epiphenomenal in Mayan culture change. Current views do not demand an “either-or” position on these ideas (see Demarest, 2004). Rather, these were societies where religion, economics, and politics were intricately intertwined, and much of the hieroglyphic and archaeological records reveal these complex interweavings: Kings were holy lords, legitimized by religious symbols and drawing on complex ecological adaptations to support their dynasties and cities.

The Classic Mayan Collapse

The collapse of the classic Mayan civilization by 900 CE is one of the great mysteries of antiquity. This cultural collapse extended over almost the entire southern Mayan lowlands, affecting hundreds of cities and smaller centers. It was, first and foremost, a demise of the elite. Commemorative monuments ceased to be sculpted and erected, large temples and palaces were no longer constructed or repaired, large cities fell into disuse, and the luxurious paraphernalia of kings and lords disappeared. The kings and their noble cadres clearly no longer ruled, or seemingly even lived in these once-magnificent cities.

It was also a demographic collapse, the elite debacle accompanied by a dramatic decline in overall population generally leaving scattered populations of farmers. Nonetheless, on the fringes of the southern Mayan lowlands, some centers (such as Lamanai in Belize) continued to thrive through the postclassic period. Indeed, cities to the north and south of this classic florescence grew and expanded throughout the postclassic.

What happened? A great many hypotheses have been forwarded to explain this region-wide collapse. Proposed explanations have included natural catastrophes such as earthquakes, hurricanes, and epidemics; environmental problems such as drought and ecological overkill; sociopolitical matters such as excessive elite demands on a stressed peasantry, revolts by a suppressed peasantry, and internecine warfare; and external factors such as invasions by foreigners. Investigations of these questions have led to some interesting insights. For instance, it is clear that there was considerable variation in the collapse among different classic Mayan centers. In some areas it was in effect as early as 750 CE; in others, it was 150 years later. In some areas it happened quickly; in others it involved a gradual decline. And perhaps

most important, in some cities certain factors took center stage while in others those same factors were minor players and still others appear as the primary causes of decline and collapse. For instance, warfare was devastating to the social order of the Petexbatun region; drought would have had a significant impact at Tikal and Calakmul; Yaxchilan and Piedras Negras may have been conquered; and overpopulation and ecological stress played a significant role generally throughout the region (Webster, 2002; Sharer & Traxler, 2006, pp. 505–520). At this point it is clear that there was no single cause of this widespread decline and demise; quite to the contrary, it involved a complex intertwining of many stress-generating factors, those factors expressed with differential force at individual Mayan centers.

Methodological Issues

Chronology

Chronologies of Mayan periods and events derive from two sources: hieroglyphic texts and archaeology. Histories of individual Mayan cities are becoming well-known through their hieroglyphic inscriptions. Alongside these histories, general periods in the overall cultural sequences in the Mayan area have been established archaeologically, although specifics (such as the early classic-late classic “hiatus”) continue to be debated. Disagreements over chronologies often stem from the variability of individual polities’ histories. On another chronological front, many characteristics typically associated with the classic Maya have been shown to have emerged earlier, in the late pre-classic, calling into question the time period designations for the current late preclassic-classic division.

Demography

Demographic studies in the Mayan area (especially the southern Mayan lowlands) confront particular challenges. The most immediate of these is the extremely dense vegetation of the environment itself, making survey archaeology, especially difficult. Population estimates are typically determined by counting house mounds and multiplying by a standard figure (usually 5.6, based on ethnographic analogy). But was a given mound actually residential? Was it occupied concurrently with other house mounds in the survey area? Was it occupied continuously, generation after generation? Is the average residential figure of 5.6 sound and stable, or did it vary over time and space, and with a family’s social and economic status? Were some household structures not raised on mounds, and hence not included in the surveys at all? With the highly dispersed, continuous settlements in the Mayan lowlands, where did one city or polity end and the next one begin? These and other questions continue to challenge archaeologists in determining the demographic characteristics of the Mayan population throughout its long history (see McKillop, 2004, pp. 162–170).

Hieroglyphic Writing

The decipherment of Mayan hieroglyphic writing has undergone several transformations over the past century. First seen as a documentation of calendric and cosmological matters, by the mid-20th century it became clear that large bodies of hieroglyphic texts dealt with kings and their extraordinary deeds. But actually translating the texts required more. Beginning with the realization by Yuri Knorozov that Diego de Landa’s “alphabet” (as cited in Tozzer, 1941) represented a syllabary, subsequent epigraphers have decoded the hieroglyphic writing to the extent that the majority of the 800 signs can now be read (Grube, 2006, p. 122). However, a full understanding of the hieroglyphic writing system, and especially its use by the ancient Maya, continues to offer challenges to epigraphers.

Future Directions

The theoretical and methodological issues discussed in this section continue to stimulate research endeavors. For the classic Maya, the manner in which sufficient surpluses were produced to sustain dense Mayan populations and urban centers continues to be studied and debated. There is a continuing emphasis on commoner populations, and a focus on middle-range persons such as artisans contributes to a well-rounded understanding of the ancient Mayan social order. Emphases on either ecology or religion as driving forces in Mayan life are giving way to more integrated views of Mayan culture and society: An important case in point is a recent volume meshing dimensions of ritual and economy (Wells & Davis-Salazar, 2007). The nature and extent of external influences and relations (especially from Teotihuacan) is a long-standing issue, and Teotihuacan’s impact on the Mayans continues to be debated. Similarly, arguments over the relations between postclassic Chichén Itzá and highland Tula have not been satisfactorily resolved. Variation in the development, composition, and collapse of individual cities and polities has emerged as a dominant theme in Mayan research for all periods. It serves as a necessary point of departure to increase scholarly knowledge of Mayan demography, urbanism, relations among kingdoms, and the classic Mayan collapse. Further advances in hieroglyphic translations and settlement survey projects will contribute immeasurably to ongoing debates and a more refined understanding of Mayan culture, history, and society.

Conclusion

Together, these three civilizations are of paramount theoretical and methodological interest and provide a valuable comparative backdrop for the study of ancient civilizations generally. The Aztec, Inca, and Mayan civilizations arose in contrasting environments, yet all three developed

complex state-level institutions, two of them becoming expansionist empires. Some persistent theoretical and methodological issues are shared by these civilizations, in different combinations. These entail issues of demography; urbanism; the nature of kingship; empire building; chronological control; and the nature, reliability, and translations of highly variable writing systems. Current trends in approaching these intriguing questions involve well-formulated interdisciplinary pursuits and the meshing of ethnohistorical and other written sources with a growing body of archaeological data.

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TECHNOLOGY

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The term *technology* is derived from the Greek word *techné*. The Greek word refers to all forms of skillful, rule-based mastery in any field of human praxis, originally encompassing both arts (like painting, sculpture, writing, and the like) and craftsmanship (like carpentry, shipbuilding, architecture, and the like). The Roman culture uses the Latin word *arts* for these domains. Accordingly the medieval terminology distinguishes between the seven free arts (grammar, rhetoric, logic, geometry, arithmetic, music, astronomy) and the mechanical arts (e.g., agriculture, architecture, tailoring), thus prefiguring the later distinction between arts (as linked to the study of humans and the humanities) and technology (as linked to engineering and the study and science of nature).

The modern word *technology* finally refers either to procedures and skillful application of sciences for the production of industrial or manual products or to the products of these processes themselves. In this sense, technology nowadays encompasses only a part of the original Greek definition. The place of technology as being on the one hand a product of humans (being thus rooted in human anthropology and human tool usage), and being on the other hand based on a solid scientific understanding of the laws of nature (modern technology), can be seen as the two key features of contemporary and recent approaches to analyze and understand technology. Technology is then in one respect as old as humankind: Many approaches in

anthropology thus refer to the general structure of technology in all of human history and relate it to the biological condition of humans. But recent anthropological thinking also reflects on the specific details of *modern* technology. It has often been argued that there is a structural difference between modern, science-based technology and older forms of craftsmanship of ancient or medieval types of technology. Therefore, a central question for modern anthropology is to analyze the consequences modern technology has for our picture of humankind: how to define man in the age of technology.

Reflection on Man's Relation to Technology: A Brief History

Reflection about the anthropological function of technology is probably as old as human self-reflection itself, since the ability to use tools and create cultural products has always been seen as a unique human feature, distinguishing humankind from most other animals (see also the next section on biological anthropology). But an analysis of technology was not at the center of political, social, anthropological, or philosophical thoughts before the development of the modern natural sciences and their counterpart, modern technology. Following Carl Mitcham (1994) one can roughly distinguish three approaches to technology before the 20th century, encompassing many

topics that later became essential parts of contemporary discussions about technology (p. 275). The three approaches are as follows:

1. In the ancient world, technology is looked at with certain skepticism. The use of tools is seen as necessary for survival, but also regarded as dangerous, since it might lead to human hubris and might raise the envy and anger of the gods. In this sense, mythological thinking envisions technology as, for example, stolen from the gods (the myth of Prometheus), and thus not properly belonging to humans. The extensive use of technology is often seen as leading to megalomaniac fantasies or unjustified overstepping of religious and ethical boundaries (e.g., myth of the Tower of Babel, myth of Icarus). Philosophical reflection, however, acknowledges the value of technology for an otherwise defenseless human being. Already Plato anticipates a central thought of modern anthropology: Human beings are poorly equipped for survival in nature. They need to compensate for this lack by developing skills of rational thinking and the usage of tools (this idea later becomes a central thesis of the famous anthropology of Arnold Gehlen [1988]). But the emphasis in ancient philosophical anthropology lies not so much on man's capacities to invent technology, but on man's moral character (exemplified by ancient wisdom or medieval religiosity). The usage of technical knowledge should thus be kept within strict ethical boundaries.

In the hierarchy of knowledge, ethical wisdom is regarded in principle as higher than and superior to technological skills. Socrates points to the question that we should not only seek knowledge about *how* to do certain things (technical knowledge), but rather about *whether* we should perform certain actions (ethical knowledge); this idea can also be found in the medieval distinction between the (superior form of a) life in contemplation (*vita contemplativa*) and the (lower) life in active involvement (*vita activa*). Ancient and medieval technology is thus embedded in an anthropological vision, in which human virtues play an important role. Different forms of virtues are combined in the original crafts, as opposed to the later, modern differentiation of these virtues: In craftsmanship one can find a union of economical virtues (e.g., efficient usage of limited resources), technical virtues (creating new entities that did not exist before), and often also aesthetic virtues (a sense of beauty that adds an aesthetic component to these newly created entities going beyond the modern idea that "form follows function"). In the Greek world, these three skills are combined in the realm of *poiesis*, while in modernity they are separated in the three domains of economy, technology, and art—each relatively independent of the others (Hösle, 2004, p. 366).

2. A profound change in the evaluation of technology emerges with modernity, a position that Mitcham (1994) summarizes as Enlightenment optimism. Already in the

writings of Francis Bacon (1620), the new science of nature and its application to experimental and technological research is highly welcomed. Progress in technology is seen as very beneficial to humankind, as it may lead to the cure of diseases, mastery over nature, and a constant progress toward a more human society. Many utopian writings mark the beginning of early modern thoughts in which technology is seen as essential in leading to a brighter future for humankind (e.g., Thomas More's *Utopia* [1516], J. V. Andreae's *Christianopolis* [1619], F. Bacon's *New Atlantis* [1627]). In a similar line of thought, Enlightenment thinkers defend science and modern technology against attacks from religious conservatism, pointing at the beneficial consequences of technological and scientific progress.

3. A countermovement to the Enlightenment is Romanticism, which accordingly has a different view on technology, referred to by Mitcham (1994) as Romantic uneasiness. Again, the central thought is an anthropological perspective in which man is seen as being good by nature, while it is civilization that poses the danger of alienating man from nature and from his fellow man, focusing only on his rational capacities and suppressing his emotional and social skills. Already Vico (1709) opposed Cartesian rationalism and feared that the new interest in science would lead to a neglect of traditional humanistic education. Rousseau's critique of modern societies then became influential, seeing an advancement of knowledge and science, but a decay of virtues and immediacy (*Discourse on the Arts and Sciences*; Rousseau, 1750). With the age of industrialism, the negative social consequences of modern labor work become the scope of interest of social theorists, leading up to Marx's famous analysis of modern societies (see subsequent section on cultural and sociological anthropology). In opposition to the positive utopias centered on technology in early modernity, the 20th century then sees the literary success of pessimistic dystopias, in which often technological means of suppression or control play an important role (e.g., already in M. W. Schelley's *Frankenstein or the Modern Prometheus* [1818] and later in H. G. Wells's *The Island of Doctor Moreau* [1896], A. Huxley's *Brave New World* [1932], George Orwell's *1984* [1948], and Ray Bradbury's *Fahrenheit 451* [1953]).

The tension between approaches praising the benefits of technology (in the spirit of the Enlightenment) and approaches focusing on negative consequences (in the spirit of Romanticism) still forms the background of most of the contemporary philosophical and anthropological debate; this debate circles around an understanding of modern technology, often rooted in the different "cultures" of the humanities and the sciences. It can be regarded as being a particularly vivid opposition at the beginning of the 20th century, that only later gave room for more detailed and balanced accounts of technology (some classics of the debate being Snow, 1959; McDermott, 1969).

Recent contributions toward a deeper understanding of the usage and development of technology stem from such different disciplines as biology, sociology, philosophical anthropology, metaphysics, ethics, theory of science, and religious worldviews. This chapter aims at a brief overview of important topics in the debate over technology during the 20th century to the present time. Three anthropological perspectives will be distinguished, depending on the main focus of anthropological interest. This will start with a brief summary of the biological anthropological perspective on technology, move on to those theories which focus more on social or cultural aspects, and conclude with more general philosophical anthropologies. This chapter is thus not chronologically organized, but tries to identify common themes of the debate, even though sometimes the topics might overlap (e.g., the case of Gehlen, a philosophical anthropologist who starts from a biological perspective and then moves on toward a more social view on technology).

Biological Anthropology

In contemporary anthropology, technology becomes a central issue for at least two different reasons:

1. From a biological perspective the usage of tools is regarded (next to the development of language and a cognitive rational apparatus) as one of the key features of humanization. Biological anthropology thus initially focuses on the differences and similarities of tool usage in humans and animals, trying to understand the role technology plays *in general* for an understanding of humans' biological and social nature. With the focus on human evolution, attention is often drawn to the question of which role technology played at the *beginning* of humankind.

2. While in this way always being a part of human culture, technology becomes arguably one of the single most influential key features of society only in modernity. According to Max Weber, science, technology, and economy form the "superstructure" of modernity, while they all share a common "rationality" (mainly of means-ends reasoning in economy and technology). The experience of the powers and dangers of modern technology (as in industrialized labor work, medical progress, nuclear energy and weapon technology, environmental problems due to pollution, and extensive usage of resources, etc.) has triggered many social, political, and philosophical reflections that—in opposition to biological anthropology—aim primarily at understanding the specifics of *modern* technology.

Let us look at these two tendencies in turn, starting with the biological perspective, before moving to the social or cultural anthropology of technology.

Biological anthropologists are interested in the role technology played during humanization, and they attempt to give evolutionary accounts of the development of tool usage and technology and compare tool usage in man with tool usage in other animals. The development of technology has often been regarded as an evolutionarily necessary form of adaption or compensation. Since most of man's organs are less developed than those of other species, he needed to compensate for this disadvantage in the evolutionary struggle for life (see Gehlen, 1980). Initially the usage of tools was considered a unique human feature, distinguishing the genus *Homo* from other animals (Oakley, 1957), but research on tool usage in different animals, especially chimpanzees, led to a more or less complete revision of this thesis (Schaik, Deaner, & Merrill, 1999).

Nowadays, many examples of tool usage in the animal kingdom are known (Beck, 1980). For example, chimpanzees use sticks to fish for termites, and elephants have been described as having a remarkable capacity for tool usage. Even though tool usage must thus be regarded as more common among animals, attention still needs to be drawn to the specifics of man's tool usage, which arguably in scope and quality goes beyond what is known from the animal kingdom. It has been pointed out that our biological anatomy offers us several advantages for an extended usage of tools: walking erectly frees the two hands, which can then be used for other purposes. Furthermore, the position of the human thumb and short straight finger are of great benefit, especially in making and using stone tools (Ambrose, 2001). Still debated, however, is whether social and technological developments go hand in hand or whether one of the two factors is prior.

Even though many anthropologists tended to see social behaviors and cultural revolutions mostly as a *consequence* of a change in tool usage or a development of new technologies, it has also occasionally been argued that the development of social skills precedes the development of technical skills (e.g., in joint group hunting). It has additionally been acknowledged that chimpanzees also pass over some of their technical knowledge through the mechanism of learning and establishing cultural "traditions" that resemble, to some extent, human traditions (Wrangham, 1994; Laland, 2009). But there seems to be a specific difference in human and primate learning, namely in the fact that human children learn tool usage mainly via imitation and by simply copying a shown behavior, even if it is not the most efficient solution to a given problem. Opposed to this, chimpanzees seem to learn through a process called *emulation*, which implies that they diverge from the paradigmatic solution that has been "taught" to them. It has been argued that learning through imitation has been selected in humans, even though it is a less flexible strategy, because it is a more social strategy of learning (Tomasello, 1999, p. 28). In this way, biological anthropology mirrors a debate in social anthropology about the role of technology;

this can be seen either as a driving force born out of necessity that calls for social changes (technical determinism), or as highly mediated or even constructed by culture (social constructivism).

Social and Cultural Anthropology

As already mentioned, technology was identified early on as a key feature of modern society (Misa, Brey, & Feenberg, 2004). Many studies have been written about the impact of modern technology on society, focusing mainly on the industrial revolution (e.g., Haferkamp, 1992; Pressnell, 1960; Smelser, 1969) or on the more recent revolution of the information society (e.g., Castells, 1999; Nora, 1980), as well as on the impact of technological change on traditional societies.

Marx

The analyses of Karl Marx and the Frankfurt School are influential, not only in trying to grasp the role of modern technology in society, but also in hinting on potential anthropological roots of technology and their essential interrelation with social aspects of the human condition. Marx insisted that the study of technology holds the highest relevance for human sciences, since it reveals the way humans deal with nature and sustain life (Marx, 1938). An essential feature of man's nature is that he has to work in order to sustain his life, that he is the "toolmaking animal" or—as he has later been called—the *Homo faber*. Marx analyzes the role of technology in Chapter 13 of his first volume of *Das Kapital*. He argues that the division of labor becomes fostered through machines, which at the same time replace more and more traditional manpower and can furthermore be operated by less skilled employees, thus leading to very bad labor conditions for the working class. Technology in general is, however, still greeted as an option to make humans' lives easier; it is mainly the social distribution of the possession of the means of production that Marx regards as problematic. (Also later thinkers, inspired by Marxian thought, tend to see technology as an important means toward establishing a better future.) On the other hand, at the same time, technology is seen as rooted in man's will to dominate nature.

Adorno

Following this later insight in particular, Theodor Adorno argues that Western civilization has developed powerful tools to ensure its self-preservation against nature. Technical rationality is regarded as the exercise of strategic power to dominate (external) nature, but it is at the same time also leading to a suppression of the inner nature of man (Adorno, 1979). The main strategy of this rationality is quantification, which lies at the heart of the

mathematical-scientific interpretation of nature and the development of modern technology. At the same time it brings forth a type of rationality, which leads to a self-mutilation. The will to exercise power becomes the main feature of modern rationality, thus leading to a dialectic that turns the noble aims of the Age of Enlightenment into a morality of humankind that is its very opposite: A new barbaric system of oppression and dictatorship arises, using technology for totalitarian purposes.

Habermas

While Adorno seeks redemption mainly in the arts (Adorno, 1999), seeming to promise the possibility of a completely different kind of subjectivity, Jürgen Habermas (1971) tries to propose an antidote; this does not lie outside of modern-Enlightenment rationality, but rather returns to its original intention. Habermas argues with Marx and Adorno, asserting that technological knowledge has its anthropological roots in the will to dominate nature and therefore serves a strategic interest of man. With this, man is not only *Homo faber* but also a social animal. Besides the strategic means-end rationality he also possesses a communicative rationality, aimed at defining common moral values and engaging in discourse over ethically acceptable principles of actions. In thus distinguishing two types of rationality, Habermas tries to incorporate much of the German tradition of cognitivist ethics into his approach. It is important for Habermas that technology be brought under the control of democratic decision-making processes; his discourse ethics has thus helped to inspire ideas of participatory technology assessment.

Winner

Outside the Frankfurt School, technology has not been at the center of social and cultural anthropology, as has been often complained (Pfaffenberger, 1988, 1992). Langdon Winner (1986) coined the term *technological somnambulism* to refer to those theories that neglect the social dimension of technology. According to this dominant tradition, the human-technology relation is "too obvious" to merit serious reflection. Technology is seen as an independent factor of the material and social world, one that forms a relatively autonomous realm of ethically neutral tools to acquire human ends. But already Winner argues that technology is essentially social and is shaped by cultural conditions and underlying value decisions. He claims in a famous article (Winner, 1980) that Long Island's low bridges were intentionally built in a way that would keep buses away, making it more difficult for the poor, and mainly the black population, to reach the island. Even though this particular claim has been challenged, Winner seems to be correct in pointing out that value decisions play a role in creating technology, and that the social value system leaves its trace in technological artifacts.

The STS Approach

In line with this renewed interest in social issues, a new field of studies related to technology emerged in the 1980s, focusing explicitly on this neglected relation between society and technology: the so-called STS approach. Having been labeled the “turn to technology” (Woolgar, 1991), *science and technology studies* (STS) analyzes society’s impact on science and technology, and science and technology’s impact on society. Several writers draw attention to the social shaping of technology. An influential author is Bruno Latour, who contributed to both the initial appeal to social constructivism (that he later gave up) and the development of the actor-network theory; both are at the center of the debate about the theoretical underpinnings of STS.

Social Constructivism

Woolgar and Latour employ a social-constructivist perspective in their early case study on the production of scientific results, in which they analyze scientists’ attempt to establish and accumulate recognition and credibility of their research through the “cycle of credibility” (Latour, 1979). The main idea of social constructivism is the attempt to interpret alleged objective “facts” in the social world as being socially constructed, so that knowledge of the world and its interpretation depends on social mechanisms and cannot be traced back to objective facts (Berger & Luckmann, 1966). In this sense technology is also not an objective, independent given, but shaped by social ideas and societal interpretations.

Actor-Network Theory

In the 1980s and 1990s, Latour became one of the main proponents of the actor-network theory (Latour, 2005); this is also attractive to scholars who reject social constructivism, since it can be combined with the idea that not all of technology is socially constructed. The social-constructive interpretation of this theory aims to develop a framework in which society and nature, or society and technology, are not separated. The idea of technology as a sociotechnical system implies that *agent* and *tool* form a unity, which cannot be explained completely by referring to one of the two elements in isolation. According to this idea, technological artifacts dispose over some form of agency and can be—to some extent—regarded as *actants*. This ascription of *intentionality* and *agency* to technical systems is, however, highly debated. The debate between realism and social constructivism has thus not been settled.

Philosophical Anthropology and the Philosophy of Technology

Research in philosophical anthropology peaked in early 20th-century Germany, discussed in the next section. But

outside of anthropological discussions, the topic of technology became an important issue for philosophy, so in this brief overview, important contributions and themes of the *continental* and *analytic tradition* will be discussed next. Finally, more recent developments and topics in the philosophy of technology will be sketched that do not try to revitalize a philosophical anthropology, but that nevertheless do touch in one way or another on anthropological perspectives on technology.

Classical Philosophical Anthropology

Classical philosophical anthropology was mainly interested in understanding the essence of human nature and often draws specific attention to the role of technology. Important contributions came from Gehlen, Plessner, and Scheler during the first half of the 20th century. The attempt to link technology to a biological interpretation of man in Gehlen’s early works especially deserves attention. Given his biological constitution, man must be seen as deficient by nature (*Mängelwesen*), since he is not endowed with instinctive routines and is not adapted well to a specific natural environment, but rather is open to the world (*welttoffen*). He compensates for this deficiency with the help of his mental capacities and tool usage. Gehlen interprets human language and human institutions as relief mechanisms (*Entlastungen*) that help him to interpret and organize the plentitude of impressions (the sensory overload, *Reizüberflutung*) that he is exposed to. Most technologies can thus be regarded to be either organ-amplification (*Organverstärkung*) or organ-replacement (*Organersatz*) (Gehlen, 1988). In *Man in the Age of Technology* (1980), Gehlen focuses more on sociological perspectives of technology. He identifies two essential cultural breaks marking principle changes in humans’ world interpretation and social organization, both of which are linked to technological developments: (1) the neolithic revolution of sedentism, marking the passage from a hunter’s culture to a society of agriculture and cattle breeding, and (2) the industrial revolution in modernity (Gehlen, 1980).

Scheler also analyzes man’s rational capacities from a biological perspective, but he concludes that a purely naturalistic approach does not render justice to our self-understanding. The human ways of sustaining life are from an often inefficient biological perspective. Therefore, it must be pointed out that the main function of human knowledge is not only to strategically ensure humans’ own survival, but also to be directed toward the discovery of moral values and toward the process of self-education (*Bildung*). Humans not only live in an environment, but also reflect on their place in the world—a capacity that marks a fundamental difference between humans and animals (Scheler, 1961).

This type of philosophical anthropology came to a certain end when the main interest of philosophers shifted from understanding “man” to understanding “society” during the 1960s. With the recent developments of sociobiology,

philosophers have taken a renewed interest in the linkage between biological and cultural interpretations of man. Let us look at some tendencies of later research in the philosophy of technology.

Philosophy of Technology

If we look at a philosophical interpretation of technology, we find the first origins of a discipline of the philosophy of technology by the end of the 19th and the beginning of the 20th century (see Kapp, 1877, and Dessauer, 1933). During the first half of the 20th century, the philosophical analysis of technology can, roughly speaking, be divided into two main schools of thought: the *continental*, often skeptical approach, and the *analytical*, often optimistic approach. As with all such very generic typologies, this distinction likewise does not claim to be more than an approximation, while the general tendency of recent research seems precisely to be to overcome this gap and to aim for a convergence or cross-fertilization of these two approaches. Therefore, what follows is an ideal-type distinction that tries to make some of the basic ideas of these two approaches more visible and aims at understanding their more general features.

The continental approach originally focused on a humanities-centered perspective on technology, its (mainly negative) consequences for society, and its rootedness in a problematic feature of human anthropology (the will to power), and finally tried to understand technology as such (its “essence”). The analytic approach, on the other hand, originally focused on a more science-based understanding of technology, its (mostly beneficial) potential for the progress of societies, and its rootedness in a rational (scientific) way to approach nature, and it finally tried to look not at technology as such but at specific problems or specific types of technologies.

The Continental Approach to the Philosophy of Technology

In the continental philosophy of technology, technology is often interpreted as closely linked to a certain form of consciousness, a form of approaching nature (and also human interaction) from a perspective that is rooted in a scientific understanding of the world, which itself is rooted in the will to dominate nature. This approach is seen to replace or at least to endanger a value-based approach to reality. In this sense, Edmund Husserl’s phenomenology regards science and technology as a mere abstraction from the full-fledged real experience of the world we live in. In this way, the sphere of technical knowledge is limited and needs to be guided by value decisions, which do not have their basis in scientific or technical knowledge, but stem from our ethical knowledge of our life-world.

While technology is not at the center of Husserl’s interest, José Ortega y Gasset (1914/1961) was one of the first

philosophers who aimed at a deeper understanding of the relation between human nature and technology. Rejecting Husserl’s later emphasis on the transcendental subject, he insists that human nature can only be understood by the formula “I am I plus my circumstances.” Philosophy can thus neither start from the isolated subject (as in idealism), nor can it interpret everything from the perspective of the material conditions (as in materialism). Rather, it must find a middle ground. The essence of humans is for Ortega not determined by nature; this distinguishes humans from plants or animals or from physical objects—all having a defined, specific given nature. Man must determine his own nature by himself by way of the creative imagination. Technology is interpreted as the material realization of this self-image; it is a projection of an inner invention into nature. According to Ortega, technology evolved in three phases: It started as a collection of accidental findings of means toward ends by pure chance. In a later state, these findings became traditions and skills that were passed on to the next generation. Modern technology marks a radical difference, since it is based on a systematic scientific approach, which forms the third phase. This approach, however, tends to become the dominant mode of thinking, so that man’s creative capacity for imagination (which is at the heart of man’s very essence) is in danger of being replaced or losing its importance (Ortega y Gasset, 1914/1961).

Martin Heidegger’s (1977) analysis of technology in his essay “The Question Concerning Technology” is also very influential. His philosophy aims at understanding the notion of *being*, which—so claims Heidegger—has been misinterpreted or neglected by traditional European philosophy. Since man is the only known being that can ask for the meaning of being, Heidegger’s analysis in *Sein und Zeit* starts from an interpretation of the existence of such a being (*Da-sein*). Even though his book is meant to be an exercise in philosophical (fundamental) ontology, it offers many anthropological insights about the specific human form of existence, in which the knowledge and the denial of one’s own mortality form essential human features.

In his later work, Heidegger (1977) understands technology as a specific form of disclosing reality. Asked for the essence of technology, people usually refer to it as a means to achieve an end (instrumental definition), or they define technology as an essential human activity (anthropological definition). Even though Heidegger admits that these definitions are “correct,” they do not disclose the essential truth about technology for two reasons. Essentially, (1) technology is not a tool for achieving an end, but rather the perspective under which everything that exists is seen only as a potential resource to achieve an (external) end. Furthermore, (2) this disclosure of reality is not a human-directed practice: Humans are driven objects rather than being themselves the active subjects. According to these conclusions, the instrumental and the anthropological definitions of technology do not capture the whole

truth of technology. Let us look at these two points in turn, as follows:

1. The essence of technology lies, according to Heidegger, in its capacity to disclose reality (*entbergen*) under a very specific, limited perspective. This perspective reduces everything to a potential object for manipulation, a resource (*Bestand*) for further activity. Technology is thus a way to disclose something hidden. Following his analysis of the Greek word for truth (*aletheia*) as referring to something undisclosed, he sees thus a “truth” at work, under which reality presents itself as a mere collection of resources for external purposes, rid of all inner logic and teleology that was so prominent in traditional understandings of nature. Heidegger points at the different ways in which a river is seen by a poet in an artwork (*Kunstwerk*), on the one hand, and, on the other hand, in which the same river is seen by an engineer as a potential resource for energy generation in a power plant (*Kraftwerk*).

2. Heidegger then goes on to claim that opposed to the image of man being in control of technology and using it for his purposes, he should rather be seen as being provoked (*herausgefordert*) by this coming to pass. Heidegger clearly wants to reject the optimistic idea of “man being in control” through the help of modern technology and, rather, revert it to its opposite: man being driven by a force greater than himself. He calls this driving force the essence of technology, the *en-framing* (*Ge-stell*) that prompts humans to look at nature under the idea of its usability. In doing so, man is in highest danger, but not because of potential hazards or specific negative consequence of modern technology. The danger is, rather, that he loses sight of understanding nature in a different way and that he might finally end up understanding also himself and other humans only as potential “resources” or potential material for manipulation and instrumentalization. Heidegger suspects that art might be a potential antidote to this development: In Greek, *techne* originally encompassed also the production of beautiful objects in art. Thus, a deeper understanding of technology might reveal its relation to art and might point to the fact that art offers a potential answer to the challenge that modern technology poses to human self-understanding.

Certainly, Heidegger’s contribution to the modern philosophy of technology lies more in highlighting this essential dimension of technology as a threat, rather than in elaborating strategies to counter these inherent dangers. Heidegger’s article is arguably the single most influential essay written in the philosophy of technology, although his mannered, often dark language allows for different interpretations and often lacks the clarity of philosophical contributions from the analytical school. But the idea that “technology” and technological rationality is a limited form of looking at reality—one that is in strong need of a

countervision, and that might further lead to a deformation of intersubjective human relations and that finally affects human self-understanding—has ever since been a prominent topic in different thinkers from Adorno and Marcuse to Jürgen Habermas, as illustrated earlier. This idea has often been linked with an ethical concern: Modern technology calls for new ethical guidelines, and despite some beneficial consequence, poses a potential threat to human existence. Much of this ethical debate about modern technology was triggered by its potential to radically destroy human life, be it through nuclear, biological, or chemical weapons or by consequences of environmental pollution and climate change.

Heidegger’s pupil Hans Jonas (1984) was one of the first philosophers to emphasize the need for a specific “ethics for the age of technology,” feeling that modern technology urges us to radically reconsider our ethical intuitions in order to meet the new challenges. Nevertheless, based on humans’ anthropological need to seek protection against nature, classical technology never fully reached this aim. Nature remained always more powerful than men, and the consequences of human actions were mostly not far-reaching. Traditional ethics could therefore focus on the “near and dear.” Modern technology, however, radically changes the picture: Its scope is unknown in premodern times; its consequences and potential dangers could be fatal, far-reaching, and irreversible. Focusing on the environmental problems of modern societies with, as the darkest perspective, the possible extinction of humankind, Jonas suggests broadening the scope of our ethical obligations: If our actions are more far-reaching than ever before in the history of humankind, we need to acquire a new ethical countervision. Jonas finds this remedy in the anthropological feature of our feelings of responsibility. Responsibility often expresses an asymmetrical relation, as in parents who feel responsible to care for their children. The old ethical intuition to derive obligations from the rights of free and conscious individuals, able to participate in argumentation and democratic decisions, seems to be too narrow to account for most environmental problems: Future generations are not yet born, animals and nature cannot in the same sense be regarded as having rights, as has been established in previous ethical approaches to the idea of universal human rights. But obligations may also stem from the idea of responsibility, from the idea that something has been given into our care.

The Analytic Approach to the Philosophy of Technology

Analytic philosophy is rooted in the quest for clear conceptualization, sound argumentation, and scientific precision. For early analytical philosophy in the Vienna Circle, the mathematical nature of scientific knowledge could serve as a role model for knowledge as such: hence, the need for and

the extended usage of logical formalization within analytic philosophy. Skeptical of the quest to address the essence of things like “the technology” in general, analytic philosophers very often focus on concrete problems linked to very specific technologies. Even though many thinkers in the line of logical positivism thus greeted scientific knowledge as the highest form of knowledge, this did not always lead to an unbalanced embrace of technology. In Bertrand Russell (1951), we find a skeptical attitude toward the social benefits of technology, especially if it is linked with totalitarian ideology. Thus, he stresses the importance of democratic education; if placed in a democratic context and applied in well-defined careful steps, technology is, however, beneficial for progress in a way in which Karl Popper (1957) typically advertises as piecemeal social engineering. Important early contributions to an analytic philosophy of technology stem further from Mario Bunge (1979), whose ideas closely link to the program of logical empiricism and oppose the “romantic wailings about the alleged evils of technology” (p. 68).

Recent Developments: Bridging the Gap

Even though this distinction between humanities’ philosophy of technology and engineering’s philosophy of technology (Mitcham, 1994) marks the background of the philosophical discussion on technology in the early 20th century, the debate soon moved beyond this opposition. Three tendencies seem to be of importance.

First, continental philosophy was moving away from the attempt to come up with metaphysical, religious, or anthropological answers to the big questions. With the emergence of postmodernism, the alleged end of the “big stories” was proclaimed, thus making a metaphysical approach less fashionable. Appealing to ontology (as in Heidegger), to metaphysics, or to religious ideals (as in Jonas) seemed less promising. Even though early continental philosophy was very critical with regard to strategic rationality and technology, it has been criticized by postmodernism as not moving radically beyond the central modernistic Western ideal of a rational philosophical synthesis or universal world interpretation.

Second, the focus within the philosophy of technology moved toward a renewed interest in looking at concrete technologies and the challenges they pose for analytical and ethical reflection, a movement that has been called the empirical turn in the philosophy of technology (Kroes, 2001).

Third, different attempts were soon made to bridge the gap between the two camps. In post-world-war Germany, the Society of German Engineers (VDI) established a dialogue about the responsibilities of scientists and engineers, addressing topics and worries of the humanities. The experience of the massive and systematic use of technology for organized mass murder during the holocaust and the development of technology for modern warfare, including the

development of the nuclear bomb, raised issues about the responsibilities of engineers. The debate of the VDI meetings resulted in a series of important publications on the philosophy of technology (Rapp, 1981); these must be recognized as an important attempt to synthesize different strands of philosophical thinking, even though it can be asked how far the VDI school was really successful in transcending its engineering-philosophical origins (Mitcham, 1994, p. 71).

Along a similar line, authors have tried to combine the phenomenological approach with American pragmatism, thus bridging insights of a more continental and a more analytical tradition. Common to phenomenology and pragmatism is the idea of the priority of praxis over theory and thus the tendency not to see technology as applied science but, rather, science as a purified or abstract form of (technological) praxis. Following the works of John Dewey, thinkers like Paul T. Durbin (1992), Larry Hickman (1990), and Don Ihde (1979) have tried to establish a pragmatist phenomenological approach to technology. The insights of Don Ihde that each technology either extends human bodily experience (e.g., the microscope) or calls for human interpretations (e.g., the thermometer) are of particular anthropological interest. If technology amplifies our experience, then it always does so at the cost of a reduction: In highlighting or amplifying certain aspects of reality, it makes invisible other aspects of this very same reality (as in an ultrasonic picture) (Ihde, 1979). The way technology thus “mediates” our interpretation of the world, and our actions within it, has been a further object of extended research (e.g., Verbeek, 2005).

A further attempt to bridge humanist and engineering tradition has been made by Carl Mitcham (1994), who nevertheless tries to defend the priority of the humanist perspective, but at the same time develops an analytic framework that should serve for further investigation within the philosophy of technology. He distinguishes among technology as object (tools), as type of knowledge, as activity, and as volition (expression of man’s intention or will). The 1980s and 1990s saw an increased interest, especially in the analyses of the first three aspects of this distinction.

With regard to the fourth aspect, ethical issues have been a central topic for many philosophers of technology, ranging from debates about the responsibility of scientists and engineers, medical and bioethics, business ethics, technology assessment, risk assessment and decision under uncertainty, to environmental ethics. Two of these fields are of particular interest from an anthropological perspective: In environmental ethics, those theories might shed light on anthropological questions seeking to interpret the environmental crisis as essentially rooted in human nature. It has been argued that it is a human tendency to value short-term (individual) interests more highly than long-term (collective) interests, thus putting a pessimistic neo-Hobbesian anthropology in the middle of the debate. According to Garrett Hardin (1968), it is this very human tendency

(together with a mismatch in the growth of the human population that exceeds the growth of the supply of the food or other resources) that leads to the “tragedy of the commons.” Research in game theory and environmental sociobiology indicates the possibility of holding a more optimistic view of the development of cooperative strategies in humans (Axelrod, 1984), though the issue is still debated and there is room for a more pessimistic perspective, as has been defended early on by some sociobiologists (Dawkins, 1978) or recently by some philosophers (Gardiner, 2001).

In the ethical debate on transhumanism, finally, many links can be found to classical anthropological questions about the essence of man (e.g., Baillie, 2005; Fukuyama, 2004). The central debated question is whether it is morally allowed, forbidden, or even demanded from us to enhance our human capacities through new technologies, ranging from short-term nonevasive ways (like taking performance-enhancing drugs) to fundamental irreversible changes (like genetic engineering). While bioconservativists argue against an extended usage of enhancement technologies, transhumanists point to the potential benefits of these new options. It is reasonable to assume that these issues will be with us as technology advances and opens new possibilities to alter the human condition. This opens a radical new challenge to anthropology, which until recently dedicated itself to understanding the *given* human nature, while it now has to face the normative question of which we should choose as our future nature, once technology offers radical new options of changing human nature (e.g., as by slowing down or even stopping the process of aging). It seems that the anthropology of the future must take into consideration, more and more, normative claims and it must reach out to incorporate ethics to prepare itself for the challenges modern technology poses.

Future Directions

Looking at recent tendencies in research, it can be argued that the initial focus on linking technology with a universal, philosophical anthropological vision, also rooted in biological knowledge, was one of the key achievements of early philosophical anthropology in the works of Gehlen and others. What made these anthropologies remarkable was their attempt to bring together the different traditions of anthropological thought, ranging from philosophy to sociology and biology. A turn toward a more social perspective was established first by Gehlen himself, the Frankfurt school, and later STS studies, sometimes leading away from or even lacking both an underlying philosophical vision and an interest in our biological nature. Very recently, however, sociologists and philosophers have shown an increased interest in biology (as is visible in the ever-growing numbers of publications in sociobiology and the philosophy of biology). This increased attention has not yet led to a revival of an interest in the links between anthropology and technology. But in order to understand man—both in his

evolutionary origins and (maybe even more) in his current historical situation—it seems to demand attention to man’s amazing capacity to develop technology.

It can reasonably be argued that what is thus needed is a new vision of how to synthesize the different fields of biological, social, and cultural anthropology. It seems that after the empirical turn to gather extended details over the biological and social aspects of technology, there is now a call for a new philosophical turn, seeking a new discourse synthesis. Many classical questions of anthropology will tend to remain unanswered, if academic research remains focused only on disciplinary perspectives, which always look at only a part of the whole picture. It is certainly true that man is a social animal, that he has biological roots and that he can ask ethical and philosophical questions about the good and about his place in this universe. The disciplinary separations in biology, sociology, and philosophy (to name just a few) tend, however, to distract from the fact that man in reality is a unity, meaning that a true answer to the most fundamental question of anthropology (What is man?) calls for a plausible combination of these approaches. To synthesize the different aspects of our knowledge about our own human nature is certainly far from being an easy task, but it seems more needed than ever.

But if this is not yet a big enough challenge, there is even a second aspect that makes the quest for a synthesis even more challenging. It seems that a new anthropological vision of humankind must answer a question that classical anthropology has not been dealing with: If technology soon allows us to alter our very nature, then we must know not only what the human condition is, but also what the human condition should be.

Ethics might again enter anthropological reflection, as has been hinted at already by early thinkers such as Scheler and Jonas. Recent attempts to place man in the middle of both a normative vision of ideals, on the one side, and against a profound overview of our descriptive knowledge about our essence, on the other side (as in the voluminous attempt at a synthesis in Höhle, 2004), deserve attention, as they might be the first steps toward a renewed synthetic anthropology that tries to bridge the gaps among the different disciplines. A deepened understanding of technology must be a central part of these efforts, since the way we use tools and produce artifacts is one of the remarkable features of humankind—a feature in much need of guidance by descriptive knowledge *and* ethical wisdom, especially in our age in which technology (of which humans have been the subject) is about to discover the *condition humana* as its potential object in a way more radical than ever before.

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PART III

SOCIOCULTURAL ANTHROPOLOGY

CONCEPT OF CULTURE

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Culture, as a concept, is one of the most complex ideas in academic use today. It is defined and applied in various and often incompatible ways and is the site of significant disagreement between academic disciplines regarding the fundamental character of human social life and the manner in which it is to be studied. For anthropologists, culture tends to refer to symbolic systems of beliefs, values, and shared understandings that render the world meaningful and intelligible for a particular group of people. While these systems—which provide the basis for such elementary concepts as food and kinship and even influence how individuals experience time, space, and other aspects of reality—often appear to their adherents as natural and objective, they in fact represent variable, socially agreed-upon models. In turn, humans must themselves construct these models in order to find order and meaning in a world lacking an inherent sense of either.

Ironically, just as the anthropological concept of culture has gained extraordinary momentum in popular use, as well as in areas such as law and political science, the concept has come under criticism from within the discipline of anthropology itself. Some anthropologists allege that the culture concept oversimplifies and stereotypes whole societies, erroneously treating them as isolated and uniform while underplaying individuality and diversity of opinion. Others maintain, however, that the concept has never entailed such assumptions, and that culture is simply a useful way to

think about the beliefs and shared understandings that make it possible for humans to understand their world.

While debates surrounding the concept of culture reflect legitimate ideological differences, they are often clouded by misunderstanding—not only is the word used to denote widely different ideas, but it is frequently defined in vague and ambiguous terms (if explicitly defined at all). This chapter seeks to provide a clearer picture of the concept by tracing the details of its use from its earliest applications through its role in contemporary anthropological thought. First, the origins and evolution of the concept are explored, with particular attention to key aspects of its development in American anthropology. Next, the contemporary concept of culture as meanings and symbols is examined in detail. Finally, major critiques of the concept and notable responses to those critiques are presented.

The Evolution of the Concept of Culture

Etymology

The original meaning of the English word *culture* was derived from the Latin *cultura*, in both the literal sense of cultivation (as in “of a crop”) and the metaphorical sense of self-improvement (the “cultivation of the mind”). The latter was commonly invoked in 18th-century England referring

to personal betterment through the refinement of judgment, taste, and intellect; and, by extension, to those activities believed to express and sustain that sophistication (Williams, 1983). This basic sense underlies the most common popular application of the term today, which identifies a specific segment of society as *cultural* (including, for example, theater and art) to the exclusion of all others.

The anthropological concept of culture took a less direct path in entering the English language, first passing through German in the form of the philosophical concept of *kultur*. *Kultur* had emerged from the idea of cultivation as well, but soon thereafter began to develop in opposition to the French word *civilisation* as the two concepts became the site of tension between the philosophical traditions of the respective countries. *Civilisation* was linked to the French enlightenment and the idea that society naturally progressed from a primitive state marked by ignorance and barbarism toward universal ideals in science, secularism, and rational thought. *Kultur*, meanwhile, came to represent local and personal concepts like religion and tradition—the “national character” of a people. In 1871, British anthropologist Edward Tylor combined elements of both concepts in defining culture as “that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society” (as cited in Kroeber & Kluckhohn, 1952, p. 81). This is generally considered to be the first formal anthropological definition of the term, as it introduced the idea of culture as a learned, shared, and broadly inclusive framework encompassing nearly every aspect of human social life.

Cultural Relativism

While Edward Tylor’s definition was groundbreaking, it lacked an essential element of the original German concept that would later become a key feature of the anthropological concept of culture. Tylor was a cultural evolutionist—he believed that over time and with the right conditions, societies developed toward higher and better forms. Thus, he regarded 19th-century England as the absolute pinnacle of human civilization, and considered all other societies (especially those outside of Western Europe and North America) to be less developed and inherently inferior. Franz Boas, a German American scientist widely regarded as the founder of cultural anthropology, was among the first to dispute the evolutionist view. Boas regarded the principles of cultural evolutionism as unscientific and challenged the crucial assumption that the presence of similar practices across societies necessarily indicated their common evolutionary origin. He cited counterexamples where nearly identical cultural institutions had arisen in different settings for markedly different reasons. Applying an approach that was both historical and comparative, Boas (1940/1995) argued that society did not follow a linear progression toward one

ideal form, but instead moved in various directions based on fluid historical circumstances.

Most important, Boas asserted that individuals actually experience reality differently based on the cultural context in which they are raised—that “the seeing eye is the organ of tradition” (1940/1995). This in turn meant that the ideas and practices of a people could only be understood *relative* to the particular ways in which the members of that community perceived and envisioned their world (1889). Boas reasoned that if cultural patterns for perception and judgment were a product of socialization, their adherence must be grounded in emotions and unconscious attachment rather than in any rational or practical appraisals of their virtue or effectiveness. Thus he concluded that any attempt to rank or comparatively evaluate the practices of diverse societies would be nonsensical.

The mistake that cultural evolutionists made, then, was to view their own culturally derived ideas and perceptions as broadly applicable and uniquely valid. Boas pointed to the analysis of speech sounds as an illustration of why this is a hazardous thing to do. Someone who is unfamiliar with the sounds used in a particular language will often hear those sounds differently than a native speaker, by, for instance, failing to recognize the difference between two sounds treated as functionally identical in his or her own language. The Japanese language, for example, does not distinguish between the English /r/ and /l/ sounds, and unless exposed to English at an early age, speakers of Japanese tend to mistakenly perceive those sounds as the same. This propensity led to an unfortunate (if humorous) episode in which early cultural evolutionists misheard the speech sounds of an indigenous American language and declared it inferior for what they mistakenly perceived to be the lack of a fixed phonemic system.

According to the “linguistic relativity hypothesis” advanced by Edward Sapir and Benjamin Lee Whorf, the principle of relativism extends to systems of linguistic meaning as well. Sapir and Whorf argued that the language individuals speak has an impact not only on how they are able to talk about things, but also on how they actually perceive what would otherwise appear to be fundamental aspects of reality. This prompted Sapir to state that in learning a language, one effectively learns a “world.” Whorf drew upon his experience as a fire instructor to show how the connotation of a word like *empty* could lead people to behave carelessly around spent gasoline drums filled with dangerous vapor. Subsequent research in this field has uncovered linguistic influences on dimensions such as the perception of color and spatial orientation, as well as on moral reasoning and other forms of decision making. Whorf noted that the majority of linguistic categories are “covert,” or existing below conscious awareness, an observation that anthropologists Alfred Kroeber and Clyde Kluckhohn (1952) extended by concluding that all cultural knowledge incorporates both conscious and unconscious categories that “screen and distort” one’s conception of reality.

While linguistic analysis may offer the clearest illustration of relativism at work, the principle appears to hold for a wide range of cultural phenomena. Not only do beliefs, attitudes, and values differ markedly from one society to the next, but also comparative research has shown that members of different cultural groups can vary even with respect to their emotional and physiological responses to stimuli. Many Americans, for example, would experience disgust and perhaps even nausea at the very thought of eating live grubs. Yet for the members of many other societies, grubs are considered delicious, and the consumption of onions and mushrooms is seen as disgusting.

As a consequence of this relativistic dimension, the concept of culture has been criticized for its perceived role in undermining attempts to formulate objective and universally binding rules for moral human conduct. And indeed, if it is illegitimate to compare diverse beliefs and practices, and if everything from nausea to the nature of reality is experienced through the screen of culture, then it would seem quite difficult to argue in favor of objective, universal moral truth. As a number of theorists have maintained, however, this does not necessarily mean that moral beliefs are impossible. It simply implies that if normative statements are to make sense, then they must be made with reference to common understandings of what the world is like. As with varying ideas on the nature and meaningfulness of reality, the fact that conceptions of moral truth are inevitably local and particular does not necessarily mean that they are irrational, illegitimate, or untenable.

Culture and the Individual

A key question in anthropology has been whether culture represents its own level of analysis, or whether it can be reduced to (i.e., explained in terms of) the ideas and actions of individuals. According to Alfred Kroeber (1917), an influential anthropologist and the first of Franz Boas's many doctoral students, as soon as culture had been recognized as a "distinctive product of men living in societies," it was only a matter of time until culture constituted a "second level." Kroeber called that level the *superorganic*. Under this view, the behavior of individuals combines to form a system that follows its own set of rules. Cultural phenomena are emergent properties of that system, and thus require their own level of explanation. Thus, Kroeber argued, anthropologists need not concern themselves with individuals in dealing with culture; in fact, they might actually produce richer analyses by ignoring them.

Edward Sapir (1917), also a student of Boas and one of the founders of linguistic anthropology, was intensely critical of the superorganic, accusing it of representing "a social determinism amounting to a religion." Sapir felt the theory treated culture too much like a thing or a concrete object rather than an abstract concept, and left no room for individuals to act in accordance with their own volition. Sapir was similarly critical of the influential theories of

Ruth Benedict (1934), another student of Boas who advanced the idea of cultures as highly integrated wholes characterized by an overarching "personality." In a profile of three indigenous groups in Melanesia and North America, Benedict famously declared that each could be described by a specific personality type (the Dobu of Papua New Guinea, for example, she described as "paranoid schizophrenic"). Sapir was especially scornful of this attempt to use psychological terms to describe whole societies, famously remarking to his students that a culture cannot "be paranoid."

Sapir's own theory, presented in a 1924 essay titled "Culture, Genuine and Spurious," regarded culture as consisting of the peculiar attitudes and ways of life that gave a people its distinctive place in the world. A "genuine" culture, for Sapir, was a harmonious, balanced, and healthy "spiritual organism." But while this did imply a significant amount of integration, a genuine culture was not merely "efficient"; that is, individuals could not simply exist as cogs in a machine. For Sapir, culture and individual could not exist without each other, since culture could not perpetuate itself without individuals as "nuclei," and individuals could not simply create culture out of nothing. Sapir's solution, and his attempt to reconcile the contradiction he saw in Benedict and others, was essentially humanistic: The individual finds a "mastery"—a vocation expressing his or her unique individual skill but that is harmonious with the will and desires of the other individuals in the community. Sapir was careful to emphasize, however, that the very categories of "culture" and "individual" could only be recognized from the anthropologist's view, since the individual himself could perceive no such distinction, psychologically speaking. The more humanistic elements of Sapir's theory never achieved wide acceptance, but his ideas on the relationship between culture and the individual anticipated many lines of critique present in "postmodern" anthropological theory (see the section on "Critiques of the Culture Concept").

The Contemporary Concept: Culture as Meanings and Symbols

Later, some referred to Edward Tylor's pioneering definition of culture in 1871 as the "everything-is-culture" definition, as it included not only things like knowledge, belief, and values, but also customs and behavior, and even a miscellaneous category called "other capabilities." Franz Boas and his students gave the concept a more scientific cast in the early part of the 20th century, and added to it the crucial dimension of cultural relativism. But up to and through the 1940s, cultural anthropologists continued to draw little distinction between ideas and behavior—belief in the power of sorcery, for instance, was culture, but so too was the ritual dance performed by the sorcerer, and perhaps even the artifacts created and used to perform

the ritual. Margaret Mead, a student of Boas and one of the most well-known cultural anthropologists in history, employed a concept of culture that actually centered on the idea of a “complex of behavior.”

As part of a seminal treatise on the culture concept, Kroeber and Kluckhohn (1952) were among the first to suggest that the concept of culture should exclude behavior. Their conclusion was based on the recognition that other factors besides culture influence how humans think and act. The problem with treating a particular behavior as a part of culture was that it essentially proposed that the behavior belonged to or was a unique product of culture, ignoring the powerful psychological, social, biological, and material factors that also motivate action. Like the rest of those factors, culture could not include behavior, since, as Kroeber and Kluckhohn noted, culture was itself a “pattern or design” abstracted from observable behavior—something that made behavior meaningful.

This view does not entail, however, that culture is just like politics or economics or any other domain of human social life. Precisely because culture is not behavior itself, but the beliefs and ideas that render behavior meaningful, culture is an essential aspect of nearly every dimension of social-scientific analysis. Even those actions perhaps appearing on the surface to be purely economic or political in character, for instance, are impossible to decipher without an understanding of the particular cultural forms that make the situations in which they occur sensible and meaningful in the first place (see Sewell, 2005).

The contemporary concept of culture, then, focuses not only on behavior and artifacts as such, but also on what that behavior *means* and what those artifacts *symbolize*. For David Schneider (1868), an American anthropologist who helped found the approach known as “symbolic anthropology,” this meant that even behavioral norms should be excluded from cultural analysis. Schneider defined culture as a set of “definitions, premises, postulates, presumptions, propositions, and perceptions about the nature of the universe and man’s place in it” (p. 202), explaining that while “norms tell the actor how to play the scene, culture tells the actor how the scene is set and what it all means” (p. 203).

Culture as Meaning

The importance placed on *meaning* in the modern concept of culture—not only for the anthropologist attempting to understand social life, but for the individual who lives it—is perhaps best accounted for in the writings of Clifford Geertz, whose influential ideas helped to redefine the discipline of anthropology in the late 20th century. Geertz (1973a) observed that humans are “unfinished animals,” set apart not just by our ability to learn, but by the astounding amount that we *must* learn in order to be able to function at the most basic level. Geertz attributed this to the fact that cultural evolution and biological evolution

overlapped by millions of years in the phylogenetic development of the species, such that the human brain became utterly dependent on inherited systems of meaning. While our biological “hardware” might furnish us with basic capabilities, we must be socialized into specific social systems in order to use them. We cannot, for instance, simply *speak*; we must learn to speak English or Japanese or some other highly particular linguistic form. This accounts for the high degree of variability seen across human societies. As Geertz put it, “We all begin with the natural equipment to live a thousand kinds of life but end having lived only one” (p. 45), since the gap between what biology dictates and what we need to know in order to survive can only be filled with highly particular cultural forms. Without culture, then, humans would not revert to some basic and primary hunter-gatherer form, but would instead be “monstrosities” unable to accomplish even the simplest tasks (1973a, p. 49).

Culture as Symbolic Systems

A central feature of the contemporary concept of culture is the emphasis placed on symbols. More than just providing the means to express and transmit cultural knowledge from person to person and generation to generation, symbols are seen as essential to the *building* of that knowledge in the first place. Anthropologists now tend to regard culture itself as a collection of symbolic systems, where the construction of cultural models and concepts relies on the unique properties of symbolic representation.

The Nature of Symbols

According to David Schneider (1968), a symbol is “anything that stands for something else.” The idea is that this “something else,” called the symbol’s *referent*, is not logically deducible from any characteristic of the symbol itself, but is associated with it purely on the basis of an agreement made by a social group. The word *dog*, for instance, really has nothing to do with the actual thing that speakers of English call a dog, but the connection is made because a group (the speakers of English) has agreed that a particular symbol (the word *dog*) will stand for a particular referent (the domesticated descendants of the Asian red wolf). At first glance, this might seem unremarkable. But as Clifford Geertz (1973a) pointed out, while there are many instances in nature of “patterns for processes”—such as when a duckling learns a set of behaviors by imprinting on his mother, or when DNA issues “instructions” on how to build certain tissues—the capacity to represent objects and occurrences *as they are* is exceedingly rare, and probably unique to humans. Symbolic representation allows the users of symbolic systems to make reference to and reflect on things that are not actually present at the time, converting them into ideas that can be analyzed, manipulated, and combined with other such concepts in the medium of abstract thought.

Furthermore, symbolic reference involves much more than merely matching a word or other symbol to its counterpart in the “real world” of objects. In a famous example, Edward Sapir illustrated that when someone uses the word *house* in the general sense, they do not think of any one house, but of any and all houses that have ever existed or could possibly exist, as well as the set of collective beliefs, attitudes, and judgments associated with that class of objects. This is what is called a *concept*. Conceptual thought opens the door to the imaginative and productive capacities of the mind, allowing humans to do such extraordinary things as wonder about our place in the world, reflect on things that *could* have happened, but didn’t, and then lie about all of it. Closely related to the ability to lie is the ability to form conceptions of things pregnant with collective attitudes and value judgments that far exceed the natural or objective characteristics of the referents themselves. As French sociologist Émile Durkheim (1912/1995) emphasized in his landmark treatise on religion, symbols allow groups to focus their collective mental energy on concretized representations of social phenomena and give tangible expression to bundles of emotions and attitudes that might otherwise remain ineffable. As anthropologist Marshall Sahlins (1976) phrased it: “Men begin *as men* . . . precisely when they experience the world as a concept (symbolically)” (p. 142). It is for this reason that symbols are seen as the building blocks of culture.

The Pervasiveness of Symbols

Language is the most highly developed symbolic system, and the most common form in which cultural meanings are expressed. As the foremost means of “cutting up” the world into sensible and meaningful categories, language is virtually impossible to distinguish from culture, and it’s not surprising that the idiosyncrasies of its particular forms can have a powerful impact on how its speakers perceive reality (see earlier section, “Cultural Relativism”). But words are far from the only type of symbols used by humans. Clifford Geertz (1973b) regarded any “object, act, event, quality, or relation” as a potential symbol, and as it turns out, human social life is replete with organized systems of them. Geertz held up religion as a prototypical example, where acts, artifacts, relationships, and even people serve to symbolize the abstract concept of the supernatural and the beliefs and values associated with it (1973b). Religion also offers examples of what Roy D’Andrade (1984) would later call the *directive* and *evocative* functions of symbolic systems, as it serves to guide and motivate action by, as Geertz (1973b) put it, forming an idea of what the world is like and “clothing” that idea in such an “aura of factuality” as to make it seem self-evident.

Symbolic systems can become so engrained in a community’s understanding of the world that they become difficult to spot. Kinship systems, for instance, appeared for

a very long time (even to anthropologists) to be deeply rooted in biology. But David Schneider (1968) argued that there is nothing about shared ancestry or genetic relatedness that necessarily leads to a recognition of the rights, duties, and responsibilities associated with cultural systems of kinship. Numerous kin classifications, in fact, ignore that criterion completely. Schneider concluded that biological relatedness is a symbol just like any other, arbitrarily designated to denote shared identity and mutual responsibility among social groups.

The Constitutive Power of Culture

The very act of perceiving an object or event in the world as being a *type* of something (e.g., perceiving a certain creature as a *dog*, the clasping of hands as a *prayer*, or the meeting of lips as a *kiss*) entails the symbolic interpretation and generalization of a specific, concrete event. Because symbols represent concepts rather than just things as they exist in the world, almost everything humans perceive is at least partially constituted by collective representations and interpretation. But the power of culture is such that, in many cases, symbols do not attach to any referent at all, and instead actually *create* the objects or events to which they refer. Philosopher John Searle (1969) referred to this as the capacity to enact *constitutive rules*. In statements like “when a player crosses the goal line, he scores a touchdown” or “the candidate who receives the plurality of votes in the general election becomes president,” constitutive rules actually create the categories of *touchdown* and *president*. Societies are built upon intricate systems of these constitutive rules, which generally take the form “*x* counts as *y* in context *c*.” While usually thought of by the members of the community as natural or even commonsensical, these rules are entirely a matter of social agreement. The idea that one *owns* a house or car or any other piece of property, for instance, is based on the collective belief that transferring something called “money” to an institution called a “bank” entitles one to special rights over some material thing. Most often, others will not even question those rights. But when someone does seek to violate the agreement through force, such as by stealing a car or invading a home, it is understood that people in uniforms with guns will (hopefully) show up to stop them. Those uniformed enforcers of social consensus will only do so, however, insofar as they agree to obey the orders of an imaginary chain of authority that runs all the way to the president of the United States, whose power comes not from any physical or mental capacity of his, but from the collective agreement that he is to have such authority. Thus, personal property—like civil government or American football—relies on a complex, ordered hierarchy of constitutive rules and social facts that have no basis in material reality.

These institutions reflect a more basic property of symbolic representation: The meaning of cultural units tends to

be layered upon many other orders of meaning. Something as simple as reading this sentence, for instance, plays upon such varied levels of conventional meaning as the denotation of speech sounds by individual letters, the definitions of words and groups of words, the grammatical rules that operate at the sentence level, and matters of tone and style conveyed by the structure of the chapter as a whole.

Methodological Implications

The centrality of meanings and symbols in contemporary concepts of culture poses challenges for the study of social life. To begin with, there really is no such thing as a symbol per se, although almost anything can function as one. Symbolism is not an inherent quality of any word or sign, but rather a product of interpretation and consensus. Nor is the meaning of a symbol rigidly determined even by the force of collective agreement. As a number of theorists have argued, the interpretation of symbols relies on complex and often emotionally charged processes in the mind of the interpreter, which it must call upon a broad range of preexisting schemas, scripts, and tacit understandings in order to make any sense at all. Consider the following short description of a sequence of events: “Roger went to the restaurant/The waiter was unfriendly/Roger left a small tip.” In their work on artificial intelligence, Schank and Abelson (1977) showed how little sense such a sequence makes without detailed prior knowledge of what normally happens at a restaurant, what is expected of a waiter, and what is communicated in the complex practice of tipping.

For Clifford Geertz (1973c), the ambiguity and polysemy of the subject matter of anthropology meant that cultures could not be *explained*, but instead could only be *interpreted* through a process he called “thick description.” To truly grasp the meaning and significance of a belief or action, Geertz argued, one must first acquire a comprehensive understanding of the social and cultural context in which it occurs. Drawing on literary theory, Geertz suggested that culture must be “read” like a text—a text that, from the anthropologist’s point of view, is “foreign and faded,” full of abbreviations, omissions, and contradictions, and written not by anyone’s pen but by sporadic instances of socially meaningful behavior.

Critiques of the Culture Concept

Social Anthropology

While culture has long been the central object of inquiry in American anthropology (hence the term *cultural anthropology*), scholars in the British social-anthropological tradition have historically been skeptical of culture, and have instead framed their investigations around the concept of *society*. In social anthropology, society refers to a complex web of social relationships and systematized

patterns of behaviors and ideologies known as *institutions* (e.g., the military, primitive magic, the nuclear family, or the National Football League). Social anthropologists compare institutions across different societies in order to ascertain their “function.” They are particularly interested in “latent” functions: those consequences of institutionalized behavior of which the actors are unaware, but which nevertheless work to motivate the very existence of the institution. The functionalist approach rests on the assumption that particular types of institutions, such as kinship or government, are motivated by the same basic factors and oriented toward the same basic ends in all human societies in which they are present. Underneath their superficial differences, the various cultural manifestations of these institutions are seen as essentially similar, like species belonging to the same genus.

As concepts, culture and society are not necessarily incompatible, and have been viewed by some as closely related and even complementary. But for several generations of social anthropologists, culture was something of a taboo term. A. R. Radcliffe-Browne, one of the discipline’s founders, insisted that the concept of culture erroneously treated abstract ideas as real and concrete, and was too broad a concept to be useful in the study of social life. He claimed that society, on the other hand, was the proper object of anthropology, since societies were bounded and concrete, and social structure was embodied in directly observable social behavior. Eventually, however, social anthropologists recognized that no attempt to study social relationships could be successful without consideration of the cultural beliefs and values associated with them. Oxford anthropologist John Beattie (1964) identified this as the primary reason that Radcliffe-Browne’s limited conception of social anthropology as “comparative sociology” never fully caught on: The behavior of people in society cannot be understood without reference to what social relationships *mean* to those who participate in them.

Still, a number of social anthropologists remain reluctant to refer to the semiotic dimension of social life as culture. Adam Kuper (1999) argued that it is more legitimate to analyze religious beliefs, arts, and other institutions as separate domains than as “bound together in a single bundle labeled culture” (p. 245). But as William Sewell (2005) observed, and as Ruth Benedict (1934) noted before him, basic beliefs and symbolic representations of the world tend to cut across the lines that sociologists would use to carve up the social sphere, reaching across institutions, linguistic communities, age-groups, and even religions to span entire societies. This suggests that any attempt to approach such beliefs as though they were miscellaneous qualities of separate institutions risks completely missing the presence of a single, pervasive cultural theme. The more or less unquestioned belief in the sanctity of human life in modern society, for instance, affects almost every conceivable institution, from industrial development and urban planning to the cultivation of food

and medicinal testing. To effectively treat such an idea as a product of any one institution would thus be a significant analytical mistake.

Postmodern Anthropology

In recent years, some of the strongest criticisms of the culture concept have come from within the discipline of cultural anthropology itself. Adherents of a loosely defined movement known as “postmodern anthropology” (also variably referred to as postcultural, poststructural, and reflexive anthropology) have questioned the very usefulness and validity of culture as an abstract concept. Often associated with a 1986 collection of essays edited by James Clifford and George Marcus called *Writing Culture*, the movement can be viewed an extension of the theories of Clifford Geertz—particularly his use of literary theory and his emphasis on the importance of context. Michael Silverstein (2005) identified the “symbols and meaning-ism” that Geertz helped usher in as the point at which anthropology became a hermeneutic and interpretive project rather than an observational science. But for those affiliated with the *Writing Culture* movement, Geertz stopped short of the inevitable conclusion of his argument—that the description or “interpretation” of a culture is as much a reflection of the point of view of the anthropologist as it is of the culture itself. From this perspective, the anthropologist does not simply record facts about others’ ways of life; instead, she actually creates (or at least coconstructs) the culture as she describes it. This is obviously very troubling for the credibility of anthropological knowledge, and it becomes especially problematic when, as was traditionally the case, the anthropologist is a member of a dominant society granted unilateral authority to depict the beliefs and practices of a subjugated population. Critics point to this unequal power dynamic as at least partially to blame for misguided attempts to capture complex realities using false dichotomies like “savage vs. civilized,” “rational vs. irrational,” or “individualist vs. collectivist.”

This “reflexive” critique is linked to an older, more basic criticism in anthropology, suggesting that culture is a tool for the preservation of existing systems of power and oppression. Proponents of this view argue that by ascribing too much importance to tradition, the concept of culture legitimates the domination and mistreatment of traditionally powerless segments of societies. A frequently cited example is the disadvantaged place that women are perceived as occupying in traditionally patriarchal societies. Others have argued, however, that the perception of inequality and discrimination in other cultures is prone to error, since it often fails to take into account the subtle cultural mechanisms that redistribute power and shape social relationships. And while there certainly are cases where the idea of culture is misused to justify atrocities, this does not explain why the concept should be rejected as an analytical tool.

Another dimension of the postmodern critique takes specific aim at the practice of referring to *a* culture or to cultures in the plural. Some feel that this use—which is often traced, somewhat controversially, to the theories of Ruth Benedict and Margaret Mead—oversimplifies and stereotypes other societies, erroneously treating entire communities as uniform, isolated, and unchanging while downplaying diversity and internal disagreement. This implication is ever more frequently seen in popular usage, where terms like *Japanese culture* imply a universally shared, unquestioned, and totaling “way of life.” And while integration is not necessarily synonymous with cultural determinism, Benedict (1934), for her part, did little to dispel that interpretation in asserting that the individual “is the little creature of his culture. . . . Its habits are his habits, its beliefs his beliefs” (pp. 2–3). In response, critics like Clifford and Marcus (1986) stressed the importance of individual agency and “resistance” to cultural norms, pointing out that cultures are not bounded, homogeneous, or “pure.” Instead, culture is contested, contradictory, and only loosely integrated, constantly subject to change both from within and without. Postmodernists note that cultures have always been hybridized and permeable, but that this has become increasingly so in recent decades in the face of globalization and capitalist expansion. As Clifford and Marcus (1986) observed, difference is now routinely found next door and familiarity at the end of the earth, suggesting that received notions of culture are not only mistaken, but also irrelevant.

Others maintain, however, that the concept of culture has never implied uniformity, and that no serious anthropologist ever viewed individuals as mindless automatons totally controlled by a self-contained and unchanging cultural system. They argue that culture has always been an abstraction; that is, culture does not represent a “thing” that exists in the world as such, but is instead separated by way of observation and logical inference from the context of real-world actions and utterances in which it is embedded. Alfred Kroeber (1952) defended the practice of speaking of cultures in the plural on this basis, anticipating contemporary critiques in pointing out that one could speak at the same time of a Tokyo or a Japanese or an East Asian culture without implying that any of them represented a homogeneous or totalizing way of life. More recently, Marshall Sahlins (1999) has asserted that the concept of culture critiqued by postmodern anthropologists is a myth. Sahlins does argue that cultural communities can have boundaries, but that these boundaries, rather than being barriers to the flow of people, goods, or ideas, represent conscious designations of identity and inclusion made by the members of the community themselves.

Regarding the uniformity and homogeneity of cultural knowledge, anthropologist Richard Shweder (2003) has argued that culture never implied the passive acceptance of received beliefs and practices or the absence of dispute or

debate. Shweder points out that every culture has experts and novices, but that such unequal distribution of knowledge does not mean that anyone is more or less a member of that culture. As one of the chief proponents of the resurgent interdisciplinary field of “cultural psychology,” Shweder has helped demonstrate that basic psychological processes such as selfhood and emotion, rather than being products of deep structural similarity, are rooted in culturally specific modes of understanding (Shweder & Bourne, 1984). Such findings have provided some of the driving force behind the growing influence of the concept of culture in the field of social psychology (e.g., Markus & Kitayama, 1991; et al).

Conclusion

Whether prior theories or particular uses of the term carried misguided implications or not, anthropologists continue to recognize culture as an indispensable consideration in the analysis of human social life. As theorists from nearly every area of study surveyed in this chapter have agreed, shared cultural knowledge is absolutely essential for individuals to function in a way that is recognizably human (see Geertz, 1973a, 1973b, 1973c; Whorf, 1956; Beattie, 1964; Clifford & Marcus, 1986; Sewell, 2005; Sahlins, 1976). Clifford Geertz referred to a gap that exists between our species’ innate biological predispositions and what humans must know in order to survive and function—a gap that could only be filled with highly particular systems of beliefs, values, and representations expressed and transmitted through symbols.

Even those most critical of the concept tend to recognize the centrality and pervasiveness of culture. Culture represents the shared ideas that define and give meaning to objects, events, and relationships in our world and the collective representations that create and maintain social institutions. This is true even of those domains of human activity appearing to follow their own logic and obeying their set of rules and principles. Renato Rosaldo (1989), whose work was also included among the 1986 collection of essays that kindled the postmodern anthropological movement, wrote as follows:

Culture . . . refers broadly to the forms through which people make sense of their lives. . . . It does not inhabit a set-aside domain as does politics or economics. From the pirouettes of classical ballet to the most brute of brute facts, all human conduct is culturally mediated. Culture encompasses the everyday and the esoteric, the mundane and the elevated, the ridiculous and the sublime. Neither high nor low, culture is all-pervasive. (p. 26)

Thus, the concept of culture, in one way or another, is likely to remain of central concern to the discipline of anthropology for the foreseeable future.

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ETHNOGRAPHY AND ETHNOLOGY

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Ethnography and ethnology are related disciplines within the field of cultural anthropology. Cultural anthropology deals with all aspects of human culture from social to religious, to political, and beyond. Ethnography focuses on single cultures or specific structures within one culture, while ethnology is a study of the members and structures of cultures and of the relationship of members to their cultures. Ethnology is highly theory driven, using a comparative approach with the writings of ethnographers to search for commonalities that may underlie all cultures or human behaviors. In addition, ethnology takes a broad view, comparing cultures or looking at the deep history of a culture in order to explain why and how it functions as it does. In recent years ethnologists have moved into many subfields of anthropology, such as gender studies and folklore.

Fieldwork with participant observation is the defining method of the ethnographer. Ethnography applies in two ways. It is both an in-depth study of people within their own culture and based on their own words, and it is the detailed written record of that study. Often the ethnographer focuses either on the development of the culture and its operation over time or on how individual behavior and the culture relate to each other. Ethnographies differ from ethnologies in that the former are descriptive and are based on direct participant observation and interview transcription, while the latter are comparative and generally based on studies of material already written about aspects of cultures.

Learning the culture from the inside is termed the *emic* point of view. The emic view acknowledges that group members themselves are the true knowledge holders within their society. Hence the ethnographer attempts to reach as close to the insider's understanding as possible. Ethnographers cannot bring ready-made assumptions into a study, although they will have formulated a theory to investigate with respect to the culture. The point of view of the ethnologist, who looks at reports already completed, is *etic*. It is a view from the outside. There are a number of classic ethnographies, including the following: *The Nuer: A Description of the Modes of Livelihood and Political Institutions of a Nilotic People* (1940/1969) was written by Edward Evans-Pritchard, who studied African societies and focused especially on witchcraft and magic. Bronislaw Malinowski wrote *The Sexual Life of Savages in North-Western Melanesia: An Ethnographic Account of Courtship, Marriage, and Family Life Among the Natives of the Trobriand Islands, British New Guinea* (1929/1962), among other works, and Margaret Mead is well known for her study, *Coming of Age in Samoa* (1928/1961). Another classic writing in the field of ethnology is *Patterns of Culture* (1934) by Ruth Benedict.

Culture itself is defined variously as the shared knowledge passed on by learning that unites a group, or, in a broader sense, all of the institutions, material culture, beliefs, traditions, and knowledge within the human world. For cultural anthropologists culture is that which is both shared and transmitted within a particular group. Culture

includes the underlying beliefs and ideologies that motivate the actions and behaviors of people within a particular society—of interest to the anthropologist is what underlies this overt behavior. As illustrated in the previous chapter, the term *culture* involves the meanings a group attaches to occurrences and objects, and it encompasses the way societies create those meanings. Cultural values are learned from infancy and become a part of the person through observation, learning, and imitation of the actions of family and community. Along with this, the values and beliefs of the society are reinforced by ritual practices and use of symbols.

The potent influence that all aspects of a culture have over individual members was first recognized and investigated by the sociologist Émile Durkheim at the end of the 19th century. Later, 20th-century anthropologists came to see that the influence did not move in only one direction. They now study humans as they relate to and interrelate with their material culture, the rituals and practices of their society, and the surrounding environment. Humans are extremely adaptable—a product of the fact that they learn much of their behavior. They do not respond by instinct alone.

Historically, anthropology focused only on studying primitive cultures, yet this focus has shifted as the world has undergone a period of rapid change since the first recorders of such primitive societies did their work. The globalization of Western civilization has influenced, and often changed, societies, no matter how remote. Consequently the fields of study have diversified considerably. Today, the discipline of anthropology encompasses the study of humankind from prehistory to the present, and includes, but is not limited to, biological, social, cultural, and psychological elements. Major divisions are archaeology; biological anthropology; linguistics; cultural/social anthropology, which incorporates ethnology and ethnography; and applied anthropology, in which research is conducted to solve real-world problems. Subdisciplines fall into these major categories.

In the mid-20th century, anthropology passed through a period of criticism from within and from other disciplines, particularly criticism of its major form of communication, the written results of tribal and cultural studies. Cultural anthropology, sometimes termed sociocultural anthropology, already changing with the lack of untouched primitive cultures to study, was under attack for its seemingly literary, rather than scientific, approach. Critics questioned the authority and accuracy of the ethnographic records, generally monographs, produced by anthropologists after months to years of focused study. They claimed that the written record was stylistic, demonstrating the author's voice in too subjective a manner, and suggested that the writing often was meant to entertain more than to present objective, quantitative evidence.

Theory

In the 19th century, ethnologists believed that cultures evolved from primitive to advanced civilizations over

long periods of time. Therefore the study of primitive societies defined the role of anthropology, as it was believed that the roots from which modern man sprang could be understood by studying primitive cultures currently in existence. Edward Tylor was a major proponent of this evolutionary view and contributed significant writings to the field. Early ethnographies, including Tylor's, focused particularly on religion and on magical practices. Influenced by Darwin's *On the Origin of Species* and other speculation about evolution at the time, ethnographers considered the primitive societies, as well as fundamental aspects of those societies, such as religion, to be evolutionary in their development. In this way, Tylor believed he saw evidence of predictable advances in religion from the simple belief that all things are animated with some form of spirit to the more complex belief in multiple gods and on to the belief in a single god. Lewis Henry Morgan, another early ethnologist, operating within the evolutionary theory of cultures, focused on a study of kinship systems.

These early theories grew within the historical period of colonialism and imperialism. Tribal societies, so different from Western culture, were seen as primitive, and their own inherent developments and complexities often not recognized as such when compared with modern Western societies. The structures within such societies were perceived as static, operating within a system of natural law just as the rest of the natural world. This theory arose from the 18th century, which had witnessed great advances in the understanding of physical processes, for example, in geology and physics. Early anthropologists reasoned that such natural laws must permeate the world, including the way in which societies were organized and functioned. Franz Boas, an early significant figure in the shaping of anthropology as a discipline, believed that some underlying laws could be recognized after cultures were thoroughly studied and compared. This remained the goal of ethnologists for many years, until the true complexity even of so-called primitive societies was recognized.

Many earlier 20th-century anthropological studies revealed the Marxist materialist view that focused on methods of and control over production. Class conflicts and economic forces were among the factors believed to bring about change within society. This is a form of materialist theory, which is based on how people behave, not what they might be thinking. Customs, how people live on a daily basis, and other observable behavioral patterns are seen to drive the culture. Somewhat remodeled, materialist theory is one of two major approaches applied today. Interpretation and understanding is based on customs, how group members live on a daily basis, and other observable behavioral patterns. Modern theories of production and control are more sophisticated and complex, particularly as the world has become more industrialized and developed a global economy. Production and economic factors remain a significant focus in ethnographic research, often in applied research.

Linguistics

At about the mid-20th century, a theory referred to by some as “The New Ethnography” was introduced. Since a key aspect of human society is language, anthropologists began to see language as a model for cultural studies. Researchers attempted to improve the rigor of the ethnographical method, making it more of a science. They believed that since linguists had already found structure and order in human language, this order would assist in understanding human behaviors revealed through speech. A learned process, language is orderly, obeying certain underlying rules, and humans are born with the capacity for language. Individuals need not understand all of those rules in order to speak. Early learning and correction gradually render spoken language grammatically correct without thought given to the process. It is automatic, unconscious. This seemed to confirm a theory of structure in human behavior—a behavior bounded by learned habits and unconscious choice built into the function of the brain. Such linguistic determinism, as discussed first by Edward Sapir in the early 1920s and later by Benjamin Whorf, left no room for conscious human intervention in the structure of culture. Whorf suggested that ideas were a result of the format of a particular language, again leaving little conscious choice to humans.

Structuralism

Claude Lévi-Strauss advocated a view of society as built on particular structures that needed to be understood in relation to each other in order to make sense of the society as a whole. To begin a system of classification required collecting a great deal of data, where meanings varied according to the culture. Lévi-Strauss believed the human mind operated under constraints, while the culture was in part determined by the conditions of its economic situation and its technology. Influenced by linguistics, his theory of structuralism brought the human and the world together as one: The human is able to understand his world because he is literally a part of it. Lévi-Strauss considered much of the structure of human society to be a result of patterns built into the human brain. The structures were not conscious choices but inevitable. Therefore the combined limitations of human thought and of cultural developments produced a structural order that could be observed.

Gradually, developments in other fields led to a reexamination of the language process. Studying the manner in which sounds are made and by which meanings are created revealed a set of grammatical structures that did not rely on unconscious processes. This and other discoveries demonstrated that humans are not rigidly wired. They become active agents in their behavior and interact with their environment. Theories of structuralism as applied to primitive societies thus came to be seen as limiting, accounting neither for the historical background of each society nor for the flexibility and adaptive nature of individuals within the

culture. Culture is now recognized as dynamic, not static. Individuals learn, react, and change. Collectively, this in turn brings change to the culture.

Cognitive Theory

The redirected focus, from culture to individual, led to the growth of cognitive theory. Cognitive theory sees change arising primarily out of mental constructs—ideas and thoughts. Cognitive theorists focus on what people actually say to get a grasp on their thoughts, beliefs, and viewpoints, with clues from linguistic information and the use of symbols. Semiotics, the study of signs and symbols, is one form of ethnographic or ethnological study, depending on whether the study focuses on one culture or compares uses across cultures. Each society has its own meanings and symbols to denote those meanings, although the same symbol may be used in different ways by different societies. Cognitive theory, based on thoughts and ideas, is the opposite of materialist theory.

By the early 1980s, ethnographic theory incorporated aspects from fields as diverse as hermeneutic philosophy (the question of how humans are able to communicate at all), semiotics, linguistics, and psychology. Hermeneutic studies consider how people can understand a culture that is not their own. This allows more insight into the observational methods and results reported by the ethnographer. It also highlights the interpretive abilities of the ethnographer who must be careful not to read more into what he sees than is really there.

Contemporary Theory

Linguistics provided evidence of the complex, interactive relationship of humans and their societies. The changes wrought among societies after the Great Depression and World War II proved beyond doubt that cultures can change, often dramatically, as the people within the cultures respond to new stressors placed upon them. Anthropologists could no longer maintain the theory of static structures within societies.

Contemporary fieldworkers may study the culture of an institution, an industry, or a profession, with the group dynamic a key feature of such a study. Symbolic, social, economic, or other aspects of any given culture may be the major focus of fieldwork, driven by current theory.

As theories have shifted and globalism brings interconnectedness to all cultures of the world, primitive, untouched societies no longer exist. The era of colonialism and conquest introduced change to conquered societies through material exchange and introduction of new ideas. Such societies must be studied in their historical context to appreciate what has changed and how it has changed. The modern theory having perhaps the greatest impact is that of humans as true actors in the drama of the cultures. The rigid structure of societies, as conceived by early anthropologists, has given way to the notion of flexible, dynamic

societies that change as their members change. Humans respond and evolve in emotion and cognition. Humans adapt to their cultures, and the cultures in turn adapt to them. This forces ethnographers to position the culture under study in a historical context and affects their understanding of it. In this framework, members of a society may be studied in terms of current cognitive theory with ideas and thoughts being of central interest.

The materialist approach is also important today, with ethnologists classifying societies by political organization or methods of production. Although theories have changed, the essential methods and desired goal—understanding humans in every aspect of their lives and cultures—remain the same.

Throughout the later 20th century, outside critics as well as anthropologists themselves recognized a need to redefine, even re-create, the methodology of cultural anthropology. Underlying these concerns has been the question of whether anthropology falls into the major discipline of science or of the humanities. Questions about the rigor of research methods and possible subjectivity of ethnographies led many to reject anthropology as a science. But current methods incorporating statistical data and surveys bring anthropological studies into the sphere of science.

Two very important concepts embraced by contemporary cultural anthropologists also serve to reduce the level of subjectivity. The first is *holism*, meaning all-encompassing. Holism posits that events and behaviors must be viewed in the larger context of the culture in which they occur. Actions and events are never isolated, but are informed by the conditions and society within which they take place. Holism recognizes all societies of the world and views them in relation to each other. This comparative approach helps anthropologists recognize underlying patterns in the human experience. The second concept is *cultural relativism*, which means that a given culture can only be understood on its own terms. Value judgments cannot be made, for these judgments would entail assessing one society on the basis of the beliefs and understandings of another.

Methods

Fieldwork

The fieldworker may spend from several months to a year or more learning the language of the society under study, observing the rituals and interactions of its members, and when possible, finding informers or interpreters who will explain the reasons behind specific conduct and practices. Fieldworkers must find a way to fit in, without becoming one with their subjects of study. Integration and objectivity must both be achieved. It is therefore necessary to find people who are willing to explain the meaning of their actions and behaviors. Sometimes informers choose to mislead, but generally, observation and discussion

combined with note taking, sound recording, and other techniques help the fieldworker to put together a picture of the worldview of the society. Observation is neither casual nor sporadic, and anthropologists walk a fine line between observing and actively engaging in the culture under study. They must be careful not to influence or attempt to change the behavior of those observed yet must get close enough to learn the intricacies not evident to a casual observer. There is an element of chance and even luck in fieldwork. The cooperation of chosen informers plays a part in the results, as does the timing. Ultimately, the goal is to understand the people and their culture in their own terms, to come to the insider's point of view. Actions that seem irrational to outsiders make sense within the context of the world in which members of the society live. This is cultural relativism.

Methods are dictated by choice of study area and topic; this in turn may be prompted by the agency from whom the field researcher is able to receive funding. Current fashions in theory, academic budgets, and departmental decisions all contribute to the final choice of fieldwork location and the tone of the ethnography that follows. Before actually entering the field, the ethnographer has already designed a study based on a particular theory or problem and selected the techniques and tools that will be used to elicit the information sought. The methodology may call for a qualitative, description-driven approach, or it may require quantitative data, including statistics. The style of writing will depend on the ultimate purpose and reader audience. Multi-sited research is a method where the choice of topic dictates that the anthropologist will travel to several sites during the fieldwork term in order to make comparisons and build a larger picture. The researcher will not focus on one culture in depth but follow some aspect or object of culture as it spreads geographically or through time.

Participant Observation

The role for fieldworkers is especially difficult because ethnographers need to be participants in the culture they study as well as objective observers. This forces the researcher to be aware of his own biases, to acknowledge personal viewpoints, and to consider how these influence the final report. This is known as reflexivity and has become a major part of the process in recent years. The researcher's expectations or hopes about what she will discover are additional impediments to a completely objective account. This too requires the fieldworker to constantly reassess and reanalyze during the processes of observation and writing. In addition, subject awareness of the researcher's presence can inhibit open and honest discussion or behavior, and some local practices are apt to shock and disturb the observer who is committed to remaining neutral. In some societies, views about gender may also limit what information the ethnographer obtains, depending on whether

the ethnographer is a man or woman. In the early years anthropologists were careful not to allow any criticism of the imperial regime into their colonial studies. Even today political power is a sensitive matter. Researchers must tread very carefully in regimes where their presence and constant observation might be misconstrued.

The observer's field notes can include interviews, observations, quotations, descriptions, surveys, and any other pertinent data. Other tools used may include recordings, pictures, and videos or other newer technologies. Out of all of this, a meaningful ethnography must be created, keeping in mind the purpose of the study within current anthropological theory. When these are combined, a distilled product, the ethnography, is the result. It cannot be the whole story, and it is a story that would be different for another observer. Culture is complex, not countable nor easily classified. These realities underlie the debate about whether anthropology is a science or a humanities study.

Among the objects and behaviors the observer will likely focus on are symbolic items and symbolic gestures, as well as rituals performed. Symbols represent particular meanings and evoke strong feelings or emotions for members of the group. The same symbol can have a different meaning in another culture, so the ethnographer makes careful note of how and when it is used. Clifford Geertz has written much about the importance of studying the symbols and gestures of a society in order to make sense of what its members believe. He suggests that the researcher needs to refer back and forth between larger cultural practices and symbolic actions by individual members of the society to gain a better understanding of how members conceive of themselves and their world. Rituals are modes of behavior that are repeated patterns and represent something significant in the society's religion, politics, or daily life.

The relationships of systems and structures are other facets of the culture that the ethnographer attempts to understand. Some ethnographers will focus on the structures themselves, while others will look at the individuals and note how they respond and adapt. Gestures, motions—nodding the head, for example—and other forms of communication provide important pointers to the thought system of the society. Fieldwork and observation, then, are the hallmarks of the ethnographic method.

Ethnography (Writing)

The ethnographer begins by observing, striving to gain the view of the insider in order to understand the reality of a particular culture. As noted earlier, this is known as the emic perspective. The emic, or insider's, approach requires the ethnographer to take into account his own biases and cultural background in order to avoid ethnocentrism, a belief that one's own culture is the best. The native point of view may be very different from the ethnographer's worldview and cannot be understood in terms

of the ethnographer's background. This can be true even of studies done in one's own society.

Once fieldwork is completed, the ethnographer organizes notes, surveys, interviews, and other data collected into a written report—the ethnography. The writing process may reveal insights and lead to a better understanding of the culture or group than the ethnographer was able to grasp in the field. In the ethnography the researcher may make certain predictions based on, but beyond, her own observations. If independent observers agree upon what is likely to occur in given circumstances, such predictions fall into the category of etic (outsider) statements.

The most important task for the ethnographer is to describe what has been observed, considering both individual elements and the function of those elements or structures within the culture. Without good description or ethnography, comparisons cannot be made by others, nor is anyone else privileged to learn about such cultures. Writing it all down thus becomes essential.

The writing, however, has come under considerable scrutiny since the third quarter of the 20th century, and much has been written about it. Early ethnographers distanced their own voices from the cultures they described and observed certain stylistic conventions. In the 1960s, however, stylistic changes appeared, altering the balance between subjectivity and objectivity. Following these, the rise of feminism caused cultural anthropologists to reevaluate viewpoints and recognize that previous ethnographies were generally biased toward forwarding the males of the society. This not only caused subtle changes in the approach to the writing but also provided new grounds for fieldwork—gender studies.

In practice, perhaps the first decision made by the ethnographer is to what audience the description will be directed. The choice at once determines a style and a point of view. A second choice is how much detail to provide. The goal is to convince others that the ethnographer has truly come to understand the culture under study. Too much detail can cause readers to become bored and lose interest or even to lose the basic sense of what the author means to convey. Too little description may lack the power to convince others that this ethnography is authoritative. Outside criticisms of the lack of a scientific approach in anthropological studies have convinced many that a very granular description and inclusion of other data is necessary. As a result, modern ethnographies seek a balance between description and data-driven reporting.

Ethnography is the writer's interpretation of the field experience, a summation that takes place long after the actual event. Specific theories applied to field research, along with point of view and the expectations carried into the study, will influence what the ethnographer sees and hears. Original conversations explaining activities and meanings within the culture will be condensed, no longer the direct words of individual group members but rather a re-presentation offering a general explanation. Out of

respect for the people and values of the culture, an anthropologist may withhold some information, thereby coloring the interpretations others apply to the reading. The ethnographer must then decide whether omitting sensitive material will give the reader too incomplete a picture. Ethnographers also must adapt the style to the expected audience, considering their backgrounds and expectations as well.

Van Maanen (1988) identified certain narrative conventions associated with ethnographic writing. First, he discerned those presenting a direct discussion format that offered the facts without embellishing on the ways the information was obtained. The second and nearly opposite format placed the fieldworker at center stage above the culture under study. A third and more dramatic form presented both the cultural aspects and fieldworker's experiences in a personalized voice. In *Works and Lives*, Geertz (1988) studied the ethnographic production of many anthropologists, along with the reception given those works, and concluded that the key to a positive acceptance was the ability to convince. An authoritative voice that could not convey the reality of first-hand experience with the culture was not as highly regarded as one that drew the reader in, convincing him of the ethnographer's presence in the midst of that culture. Yet one of the most difficult things to do is to transform real experience and real voices into a condensed written account.

Ethnology

The ethnologist looks at ethnographic studies already completed and views them from the outside, using the etic approach. Ethnologists, dealing in comparative studies, may use the valuable resources of the Human Relations Area Files (HRAF; www.yale.edu/hraf/) for substantive information, rather than conducting intensive fieldwork—generally the preserve of the ethnographer. These files, created in 1949 at Yale University, constitute a database composed of text from manuscripts, articles, books, and other sources that bring together several hundred ethnographies. Works on ethnic groups, religious groups, and other cultures provide a rich source for material. The HRAF are still being developed, particularly as indexed electronic collections available online. Today there are a large number of online resources created for the many areas of anthropological study, and academic and special libraries provide additional print resources as well as digital collections from which material can be obtained. Ethnologists may now more easily make comparisons across time focusing on a particular group or culture. They may also engage in multi-sited field research as they make comparisons of cultural elements and structures or aspects of human behavior.

Historical Changes

Initially, in the late 19th and early 20th century, ethnographies were derived by “armchair” scholars from the

reports of missionaries, colonial administrators, or travelers. Each of these sources had its own particular view to report and none were interested in the primitive society's own reasons for its rituals and patterns of behavior. The theories held by early anthropologists, in combination with the already biased reports they received, had a significant effect on their writings, which were not impartial, although they might contain a great deal of description. Those who happened to travel to other locales to study the society did not employ the method of participant observation or fieldwork. They might have conducted a few interviews and made some observations, likely based on preconceived notions of the culture. In fact, there was little interest in how those within the culture actually behaved or thought.

Early in the 20th century, Franz Boas in America and Bronislaw Malinowski, working for the British, encouraged anthropologists to begin doing their own fieldwork and making their own observations. Thus, late in the first quarter of the 20th century, the central practice of the cultural anthropologist became fieldwork. The anthropologist spent months to years living within the society she was studying. The Chicago School is credited as a key factor behind the impetus for conducting serious fieldwork within sociology. This evolved when, just prior to the Great Depression, a group of social scientists at the University of Chicago began to promote empirical research, using both qualitative and quantitative methods in the urban environment. Cultural anthropologists, influenced by Boas and Malinowski, adopted the new fieldwork methods.

Early ethnographies were based on descriptions, as detailed as the writer was able to make them. In part this was intended to distinguish them from the less “scientific” travelers' reports. The detail was also meant to enable classification of societies from primitive to the most advanced, fitting in with the evolutionary theories of the time. Today ethnographers design a specific research topic, bringing the study into greater focus. In part, this change is due to the direction taken by American college students in the 1970s in which they demanded more relevance in what they studied and in its practical use. Today, field research may be in the ethnographer's own society, and the research may cut across more than one site. Yet another change in ethnographical forms arose out of a movement toward a more literary writing style. Margaret Mead's book *Coming of Age in Samoa* (1928) enjoyed popularity among nonacademics and exemplifies a literary style. More recently, Clifford Geertz and Claude Lévi-Strauss demonstrated interest in the literary style.

Globalism is another major issue in modern cultural studies. Understanding ourselves and others is critical. W. Penn Handwerker (2002) stated that we may now come face-to-face with people whom we previously considered to be “other”—that is, from distant, unfamiliar cultures—yet who might now very well share many of our patterns of thought and behavior. This opens up new fields of research and a need for better understanding in order to

interact at all levels. People of cultures formerly viewed as “primitive” or different are not willing to be studied as exotic subjects. They ask for a return of something that can benefit their own societies, or at the least they prefer to be considered a part of the larger, more modern world. Earlier cultural studies placed given societies within the larger world in terms of how that world might surround them and occasionally have some impact. Today, anthropologists recognize that all cultures exist as part of the larger world, and no society can be described or understood in complete isolation.

Finally, the field of anthropology has been affected by modern changes in the way universities are managed and funded. Scientific research is emphasized, often de-emphasizing the importance of anthropological studies that are seen as humanities-based, using qualitative rather than quantitative research. This compromises the amount of funding available, the ways in which ethnographical research is presented, and even the choices of topics made. The immediate relevancy of application becomes more important in order to attract support.

Applications and Criticisms

Major events in the 20th century, including World War II and the passing of colonialism, brought about a greater communication and interconnectedness among all world cultures. The untouched primitive society no longer existed. The discipline of anthropology, developed for the specific purpose of studying just such societies, foundered. Social scientists already studied other aspects of society, so it seemed there was no need for the cultural anthropologist in an increasingly complex and technological world. As society changed, new theories arose in other academic disciplines. One of these was postmodernism.

Postmodernism strongly influenced anthropology’s reevaluation of its methods. Essentially postmodernism does not acknowledge a single view or explanation but considers that each mind brings in its own interpretation, creating its own reality. There is no single, ultimate explanation, and hence any ethnography is only in the mind of that particular writer. Indeed, early ethnological comparative work soon revealed that ethnographic reports addressing the same topic often appeared quite different, depending on the particular academic training of the ethnographer. Some, for instance, would be more likely to explain or describe using a psychological approach, while others were more influenced by learning theory. Other differences arose out of the specific audience the ethnography was written for or the time when it was written. Earlier and later ethnographies of the same society might vary due to changes in the culture or because of the relationship established between the particular ethnographers and the groups they studied.

In spite of attempts to maintain a nonjudgmental evaluation, based on the theory of cultural relativism, ethnographies

of the same society have even been shown to differ based on the culture from which the ethnographer came. It is not possible to remain completely objective. Instead there is interpretation and mediation in the ethnographic report, and description filtered through the trained eyes of the beholder. These reconsiderations of the written material meant that fieldwork itself needed changes in planning and design. This opened up new directions for practice.

During the same period, academic realignment also contributed to greater diversification in anthropological fields of study. Often anthropology departments were subsumed into other departments in the humanities, no longer maintaining a separate identity within their institutions. Anthropologists began to explore areas of specialty within their own culture, some doing fieldwork among urban gangs, others researching such subcultures as education or science. Today there are biological anthropologists, psychological anthropologists, linguistic anthropologists, and many more subdisciplines with anthropologists exploring every facet of the human experience from birth to death and in between.

Applied Anthropology

These changes and diversification contributed to the growing field of applied anthropology in the United States. Since many anthropologists had also begun to look closer to home for areas in which to do fieldwork, the ethnographies they produced could be tailored to assist in answering questions critical to setting policy and making decisions. A better understanding of how humans and cultures function at every level sheds light on the many problems faced by urban planners, military personnel, international businesses, educators, epidemiologists, public health officials, and others. With boundaries breaking down and the variety of ethnic groups within a given city multiplying, it is ever more essential to understand the human experience in all of its facets. Cognitive or psychological anthropologists can point to the commonalities of human thought and to the likely responses of humans under stress or threat, thereby assisting urban planners or educators.

Anthropologists work within industry and other institutions, with Native American organizations, or in the government. They work in hospitals, mental health centers, and utility companies, with public interest groups, with education facilities, and in countless other areas. Practical applications of ethnographic research involve close observation of some particular group within a society, such as experts in a given field, the middle or upper class, or the linkages and relationships among certain institutions, such as industries and the media. Such ethnographies reveal a great deal to the political or social scientist charged with helping to shape policy. These fields of research place applied anthropologists more in the public eye and increase accountability. The work they produce may additionally be

of value in determining how funds will be apportioned, what is the best way to move forward with a project, or who or what will be most affected and how. Such studies can be applied to areas of public assistance, for example, where the way in which assistance is designed, such as in job training, has a significant impact on the success of that program. Whatever the study and tools used, fieldwork and participant observation remain the foundation upon which the studies are conducted.

Future Directions

Some of the new directions anthropology has taken are now well under way. The process of reflexivity or self-reflection is a method by which anthropologists look into their own attitudes and biases to understand why and what they are writing, and to attempt to bring about a more objective view. Following criticisms invoked during the literary postmodernism movement, writers of ethnographies are more aware of the problem of what truly is reality versus what a person experiences and interprets through the lens of his own life. This has led to relying upon archival research, statistics, and other cross-checks along with the writer's own experience before writing. Where ethnographies were once monographs they may now be written in a scientific format or as articles for various publications. The style of writing varies considerably. Fieldwork itself no longer always involves trips to remote areas of the earth but may take place in one's own hometown or some other familiar area where the focus is on feminist issues, studies of professions, or other fine-grained topics once more familiar to social scientists.

Cognitive anthropology is an important direction for new studies. Recognizing the role of the individual as an active rather than passive participant is a significant contribution to contemporary theory, reshaping fieldwork design. The question addresses whether individuals are in control of or products of their culture. Over time it has been shown that individuals learn to cope with changing circumstances in their environment and may make changes in the culture to adapt. While the culture changes somewhat as a result, a balance between individual and culture will eventually be achieved again. Recent history demonstrates this. Major 20th-century events such as war, depression, and greater communication bringing globalization have all produced the circumstances that wrought changes in cultures, forcing anthropologists to abandon previously held, more rigid theories.

Applied anthropology appears to be the new face of the field. Studies are expected to provide useful information that can be applied to improving situations, making changes, recognizing problem areas, and making policy and other decisions. This has influenced the method, calling for more rigorous—often quantitative—data, along with the qualitative ethnography. Surveys and statistical studies are just two

of the tools that may be used to provide hard evidence for particular conclusions. These methods may be used in studies of subcultures within society, such as gangs, the drug culture, or the commune. As this illustrates, the areas into which applied anthropologists are moving are constantly expanding. The long view for anthropologists is changing as they consider their individual studies within the context of a more global picture. Rather than focusing on a culture alone, they look at a group as it interacts regionally or even internationally.

A very important direction of future studies is in the fields of science and technology, perhaps especially biotechnology. As John Bennett (1998) stated, "Race is out; genes are in" (p. 2). The latter areas are of critical importance in decision and policy making. Ethnologists and ethnographers have moved into the present, finding the interconnections, interrelationships, and emerging trends among peoples, institutions, specific groups, and professions that define our highly technological societies today.

Political and economic structures are a target of research, viewed in a global context. Popular culture and media studies will also continue to be a focus. With the world in a period of rapid change due to greater industrialization and advances in technology, the need to revisit other geographically situated cultures to study how such changes have affected them will continue. Such studies require revisions in the earlier thinking and methodology of cultural anthropology. Whereas previous fieldwork called for long-term observation, many of the types of studies conducted today, both at home and in other societies, will be multisited with descriptions of association and linkages among the sites. Single sites that have already been visited may be visited again, but with new questions asked and perhaps new ways of observing and interviewing subjects. Fieldwork will require a more collaborative approach as cultures formerly considered "other" are now a part of the global community.

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MARRIAGE AND THE FAMILY

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Marriage and families are found in all societies; however, marriage and family customs vary significantly across cultures. Cultures differ with regard to what is considered appropriate premarital behavior, whom one marries, how one marries, a proper marriage ceremony, and length and purpose of the marriage. From an anthropological perspective, there are various marriage systems or “marriagelike” relationships that fulfill both biological and social functions. Regarding families, all societies have parent-child social groups but the size and form of the family varies. Although marriage remains customary across societies, it does not necessarily constitute the basis for family life.

Marriage

Marriage is found in virtually all societies, and the majority (some 90%) of people in every society get married at least once in their lifetime (Carroll & Wolpe, 1996; Ember, Ember, & Peregrine, 2006). Cultures vary with regard to what is considered appropriate premarital behavior, whom one marries, how one marries, a proper marriage ceremony, and length and purpose of the marriage. Each culture also defines marriage differently although there are some common criteria across many societies. Marriage is typically defined simply as a “socially approved sexual and economic union, usually between a woman and a man”

(Ember et al., 2006, p. 343), which is generally denoted symbolically in some way (e.g., ceremony, certificate, symbols—rings). Normally, there are reciprocal rights and obligations between the two spouses and their future children. Viewing marriage as a social process where new relationships are set up between the kin of both the husband and the wife essentially describes all forms of marriage. With this, marriage maintains social patterns through the production of offspring.

Traditionally, marriage was defined as a union between a man and a woman with children born to the woman being recognized as legitimate offspring to both parents (Royal Anthropological Institute, 1951). Marriage was thought to change the status of a man and a woman, stipulate the degree of sexual access for the married partners, establish the legitimacy of the children born to the wife, and create relationships between the kin of both the wife and husband. Anthropologists have since noted the exceptions to this standard definition and have expanded it to reflect broader practices. As such, Miller (2008) offers a working definition of marriage given the complexity of practices that fall under the umbrella of marriage—“a more or less stable union, usually between two people, who may be, but are not necessarily, co-residential, sexually involved with each other, and procreative with each other” (p. 140).

British anthropologist Edmund Leach (1955) observed that marriage may accomplish the following depending on

the society. Leach described these rights of marriage as possibilities for either or both spouses:

- Establish legal father and mother of children
- Provide control over sexuality of spouse
- Give rights to labor of spouse
- Give rights over spouse's property
- Create a joint fund of property (for children)
- Begin a socially significant affinal relationship between spouses and their relatives

In some cultures, there are other reasons for marriage. For instance, the Hindu religion considers marriage sacred and representative of the marriage between the sun god-deity Surya and the moon god Soma. Without a wife, a man is considered spiritually incomplete (Kumari, 1988). Representing the two interacting principles of *Yin* (female, passive, weak) and *Yang* (male, active, strong), long-term relationships in China are thought to be a spiritual necessity that ensures survival. Still others may marry to gain higher status (Sonko, 1994).

From the ethnographic literature, we know that one group of people did not have marriage as it has been typically defined. During the 19th century, a caste group in southern India called the Nayar appear to have treated sexual and economic relations between men and women as separate from marriage. At puberty, Nayar girls took ritual husbands but after the ceremony, the husband had no responsibility for his wife and typically never saw her again. The girl lived in a large household with extended family and was visited by other men through the years. If she became pregnant by any of them, the man was not responsible for supporting her or the child except for paying for a midwife. The female's relatives remained responsible for supporting her. Thought to be a response to extended male absence during military service, Nayar unions seemed to fulfill the needs of this particular caste group within a historical and cultural period. Today, the Nayar men are not involved in soldiering to the extent they once were, and stable marital relationships have become the norm (Ember et al., 2006).

Across societies, many people live in long-term, common-law domestic partnerships that are not legally sanctioned. Some people have civil marriages which are licensed and legalized by a justice of the peace while others go through religious marriage ceremonies so they are united from a religious perspective but not a legal one (Kottak, 2008).

Choice of Marriage Partner

Every society has directives and ideological notions about whom one should marry ranging from arranged marriages to exogamous individual choice of partner. Sometimes these directives are informal and implicit, and other times they are formal and explicit. Marriage is one of the primary ways to establish relationships of

affinity in contrast to consanguine relationships, which are from bloodlines.

Exogamy and Endogamy

Exogamy, the practice of seeking a husband or wife outside of one's own defined social group, has adaptive value because it links people into a wider social network that can nurture, provide for, and protect during times of need (Kottak, 2008). For example, the Hindus of northern India practice village exogamy in order to ensure that spouses live in a far-away village or town. In addition, exogamy ensures genetic diversity between groups and maintains a successful human species.

In contrast, endogamy is the practice of marriage within a particular group so that the spouse comes from a specific social category. Sometimes endogamy is based on geographic location. For instance, village endogamy is favored in the eastern Mediterranean among both Christians and Muslims, and among Muslims throughout India and among Hindus in southern India. In other cultures, endogamy occurs to maintain a strong kinship network. Some religious and ethnic groups prefer endogamy in order that groups remain intact. An extreme example of endogamy is India's caste system, which, although abolished in 1949, still remains in terms of structure and ideology. Royal endogamy, usually royal brother-sister marriage in a few societies, is similar to caste endogamy whereby certain sacred, political, and economic functions can be maintained. Inca Peru, ancient Egypt, and traditional Hawaii allowed royal brother-sister marriages. Other kingdoms, including European royalty, have practiced endogamy through cousin marriage rather than brother-sister marriage (Kottak, 2008).

Hypergyny, Hypogyny, and Isogamy

Status also plays an important role in the selection of a spouse across cultures. Hypergyny, or "marrying up," indicates a marriage where the bride has a lower status than the groom. Hypergyny is commonplace in northern India especially among upper-status groups and in middle- and upper-class individuals in the United States. The opposite of hypergyny is hypogyny, or "marrying down," in which a bride has a higher status than the groom. Hypogyny is relatively rare cross-culturally. Isogamy is marriage between partners who are status equals and occurs in cultures where gender roles are viewed as holding equal value (Miller, 2008).

Arranged Marriages

Arranged marriages are marriages that are "arranged" by parents of the bride and groom based on whether they believe the families are good matches. Arranged marriages are well-known in many Middle Eastern, African, and Asian countries. The most important criteria that parents consider are the family's reputation, social status, education,

occupation and income of the spouse, and the absence of undesirable family traits like mental illness or divorce (Miller, 2008).

Cousin Marriages

An example of kin endogamy is cousin marriages, which has two forms: parallel cousins and cross-cousins. The marriage between parallel cousins is comprised of the children of either one's father's brother or one's mother's sister (linking siblings are the same gender). The marriage between cross-cousins includes children of either one's father's sister or one's mother's brother (linking siblings are of different genders). Parallel-cousin marriage is practiced by many Muslim groups in the Middle East and northern Africa, especially patrilineal parallel-cousin marriage, which is cousin marriage into the father's line (Miller, 2008). Matrilineal cross-cousin marriage (cousin marriage into the mother's line) is favored by Hindus of southern India but only includes about a fourth of the population (Ramesh, Srikumari, & Sukumar, 1989).

Levirate and Sororate

Still common as a form of second marriage, cultural norms in many societies require individuals to marry the spouse of deceased relatives so that alliances between descent groups can be maintained. Levirate is the custom of a man marrying his brother's widow. Sororate describes when a woman marries her deceased sister's husband. In some societies, this practice is permitted but not required and widows make other arrangements (Potash, 1986).

Courtship Patterns and Mate Selection

There is a plethora of research about what attracts people to potential mates. Proximity has long been linked to attraction, and physical attractiveness seems to be a key ingredient in romantic relationships especially for males. Several hypotheses have been proposed about what attracts someone to a partner for a romantic relationship. The matching hypothesis proposes that people with equal physical characteristics select each other as partners (Brehm, 1985). The similarity hypothesis proposes that people with similar demographics of age, race, religion, social class, education, intelligence, attitudes, and physical attractiveness tend to form intimate relationships (Brehm, 1985). Another approach is the reciprocity hypothesis, suggesting that people like others who are unlike them (Byrne & Murnen, 1988).

How and why individuals are attracted to each other varies significantly across cultures. Despite some of the differences, there are cross-cultural similarities with regard to mate selection. In a well-known study conducted by evolutionary psychologist David Buss (1989, 1994), more than 10,000 respondents across 37 different cultures

responded to questions about factors in choosing mates. In 36 out of 37 cultures, females, as compared with males, rated financial prospects as more important, and in 29 of the 36 cultures, they rated ambition and industriousness as more important. In all 37 cultures, females preferred older mates and males preferred younger mates. In 34 of the cultures, males rated good looks as more important than did females, and in 23 of the cultures, males rated chastity as more important than females. Buss concluded that his findings represented and supported an evolutionary framework of universal mate selection across cultures whereby females look for cues in potential male mates that signal resource acquisition and males place more value on reproductive capacity.

Others have emphasized the cultural differences in Buss's study. As compared with more advanced or modern cultures, traditional, less advanced cultures place greater value on chastity, domestic skills (e.g., housekeeping), desire for home and children, and abilities to support the home (Zebrowitz-McArthur, 1988). In China, India, Taiwan, and Iran, chastity was viewed as highly desirable in a prospective mate while in the Netherlands, Sweden, and Norway, it was considered irrelevant (Gardiner & Kosmitzki, 2002). Being a good housekeeper was highly valued in Estonia and China and of little value in Western Europe and North America. Refinement/neatness was highly valued in Nigeria and Iran and less so in Great Britain, Ireland, and Australia. Being religious was highly valued in Iran, moderately valued in India, and little valued in Western Europe and North America (Buss, 1994, p. 199).

Gender differences were also revealed in Buss's study. Women across cultures place high value on characteristics of men that relate to providing resources—good earning capacity, financial prospects, ambition, industriousness, and social status. Men across the 37 cultures place a high premium on the physical appearance of a potential mate; according to Buss (1994), this supports an evolutionary argument because men use physical attractiveness as an indicator that the woman is fertile and has good reproductive capacity.

Other similar studies have shown that men across cultures rate physical attractiveness higher than women do in terms of preferences in a marital partner (Hatfield & Sprecher, 1995). However, there seem to be more consistencies than differences in descriptions of physical attractiveness. For instance, female attractiveness cross-culturally is connoted by characteristics of kindness, understanding, intelligence, good health, emotional stability, dependability, and a pleasing disposition (Shiraev & Levy, 2007). Attractiveness is usually described in terms of cleanliness, health, and feminine plumpness. Although the degree of plumpness varies across cultures, extreme thinness seems to be considered unattractive and unhealthy (Zebrowitz-McArthur, 1988).

Other theories, such as the social construction perspective, suggest that interpersonal attraction is due to individual and cultural factors instead of evolutionary factors.

One study conducted in the United States highlights gender similarities in mate selection with both men and women rating kindness, consideration, honesty, and a sense of humor as important traits in mate selection (Goodwin, 1990). A more recent study (Pines, 2001) of American and Israeli students and their perceptions of romantic relationships combines both the evolutionary and social construction theories. Pines (2001) found that more men than women, regardless of culture, reported physical attractiveness as a major part of attraction (evolutionary theory). However, culture was important in other factors of attraction (e.g., compared with Israelis, Americans indicated status, closeness, and similarity as key determinants of attraction—social construction theory). In one study demonstrating different standards of beauty, Daibo, Murasawa, and Chou (1994) compared judgments of physical attractiveness made by Japanese and Koreans. In Japan, attractiveness ratings were positively correlated with large eyes, small mouths, and small chins. In Korea, however, attractiveness ratings were positively correlated with large eyes, small and high noses, and thin and small faces. Koreans were more likely than the Japanese to attach other judgments such as maturity and likeability to judgments of attractiveness (Daibo et al., 1994).

Patterns of courting and flirtation have similarities across many cultures (Aune & Aune, 1994), but there are many exceptions to the rules. Kissing, for example, is a widely acceptable cross-cultural phenomenon but is unknown to people in some cultures in Africa and South America, who would not consider kissing as an aspect of mate selection and reproduction (Shiraev & Levy, 2007). In Mediterranean cultures, physical affection is displayed by touching as a form of communication and is considered acceptable and appropriate, whereas in the United States it may be considered inappropriate with some groups. The expectation of marital fidelity appears to be almost universal, although among some Arctic peoples, it is customary to offer a host's wife to a guest (Shiraev & Levy, 2007). Men everywhere react more negatively, as compared with women, when their partners share sexual fantasies about having sex with others. Women everywhere are more distressed than men when their partner is kissing someone else (Rathus, Nevid, & Fischer-Rathus, 1993).

A relatively new phenomenon is Internet dating and the development of computer-mediated relationships (CMR). Since the 1990s, the Internet has become a primary venue for social encounters across the globe—offering an expanded world of mate possibilities in a shorter period at less expense (Lawson & Leck, 2006). Although some theorists have lamented the technological isolation and reduction of face-to-face interaction leading to emotional disconnection or superficial attraction that can occur with the Internet (Lawson & Leck, 2006), others have suggested that the Internet can be helpful in promoting romantic relationships because physical attributes and traditional/constraining gender and relationship roles are downplayed

while other factors related to emotional intimacy (e.g., rapport, similarity, mutual self-disclosure) are emphasized (Lawson & Leck, 2006). Whitty and Carr (2006) describe how online relating is different than romantic and sexual relationships offline. Advantages include opportunity to “grow” a relationship, safe space to flirt and experiment with relationship development, and greater freedom for people who are anxious or introverted (Whitty & Carr, 2006). The biggest benefits of Internet dating are the sheer number of potential partners and the freedom of choice among partners (Lawson & Leck, 2006). In fact, in one study examining the dynamics of Internet dating, Internet daters reported being lonely and many said they were seeking comfort after a crisis situation. The majority of the respondents liked the control over the presentation of self on the Internet and the feeling of a safe environment for getting to know someone. Finally, respondents reported that Internet dating provided freedom from commitment and stereotypic roles (Lawson & Leck, 2006).

Some of the typical dating problems still remain with Internet dating—people still tell lies, trust has to be negotiated, presentation of self must be managed, compatibility continues to be important, and appearance and shyness issues do not completely disappear when dating online. Rejection and emotional pain still can be part of Internet dating, as they are with face-to-face dating. There is also a dark side of online relationships, including Internet infidelity, Internet addiction, pedophilia, cyberharassment, cyberstalking, and misrepresentation of self (Whitty & Carr, 2006). However, many Internet daters say they are willing to take the risks associated because of the advantages offered by this technology (Lawson & Leck, 2006). Overall, successful relationships online start with people being honest and upfront in their profiles (Whitty & Carr, 2006).

Restrictions on Marriage: The Incest Taboo

One of the most basic and universal rules of exclusion to marriage is the incest taboo, or a rule prohibiting marriage or sexual intercourse between certain kinship relations. The most common form of incest taboo across societies is against marriage or sexual intercourse between fathers and their children and mothers and their children. In the majority of cultures, brother-sister marriage is prohibited, although there are exceptions. Historically, brother-sister marriage in royal families was considered the norm and even existed to some extent in the general population (Kottak, 2008). A prime example of this was brother-sister marriages of royalty in Egypt at the time of the Roman Empire (Miller, 2008). In some cultures, incest taboos include cousin marriage, although in other cultures, cousin marriage is considered a viable option in order to build localized kinship networks. In other groups, such as the Nuer of southern Sudan, the incest taboo includes all members of the patrilineage in order to create widely dispersed kin networks (Kottak, 2008; Miller, 2008).

One of the most practical explanations for the incest taboo is that it arose to ensure exogamy, which was evolutionarily advantageous in terms of increasing survival via the creation and maintenance of alliances outside the social network. Despite prevalence of the taboo, in one study across 87 societies, some occurrences of incest were identified (Meigs & Barlow, 2002). Reportedly incest was “widely practiced” among the Yanomami of Venezuela and Brazil. Among the Ashanti people, punishment for incest shifted from death to merely being fined. Among 24 Ojibwa individuals, 8 cases of parent-child incest and 10 cases of brother-sister incest were found (Kottak, 2008). In Western societies, father-daughter incest is considered a risk under certain conditions (Meigs & Barlow, 2002). Father-daughter incest is most common with stepfathers and nonbiological male household members but also occurs with biological fathers, especially those who were absent or did little caretaking of their daughters in childhood (Kottak, 2008).

The Act of Marriage

Societies have some way of marking the onset of marriage. Many societies have formal ceremonies and rituals that denote the beginning of marriage while others use symbolic or informal practices to indicate that a marriage has occurred. In the societies where a ceremony occurs, several elements emphasizing important aspects of the particular culture commonly occur as part of the ceremony. For instance, feasting and celebrations typically accompany marriage ceremonies, often with the underlying purpose of bringing the two families and friends together in unification. Shinto customs are still followed by many in Japanese wedding ceremonies with the drinking of rice wine (sake) after the ceremony to confirm the marriage (Gardiner & Kosmitzki, 2002). In some cultures, marriage ceremony customs include ritualized expressions of hostility between kin groups such as the trading of insults, which occurs on the Polynesian atoll of Pukapuka (Kottak, 2008). In Kenya, the rebuilding of a house in the bride’s village represents an important part of the marriage ceremony (Gardiner & Kosmitzki, 2002).

Love and Marriage

The role of romantic love has been debated historically and cross-culturally. Many argue that romantic love did not become part of marriage until Western Europe and America accepted the idea given the strong influence of the Enlightenment and the individualistic emphasis during the French and American Revolutions (Coontz, 2007). Romantic love is more common in cultures where women are dependent on men economically, but increasingly, marriage based on romantic love is becoming widespread in many cultures (Levine, Sato, Hashimoto, & Verma, 1995).

There is cultural variation in the extent to which love plays a role in marriage. Marriage for love is a fairly recent development in the Western world and may be related to the individualistic orientation (Coontz, 2005). In many Western cultures, marriage is viewed as the culmination of romantic love represented by the idealistic and somewhat “fairy-tale” notion that people meet their soul mates, fall in love, marry, and live “happily ever after,” proving that “love conquers all” (Gardiner & Kosmitzki, 2002). People in collectivistic cultures place less emphasis on romantic love and love commitment in marriage. Historically, people married to acquire status through influential in-laws, for political reasons, to forge family alliances, to increase labor forces, and to effect business mergers. Romantic love was not unknown but it was not considered an essential part of marriage and thus was discouraged on the basis of being a selfish and weak reason to marry. For instance, in ancient India, love before marriage was perceived as irresponsible and anti-social. During the Middle Ages, the French viewed love as a type of insanity only curable through sexual intercourse either with the beloved or with someone else (Coontz, 2007).

In contrast, many of the arranged marriages common in Asia, Africa, and other parts of the world do not have romantic love as a basis (Gardiner & Kosmitzki, 2002). This “Eastern ideal” is based on the notion that individuals have several possible mates with whom they could have a successful and enduring marriage. Arranged marriage is still practiced in some places, such as India, where arrangements may be made between families during a child’s infancy. Such arrangements are typically based on the parents’ status and knowledge of other families and possible matches; the marriage is considered the blending of two families (Ember et al., 2006; Gardiner & Kosmitzki, 2002). Arranged marriages are viewed as more than just a union between two individuals and more as an alliance between families and even communities (Gardiner & Kosmitzki, 2002). However, trends are changing even in countries where arranged marriage has been popular. For example, in Japan, love marriages are replacing the earlier practice of arranged marriages, yet traditional customs often remain as part of the ceremony.

For thousands of years, the institution of marriage served many economic, political, and social functions at the cost of minimizing the needs and wishes of individuals (Coontz, 2005). Especially in the last 200 years, marriage, particularly in Europe and America, has become more personal and private with a greater emphasis on the emotional and sexual needs of the couple. With this historical transition came free choice in mate selection as the societal norm and love as the primary reason for marriage. As Coontz (2005) notes, “Marriage has become more joyful, more loving, and more satisfying for many couples than ever before in history. At the same time it has become

optional and more brittle. These two strands of change cannot be disentangled” (p. 306). For some, this transformation of marriage and love has been appreciated as a liberating option from restrictive social and cultural expectations. For others, the shift has meant a significant loss of rules and protocol for relationships with nothing offered in its place. With such factors, the need to marry or remain unhappily married decreases.

Coontz (2005) suggests historical factors that have supported single living and personal autonomy. Factors include the belief that women have just as much sexual desire as men; less societal/governmental regulation of personal behavior and conformity; reliable birth control, which became readily available in the 1960s, relieving women from fears of unwanted pregnancy; increasing economic independence of women; and more time- and labor-saving devices, which have lessened the demand on women to do housekeeping. Examining the role of love in marriage provides a unique lens that reveals many aspects of culture, economic, interpersonal, and emotional (Padilla, Hirsch, Muñoz-Laboy, Sember, & Parker, 2007).

Economic Aspects of Marriage

Most marriages (approximately 75%) are accompanied by some type of economic transaction, and exchanges between partners of goods or services and their families and friends (Ember et al., 2006).

Bride Price

Bride price or bridewealth, common in horticultural and pastoralist cultures, is the transfer of goods or money from the groom’s family to the bride’s family. This is the most common economic transaction across cultures. Payment of the bride price can be in the form of money, livestock, or even food. Bride price still occurs globally but is most popular in Africa and Oceania. For example, the Nandi typically offer five to seven cattle, one or two sheep and goats, cowrie shells, and money equivalent to one cow as the bride price.

Brideservice is a type of bride price where labor is transferred from the groom to his parents-in-law over a designated time period. This still occurs in about 19% of societies that have an economic transaction as part of marriage. One particular example is the brideservice still practiced in the Amazon (Ember et al., 2006).

Exchange of Families

In a few societies (about 6% who have economic transactions at marriage), a sister or female relative of the groom is exchanged for the bride. This occurs, for example, among horticultural and egalitarian societies such as the Tiv of West Africa and the Yanomamö of Venezuela and Brazil (Ember et al., 2006).

Gift Exchange

Gift exchange between the two kin groups linked by marriage occurs in some 11% of societies that have economic transactions at marriage. In the United States, it is customary that the groom’s family is responsible for paying for the rehearsal dinner the night before the wedding whereas the bride’s family is expected to pay the costs for everything else (Miller, 2008). Among the Andaman Islanders, kin groups become united through the parents exchanging gifts via a third party once a boy and girl have voiced their intention to marry (Ember et al., 2006).

Dowry

A dowry is the transfer of goods (sometimes money) from the bride’s side to the new married couple for their use. Occurring in about 8% of societies with economic transactions at marriage, the dowry normally includes household goods such as furniture, cooking utensils, and perhaps even a house. Dowries are still practiced in parts of Eastern Europe, southern Italy, France, and India (Ember et al., 2006).

In parts of India, the dowry passes to the groom’s family making the more accurate term groom price (Miller, 2008). Sometimes, an indirect dowry is provided from the groom’s family by giving goods to the bride’s father who then passes them along to her. Among the Basseri of southern Iran, the groom’s father gives cash to the bride’s father in order to set up the couple’s new household (Ember et al., 2006).

Sexuality and Marriage

In many cultures, marriage sanctions sexual relations between partners. In others, sexuality is confined to procreative purposes. Depending on the society, there are different views about procreation. In some societies, it is believed that spirits place babies in women’s wombs. Some cultural groups believe that a fetus must be nourished by continual insemination during pregnancy. The Barí of Venezuela believe that multiple men can create the same fetus (multiple paternity). When the baby is born, the mother names the men she recognizes as fathers and they assist her in raising the child (Kottak, 2008).

Sexual practices differ as well depending on the society. Some societies are more restrictive concerning sexuality. The regulation of premarital sex and extramarital sex differs depending on the society. For example, Inis Beag, off the coast of Northern Ireland, is a sexually conservative and prohibiting culture. Nudity is prohibited, sexual ignorance is widespread, female orgasm is unknown, marital sex occurs infrequently, and the idea of sexual pleasure is nonexistent (Messenger, 1993). In other societies, such as the Melanesian Islands in the South Sea, marital sex is

perceived as a normal and natural form of pleasure; however, premarital and extramarital sex are almost equal to the crime of murder (Davenport, 1965). Reportedly, in the Melanesian Islands, marital intercourse including orgasm is expected to occur two to three times per day in the early years of marriage, and later to subside to once a day or less. Premarital masturbation is encouraged for both males and females. The Trobriand Islanders approve of and even encourage premarital sex and provide thorough instruction in various forms of sexual expression for adolescents, believing that it is important preparation for later marital activities. The Ila-speaking population of central Africa encourage trial marriage between adolescents so that girls can “play wife” with boys of interest before marriage. Reportedly, virginity in this group does not occur after age 10 (Ember et al., 2006). Other cultural groups, such as many Muslim societies, “test” the female’s virginity by displaying blood-stained sheets from the wedding night as proof of her premarital chastity.

Extramarital sex is fairly common across societies, with about 69% of men and 57% of women engaging in extramarital sex more than occasionally. Most societies have a double standard with regard to women’s sexual behavior and expect that women will have more restrictions against extramarital sex.

One commonality of sex occurring during marriage is privacy in almost all societies. North Americans typically find privacy in their bedrooms while others have to locate other private areas or sometimes perform coitus with others present. Nighttime is generally the preferred time for coitus in most cultures although there are examples of preferences for daytime sex (e.g., the Rucuyen of Brazil). There are other prohibitions in some cultures restricting sexual activity, for example, before certain activities like hunting or planting or because of certain events like death, pregnancy, or menstruation (Ember et al., 2006).

The acceptance of homosexual relations differs widely across societies. Some more restrictive societies deny homosexuality and thus forbid homosexual practices. Historically in other groups, like the Siwans of North Africa, there are examples of much greater permissiveness regarding homosexuality, and all males were expected to engage in homosexual relations. The Etoro of New Guinea are reported to have preferred homosexuality to heterosexuality with specific prohibitions against heterosexuality most of the days during a year. Furthermore, male homosexuality was thought to make crops flourish and strengthen males (Ember et al., 2006).

Forms of Marriage

Typically, marriage has been between a male and a female, but some societies have recognized marriage between people of the same biological sex. In the anthropological literature, alternative forms of marriage have also been noted.

Monogamy

Monogamy is the marriage between two people (opposite gender if heterosexual and same gender if homosexual). Heterosexual monogamy is the most frequent form of marriage across cultures and constitutes the only legal form of marriage in many countries (Miller, 2008). Serial monogamy appears to be a common form of monogamy in North America, where people may have more than one spouse in their lifetimes but never legally at the same time (Kottak, 2008).

Same-Sex Marriages

Some societies recognize various kinds of same-sex marriages (Kottak, 2008). Same-sex marriages are legal in Denmark; Norway; Holland; South Africa; Ontario, Canada; and Massachusetts, in the United States. There is much debate politically and socially regarding the legal status of same-sex marriages (Miller, 2008).

Depending on the historical and cultural setting, same-sex marriages have been accepted. In some African cultures, for instance, women may marry other women in order to strengthen their social and economic status among society (Kottak, 2008). Among the Nandi of Kenya, approximately 3% of marriages are female-female marriages. The Nuer of southern Sudan are also reported to have woman-woman marriage. In this type of marriage, a woman with economic means gives gifts to obtain a “wife” and brings her into the residential compound just as a man would do if he married a woman. The wife in a Nuer woman-woman marriage performs productive labor by having sexual relations with a man, as the two women do not have a sexual relationship with each other. Her children, however, will belong to the two women who are married (Miller, 2008). In former times, the Cheyenne Indians allowed married men to take *berdaches* (two-spirits/male transvestites) as second wives (Ember et al., 2006).

Plural Marriages/Polygamy

Polygamy is marriage that involves multiple spouses, which is still permitted in many cultures (Miller, 2008). The most common form of plural marriage is polygyny, which is the marriage of one man with more than one woman. Polygyny in many societies serves as an indicator of a man’s wealth and prestige—in other words, the more wives he has, the greater status he accrues. In other societies, polygyny is practiced because a man has inherited a widow from his brother (levirate). In still others, polygyny is a way to advance politically and economically. For polygyny to work, there has to be some agreement among the wives about their status and household chores. Generally, there is a first wife or a senior wife who is in charge of the household and has some say-so regarding who is taken as another wife. For instance, among the Betsileo of Madagascar, each

wife lived in a different village, but the senior, first wife, called “Big Wife”, lived in the primary village of her husband where he spent most of his time (Kottak, 2008). Other customs like having separate living quarters for cowives who are not sisters helps lessen jealousy among the cowives. The Tanala of Madagascar require the husband to spend one day with each cowife in succession and assist with cultivation of that wife’s land. If this rule is not followed, a wife can sue for divorce and alimony up to a third of the husband’s property. Such a practice gives cowives greater equality in matters of sex, possessions, and economics (Ember et al., 2006).

Marriage between one woman and more than one man (polyandry) is extremely rare, although it is still practiced in Tibet and parts of the surrounding Himalayan region. In Tibet, fraternal polyandry (brothers jointly marrying a wife) is still practiced. Fraternal polyandry is one of the least common forms of marriage globally, but in Tibet, it remains a viable and ideal form of marriage and family. Practically, the eldest brother is normally the dominant authority. The wife is expected to treat all brothers equally, and the sexual aspect of sharing spouses is not viewed as repulsive by males or females. Any offspring are treated similarly, and the children consider all the brothers their fathers. The typical explanation given for this type of marriage in Tibet is that it is a materialistic and economically advantageous one. The brothers do not have to divide their property and can therefore have a higher standard of living. Due to changes in social and economic conditions, polyandry may vanish within the next generation (Kottak, 2008).

Other Forms of Marriage

In the Brazilian community of Arembepe, people can choose among various forms of sexual union including common-law partnerships (not legally sanctioned), civil marriages, and “holy matrimony” (religious ceremony but not legally sanctioned). This means that some can have multiple spouses at the same time from the different types of unions (Kottak, 2008).

Also common among the Nuer was what Evans-Pritchard (1951) called the ghost marriage. The Nuer believed that a man who died without male heirs in his family was likely to trouble his living kin through an unhappy and angry spirit left behind. To appease the angry spirit, a relative of the dead man would often marry a woman “to his name” so that the woman was married to the ghost but lived with one of his surviving kinsmen.

Universality of Marriage

The custom of female-male marriage practiced across societies appears to have adaptive functions that solve problems in societies. For instance, marriage has been proposed as an answer to gender division of labor that

exists in every society. If societies designate different economic activities for men and women, there needs to be a mechanism by which the products of labor can be shared between men and women, and marriage is one possible solution.

Another interpretation of why marriage is universal is based on the extended care required for human infants. It has been suggested that infants have a prolonged dependency on the mother (typically the main caregiver in most cultures); this limits the kind of work she can do (hunting, for example). Therefore one solution is that the man must be available to help the woman with certain tasks, thus the mechanism of marriage (Ember et al., 2006).

A third interpretation of why marriage is universal is sexual competition between males for females. Marriage offers one possibility for reducing male rivalry and destructive conflict so that societies can survive (Ember, et al., 2006).

Divorce

Many believe that divorce occurs more frequently in the modern United States as compared with other societies. However, anthropologists have reported comparable rates of separation and remarriage among hunting and gathering societies and other groups to those in modern-day industrial societies. For example, the highest rates of divorce ever recorded in the first half of the 20th century were in Malaysia and Indonesia, which surpassed the U.S. record rates of 1981 (Coontz, 2007). Depending on the society, ease of divorce varies. Marriage is much easier to dissolve in societies where marriage is more of an individual affair. In other societies where marriage represents a political and social union between families and communities, divorce is more difficult (Kottak, 2008). Considerable bridewealth and replacement marriages (levirate and sororate) work to preserve group alliances and thus decrease divorce rates. A wife among the Shoshone Indians could divorce her husband by merely placing her husband’s possessions outside the dwelling, which was considered her property. Divorce is official among the Cewa of East Africa when the husband leaves his wife’s village taking along his hoe, axe, and sleeping mat (Coontz, 2007). In the traditional society of Japan, a woman wanting a divorce had to complete two years of service at a special temple while the man could simply write a letter containing three and half lines in order to divorce his wife.

Coontz (2007) posits that the reasons for divorce in any given time period relate to the reasons for marriage. For example, a common reason for divorce in contemporary society is the loss of love, lack of individual fulfillment, or absence of mutual benefit. This has to do with the primary reason for marriage being love and romance.

In Western societies, there is more flexibility with the notion of a failed marriage. Generally, if romance, love, sex, or companionship dies out in a marriage, then couples

in contemporary Western society may opt for divorce. However, sometimes for economic reasons, obligations to children, negative public opinion, or simply inertia, couples may maintain “failed” marriages. Among countries across the globe, the United States has one of the highest rates of divorce, although rates have dropped as compared with the 1970s. From historical records of divorce in the United States, there is an increase after wars and a decrease after tough economic times. The high rates of U.S. divorce are thought to be related to the economic independence enjoyed by many women and the cultural ideas of independence and self-actualization which give greater permission for people to abandon marriage if it is not working for them (Kottak, 2008).

The Family

A family is a group of people who consider themselves related through kinship, while a household is defined as people who share a living space and may or may not be related (Miller, 2008). Most households consist of members who are related through kinship, although an increasing number do not. For instance, a group of friends sharing living quarters or a single person living alone constitute a household. Young adults in the United States usually live away from home when they go to college. In more complex societies, family members tend to live apart from one another, while in more simple societies, the family and the household are impossible to differentiate (Ember et al., 2006). Across most societies, a primary function of families is the socialization and protection of children so that the children can obtain the cultural behavior, beliefs, and values necessary for survival. The nature of the family inevitably shifts and reflects the social and cultural changes in economics, education, and political systems (Georgas, Berry, van de Vijver, Kagitçibasi, & Poortinga, 2006).

Family Structure and Types of Households

All societies have families, although family form and households vary from society to society. The nuclear household, still commonly referred to as the nuclear family, comprises one adult couple, either married or “partners,” with or without children. Most people belong to at least two different nuclear families during their lifetime. Anthropologists distinguish between the family of orientation, the family in which one is born and grows up, and the family of procreation, the family formed when one marries and has children of his or her own. Nuclear-family organization is widespread cross-culturally and varies in significance from culture to culture, but it is not universal. For instance, in the classic Nayar group, the nuclear family is rare or nonexistent (Kottak, 2008). In contrast, in North America, the nuclear family is the only well-defined kin

group and remains somewhat of a cultural ideal (Ember et al., 2006). Such a family structure is thought to arise from industrialism and contributes to geographic mobility and isolation from extended family members. Many North American married couples live far away from their parents in locations generally determined by their jobs in communities (neolocality) and establish households and nuclear families of their own (Ember et al., 2006).

An extended household is a domestic group containing more than one adult married couple related either through the father-son (patrilineal extended household) or mother-daughter line (matrilineal extended household) or through sisters and brothers (collateral extended household). Extended families are the prevailing form in more than half of the world’s societies (Ember et al., 2006). For example, in former Yugoslavia, extended-family households, called *zadruga*, consisted of several nuclear families living together. The *zadruga* was headed by a male household head and his wife, considered to be the senior woman. Also included were married sons and their wives and children, and unmarried sons and daughters. Each nuclear family had their own sleeping quarters; however, many items were freely shared among members in the *zadruga* (e.g., clothes, items from the bride’s trousseau, and other possessions). The Nayar, a caste of southern India, provide another example of extended households. The Nayar lived in matrilineal extended-family compounds called *tarawads* (residential complexes with several buildings headed by a senior woman and her brother). The *tarawads* were home to the woman’s siblings, her sisters’ children, and other relatives of matrilineal descent. These compounds were responsible for child care and provided the home for retired Nayar men who were military warriors (Ember et al., 2006).

Expanded-family households (those that include non-nuclear relatives) also exist in some cultures. For example, in lower-class families of North America, expanded-family households are more common than in middle-class families. If an expanded-family household consists of three or more generations, then it is considered an extended-family household. Collateral households, another type of expanded family, include siblings and their spouses and children (Ember et al., 2006). Polygamous married people are considered to constitute complex households in which one spouse lives with or near multiple partners and their children. Descent groups including lineages and clans of people claiming common ancestry may reside in several villages, but rarely come together for social activities. These descent groups are common in nonindustrial food-producing societies (Kottak, 2008).

Changes in Marriage and the Family

Globalization, including technological advances and international migration, has increased the opportunity for

interactions among different types of people and contributed to rapid changes in the structure and function of marriage and the family. The institution of marriage continues to retain popularity although many of the details of marriage are undergoing transformation. For instance, the Internet has provided new forms of finding a potential partner and courtship. Also, the age of first marriage is rising in most places due in part to increased emphasis on completing education and higher marital aspirations (e.g., owning a house). Marriages between people of different nations and ethnicities are another example, now increasingly commonplace and leading to pluralistic practices and customs of marriage and family. Coontz (2007) claims that marriage “has been displaced from its pivotal position in personal and social life” (p. 15) with many children being raised in alternative settings. The definition of marriage has also changed, given that most people today live in a global climate of choice with many options. This makes divorce and other relationship forms like cohabitation viable options for many people across the world.

In many societies, people choose to have children without being married, or being a single parent becomes a necessity, and thus one-parent families are becoming more common globally. Traditionally, single-parent families have been more common in Western societies, but there continues to be a large increase in one-parent families with the majority headed by women (approximately 90%). In the 1970s, of the Western countries, Sweden had the highest rates of single-parent families, but now the United States has the largest percentage. One-parent families occur for several reasons, including divorce/separation of two-parent families, births outside of marriage, deaths of spouses, and single people who decide to have children. Some parents may choose to remain single because of lack of suitable partners. For example, in the former Soviet Union, the ratio of women to men is much higher because males are more likely to have died from war, alcoholism, and accidents. In other countries, a common explanation is that one-parent families are able to manage because of support from the state; for example, in Sweden, unmarried and divorced mothers receive significant social supports, maternity leave, and educational leave (Ember et al., 2006).

Another family form that is making a comeback, at least in the United States, is the multigenerational family (three or more generations living together). According to the 2000 Census, there are almost 4 million U.S. multigenerational households; this represents about 4% of all households, and this number continues to rise. The majority of these households include grandparents living with their children and their grandchildren in the house of the grandparent. In about one third of these households, the grandparents live in the home of their children (or son- or daughter-in-law) and their grandchildren. A very small percentage of these households are comprised of grandparents and great-grandparents as well as children and grandchildren of the grandparents (Generations United, 2006).

Some of the reasons for the rise in multigenerational households include financial factors such as high housing costs, high cost of living, child care/elder care expenses, unemployment, parents returning to school, and parents working to save money to become independent. Cultural reasons such as immigration, value systems, importance of ritual and celebration of holidays and events, and desire to stay connected with one’s cultural group all are reported reasons for multigenerational households. Other reasons include individual beliefs that child care and elder care are family responsibilities or that age-integration within communities is important, and a desire to be involved and connected with offspring and elders. Situational factors such as the inability to live alone after being widowed, a divorce that requires moving to a parent’s home with children, an illness requiring regular care and assistance, single parenting, housing shortages, and extended life span also promote multigenerational households (Generations United, 2006). In the future, multigenerational families are expected to become more commonplace and continue to increase. By 2010 in the United States, it is expected that more children will know their great-grandparents, people in their 60s will be caring for 80- to 90-year-old parents, more children will grow up with the support of older relatives, and there will be an increase in four-generational households (Generations United, 2006).

Grandparenting in general is a relatively new phenomenon as of the last 100 years, due to increased life expectancy and good health. The number of grandparents parenting grandchildren has increased generally due to crisis situations involving drugs, divorce, desertion, and death (Glass & Huneycutt, 2002). Other factors contributing to the increase of grandparents raising their grandchildren include high teenage-pregnancy rates, more parents in prison (with some 80% having dependent children), more women using drugs, and parents dying from AIDS. All of these scenarios that lead to the number of grandparents raising their grandchildren are thought to be on the rise.

Increasing numbers of lesbian women and gay males are exploring parenting options (McCann & Delmonte, 2005) and taking on parenthood through donor insemination, surrogacy, fostering, and adoption. Although there appears to be no definitive research pointing one way or another, gay parenting has been a contentious issue for many because of the presumed damaging effects that gay parents can have on their children. Concerns have been raised regarding whether the child will become homosexual, whether the child will be bullied, whether the child will have appropriate opposite-sex role models, and more (McCann & Delmonte, 2005).

Another complexity for family structure is the challenge presented by international migration. Parents may still identify with their ancestral culture and children often become immersed in the new culture, quickly adapting to the language and customs. This can cause rifts in the relationship between parents and children and can contribute to

disagreements about social issues like dating, clothing, and careers. Sometimes children also serve as cultural brokers for their parents, navigating complex and unfamiliar bureaucratic systems since their parents may not speak the language or be acculturated to the new country and customs. Immigrant children typically adapt to the dominant culture faster than their parents, which also contributes to conflict between parent and child—parents trying to hold on to previous traditions, while children are adapting to the new, dominant culture as their new way of life. Immigrant children frequently become masters of both cultures, easily adapting between both worlds (Suárez-Orozco & Suárez-Orozco, 2001). Immigrant parents are often conflicted between encouraging their children to develop the cultural competencies of the dominant culture and trying to maintain their own traditions (Suárez-Orozco & Suárez-Orozco, 2001). In addition, resettlement issues such as obtaining housing, food, and employment, and dealing with the bureaucracy of immigration and documentation, can overwhelm parents' ability to attend to their children. Immigrant families may also experience stress due to adaptation to the United States, including such tasks as learning and/or enhancing English skills and finding employment, housing, and schools; these are difficult tasks for anyone, but especially for immigrants as they also deal with new and different social/cultural expectations and attitudes.

International adoption (sometimes referred to as transnational adoption) is becoming more common in the United States and European countries. Although still on a relatively small scale, international adoption represents a significant shift from historical adoption practices and constitutes an entirely different family structure (Conn, 2009). More than 20,000 internationally adopted children enter the United States each year (U.S. Department of State, 2005) from China, Russia, and Guatemala.

Conclusion

Marriage and family are universal forms of mating and relating; however, the forms of marriage and family are variable depending on social, cultural, and historical influences (Ferguson, 2007). Family arrangements are more diverse now than ever before, and relationships have shifted from having a biological emphasis to a social emphasis. In the future, there is likely to be increased diversity and transformation in the institution of marriage, along with family forms and households, across the globe (Miller, 2008).

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KINSHIP SYSTEMS

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Humans in every culture structure a set of social relations that classify its members within the framework of a family. The notion of what constitutes a family can be fairly extensive in some groups, and more narrowly defined in other groups. For example, the concept of family is restricted to a smaller number of people in American culture than in Egyptian culture. When asked, students in the United States typically write down the names of 80 to 120 relatives when asked to name all the members of their family, while Egyptian students can usually write down over twice that number. Likewise, categories of classification—kinship terms, such as *father* or *mother*—can be extensive and incorporate a number of different social relationships, as for example, when the term *father* in some kinship systems, refers simultaneously to one's biological father, one's father's brothers, and one's mother's brothers. Or kinship terms can be more narrowly defined, as in our own system where *father* refers only to one particular social relationship.

Kinship terms are also relative categories that classify according to one's position in the overall system of relations. Consequently, while a certain female might be classified as daughter by her mother, she may also be differently classified as mother by her son. These variant classifications are simultaneous, so that every person can potentially be every possible category at the same time, the only limitation being that some categories are specific to one's sex. Additionally, kinship classification is reciprocal. For example, a person

who classifies another as sister will be referred to by that person as "sister" or as "brother" depending on their sex. A person who classifies another as son will be referred to as either "mother" or as "father."

Kinship systems are structured by a variety of marriage practices but can also make allowances for the dissolution of structures through divorce. Kinship relations continue to persist even after the death of members of a society. Additionally, systems of bridewealth, brideservice, and dowry are an integral part of kinship systems, as are post-marital residence patterns. Most kinship systems are also malleable enough to allow the creations of "fictive" relations, that is, to allow for the incorporation of nonfamily members into the family.

Anthropologists are interested in studying kinship systems because such systems are found in every culture, and because a society's kinship system articulates in some way all other aspects of the culture, such as politics, religion, worldview, marriage practices, economic behaviors, and so on. Due to the pervasiveness and surprisingly small range of variability in kinship systems across cultures, and because kinship systems are easily accessible for study in most cultures, such studies seem to offer, perhaps more so than some other areas of study in anthropology, an opportunity to say something universal about humanity. Consequently, many studies in anthropology have devoted a lot of effort to understanding kinship systems.

This chapter offers an overview of the history and different approaches to the study of kinship; a discussion of the application of kinship studies in ethnography; a discussion and overview of what is known in anthropology about kinship systems, family, marriage, and related topics; and some speculation on the future of kinship studies in anthropology.

Development of Theory in Kinship Studies

In the mid-19th and early 20th centuries, scientific inquiry in a number of disciplines became focused on the natural history of humanity. In order to understand how kinship studies emerged in an intellectual context in anthropology, it is necessary to briefly review a few works from that time. During this time, biology, history, and the then emerging disciplines of psychology, sociology, and anthropology all attempted to address various “origin” questions related to humans. Charles Darwin’s *The Descent of Man*, first published in 1871, provided breaking ground for answering questions about human biological origins. Around the same time, the historian Fustel De Coulanges, in *The Ancient City* (1873), explored the origin of Greek and Roman cities and civilization. Sigmund Freud then, in 1913, attempted to explain the psychological origin of incest taboos in *Totem and Taboo*. In *The Elementary Forms of the Religious Life* (1915), the sociologist Émile Durkheim sought to explain how humans came to classify the world, prefaced by his work with Marcel Mauss in *Primitive Classification* (1903/1963). In anthropology, Lewis Henry Morgan wrote two books, *Ancient Society* (1877/1912) and *Systems of Consanguinity and Affinity of the Human Family* (1870/1997), in an effort to explain the origin and development of culture. Throughout all of these works, concepts such as family, race, descent, incest, lineage, clan, tribe, marriage, agnation, and others frequently occur, all of which are in the domain of kinship studies.

Biology, history, psychology, sociology, and anthropology all recognized that human kin relations were connected in significant ways to other social phenomena. Darwin (1871/1952) found it necessary to discuss polygamy as one manifestation of human sexual selection (p. 369); Fustel de Coulanges (1873) had to elaborate on the family system of the ancient Romans and Greeks in order to explain the organization of ancient cities (pp. 40–116); Freud (1946) could only understand incest taboos within the framework of kin relations (pp. 3–25); Durkheim (1915) believed the elaborate kinship structures of “primitive” people gave rise to the earliest religions; and Morgan (1870/1997) saw the study of kinship as a way to illuminate the evolution of culture from the primitive to the civilized (p. xxii).

Morgan and Durkheim

A few particular works of Morgan and Durkheim have had a significant impact on the study of kinship systems in anthropology and will be briefly reviewed here.

In *Ancient Society*, Morgan (1877/1912) described the complexity of the kinship system of an Australian group called the Kamilaroi. The Kamilaroi have a totemic kinship system. The society is organized into two clans that are in turn subdivided into three lineages each. Each lineage has its own totem, an animal that symbolically represents the group. The purpose of describing the complex kinship system of the Kamilaroi was to establish a description and overview of the evolution of culture.

In *Systems of Consanguinity and Affinity of the Human Family*, which, more than any other single work, established the foundation for kinship studies in anthropology, Morgan (1870/1997) systematically collected and organized a large volume of data from many different culture/language groups. These data were arranged in tables that display the names given to one’s various kin relations in all the different groups. In Table I of *Systems*, Morgan compared 196 different kin relations among 39 different languages/cultures—an impressive display of scholarship for the time. For example, the following is a portion of the list in Table I for Arabic, slightly rearranged and shortened and using a different system of transliteration for Arabic than that used by Morgan (pp. 77–127):

My great grandfather: *jidd abii*
 My great grandmother: *sitt abii*
 My grandfather: *jiddii*
 My grandmother: *sittii*
 My father: *abii*
 My father’s brother: *‘ammii*
 My father’s brother’s son: *ibn ‘ammii*
 My father’s brother’s daughter: *bint ‘ammii*
 My father’s sister: *‘ammtii*
 My father’s sister’s son: *ibn ‘ammtii*
 My father’s sister’s daughter: *bint ‘ammtii*
 My mother: *ummii*
 My mother’s sister: *khaltii*
 My mother’s sister’s daughter: *bint khaltii*
 My mother’s sister’s son: *ibn khaltii*
 My mother’s brother: *khalii*
 My mother’s brother’s daughter: *bint khalii*
 My mother’s brother’s son: *ibn khalii*
 My son: *ibnii*
 My daughter: *bintii*
 My grandson: *ibn ibnii/ibn bintii*

In the above data, there are immediately discernible patterns. For example, *ibnii* means “my son,” and *khalii* means “my mother’s brother,” and *ibn khalii* means “son of my mother’s brother.” (The suffix, -ii, is the first person possessive pronoun and means “my:”) Likewise, *bint khalii* means “daughter of my mother’s brother.” Morgan called kinship-terminology systems that narrowly describe kin relations, like this one, “descriptive” (p. 50). He believed that descriptive systems contrasted with another group of systems that he labeled “classificatory” (p. 143).

Classificatory kinship terminology, for Morgan, comprises a system that does not repeat core terms, such as

daughter or *son*, for the categorization of more distant kin, and because of this, classifies multiple relationships under one category. For example, the kinship terminology used by most North American English speakers has the categories aunt, uncle, and cousins to indicate the collateral relationships on both the father's and mother's side of the nuclear family.

As it turns out, Morgan's distinction between descriptive and classificatory does not stand close scrutiny. All kinship systems are classificatory. The term *aunt* classifies under one category, four relationships, two of which are consanguineal (i.e., blood relationships), and two of which are affinal (i.e., created by marriage): father's sister, mother's sister, father's brother's wife, and mother's brother's wife, respectively. Likewise in Arabic, the term *bint 'ammii*, my father's brother's daughter, can refer to all the daughters of all of my father's brothers, and in so doing classifies more than just one relationship.

Systems generated a vigorous intellectual reaction, raising an important question for anthropologists. Was kinship terminology a psychological or a social phenomenon? This is an important question. A. L. Kroeber, in a 1909 article titled "Classificatory Systems of Relationship," argued that kinship terminology is a linguistic phenomenon, hence psychological in nature, and not useful for the study of other social concerns. On the other hand, W. H. R. Rivers, in *Kinship and Social Organization*, published in 1914, argued that the study of kinship contributed significantly to understanding other social relations. Determining whether or not kinship terminology is merely linguistic classification, or whether it is causally linked to other social behaviors—such as marriage, descent, residence patterns, and so on—became, and remains, an important issue for anthropologists. It is clear that all these aspects of kinship are connected somehow, but to what degree one affects the other, and exactly how they influence each other, is not totally resolved.

Émile Durkheim and Marcel Mauss, in an essay first published in 1903, called *Primitive Classification*, argued that social classification is the basis for all primitive classification. Because humans form groups, the social structure of the group becomes the template for other classification by the group. Durkheim and Mauss argued this from the ethnographic literature of the time about how primitive people classify the world. The primitive people they analyzed in *Primitive Classification* were native Australians, Zuni, Sioux, and Chinese. Durkheim and Mauss claimed that primitive classification was quite different than most modern and scientific forms of classification in that the categories of primitive classification are inclusive, not exclusive. By this, Durkheim and Mauss meant that primitive people classified according to categories that lumped things together, rather than according to categories that distinguished things. Specifically, they referred to totemic systems in which, for the primitive person, "There is a total lack of distinction between him

and his exterior soul or totem" (1903/1963, p. 6). Myth and much of the religious thought that still existed in modern societies was seen by Durkheim and Mauss as survival of an earlier way of thinking, and modern scientific thought was an evolution away from it. In essence, according to Durkheim and Mauss, primitive people had a different way of knowing and thinking about the world that originated in the structure of kin relations in human groups. Of course, later scholars, such as Claude Lévi-Strauss (1963, 1949/1969), would challenge the notion that primitive thought was significantly different than modern thought, but the basic observation is significant: Kinship systems provide the model on which the world can be classified for some human groups.

In *Elementary Forms of the Religious Life*, published in 1940, Durkheim extended the ideas put forth in *Primitive Classification* by arguing that primitive religion is the ultimate product of primitive classification. He argues that totemic clans abstract symbols of their totems and place those symbols on objects, which become the focus of various rites; these rites in turn make those objects sacred. Beliefs, which are explanations of the rites directed at sacred objects, make the system understandable. Consequently, religion is society worshipping an abstraction of its own social order.

Lévi-Strauss

In the mid-20th century, the work of Claude Lévi-Strauss brought a new perspective to the understanding of kinship systems. Applying structural theory to kinship studies, he examined the nature of the relationships between different kinship categories in an effort to explain, for example, why many societies had different kinship classification systems, and why different descent systems had the same avunculocal postmarital residence pattern. In the avunculocal postmarital residence pattern, a man and his wife go to live with his mother's brother. His analysis of the avunculate focused on the relationship between the individuals directly involved in the practice: a man, his mother, his father, and his mother's brother. He referred to such a group as the "atom of kinship" and suggested it as the starting point for analyzing kinship structures (1963, p. 72). In structural analysis, focus is shifted away from the categories and is placed on the relationship among the categories. This approach is borrowed from modern structural linguistics.

Lévi-Strauss, in *The Elementary Structures of Kinship* (1949/1969), assumed that kinship classification, at least in some societies, is connected to marriage practices, and by doing some comparative analysis, he offered an answer to the question about the relationship between kinship systems and other social behaviors. He began by discussing incest and its origins. To him, incest prohibitions are manifestations of the transition from blood-relatedness (nature) to social alliances (culture) (p. 30). As a consequence, he suggested that the incest prohibition itself, by virtue of

limiting what is possible in marriage relations, brings about the organization of social relations. He further argued that this organization takes the form of exogamous marriage practices that are, in reality, reciprocal systems of marriage exchange (p. 51). He concluded that “the rules of kinship and marriage are not made necessary by the social state. They are the social state itself” (p. 490).

So, for Lévi-Strauss, kinship and marriage are the fabric of human society, consisting of social relations woven together by the warp and woof of marriage possibilities and marriage prohibitions.

The Elementary Structures of Kinship, as the title suggests, was only concerned with societies where there were preferred marriage patterns, such as preferences for matrilineal or patrilineal cross-cousin marriage. The work explicitly did not deal with complex structures of kinship, where the determination of eligible marriage partners is a result of other social processes, and not a result of the kinship classification itself.

Of course, Lévi-Strauss was careful to point out later, in *Structural Anthropology* (1963), that correspondences between behaviors, such as marriage patterns, and linguistic categories, such as kinship classification systems, will always be difficult to determine, especially in complex societies, unless another approach is adopted. That is because the relationship between language and culture is mediated by the human mind, which structures both language and culture (p. 71). He saw the study of language, on the one hand, and behavior, or culture, on the other hand, as two separate levels of analysis. Hence these were not directly comparable, but the fact that the human mind, and the way in which it works, underlies both language and culture suggests that by understanding the processes of the human mind, the relationships between language and culture can be better understood.

Recent Thought

There are currently many challenges to developing a more comprehensive approach to the understanding of human kinship systems. One recent book, *Relative Values: Reconfiguring Kinship Studies* (2001), edited by Sarah Franklin and Susan McKinnon, surveys many of those challenges. *Relative Values* “attempts to shift the terms of anthropological debate about kinship onto more contingent and productive terrain” (Franklin & McKinnon, 2001, p. 7). With this, the editors meant that it is necessary to remove kinship studies from the framework imposed by biology, that is, to focus more on gender, as opposed to sex. It is clear that the assumptions underlying much traditional work in kinship studies have implicitly unified sex and gender identity and have treated the two as one, when it is clear that the two are distinct. That being the case, traditional theories and approaches have failed to account for the emergence of new family forms, new conceptions of

certain social relations, and the new dimensions that reproductive technologies have brought into being.

Feminist anthropologists and gay and lesbian anthropologists have brought a new perspective to kinship studies that appreciates the malleable nature of kinship systems and the contexts within which they are articulated. Same-sex unions/marriages, single-parent families, cross-cultural/cross-ethnic adoptions, and surrogate parenting have all brought about reformulations of what it means to be “family.” Certainly, kinship systems have always been malleable, and have always been undergoing some degree of change in all times and places, but anthropologists have tended to use the ethnographic present when describing the kinship systems of the groups they study; until relatively recently, this has framed almost all kinship studies in the eternal present, making it appear as if they never change.

More contemporary studies in anthropology must also take into account the systems within which kinship systems and related behaviors are articulated. Conceptions of family, ethnicity, descent, marriage, and so on, exist within contexts of political power and technological ability. “Family values” are a familiar topic in American political discourse, and political power is brought to bear on determining the definition of exactly what constitutes a family. For example, consider current attempts to legally define marriage as being only between one man and one woman. Likewise, the technological ability to physically alter one’s body from male to female, or from female to male, has created social and legal conundrums in traditional thought and law. Power and technology have significantly impacted the nature of kinship systems and how they are now playing out in societies. In a truly holistic approach to the study of kinship systems, cultural context and power cannot be ignored.

Application of Kinship Theory

Kinship theory has found successful application in the ethnographic literature of anthropology. One characteristic of every well-written ethnography is a detailed description of a group’s kinship system and how that kinship system articulates into other aspects of that group’s culture. Kinship classification, descent system, and marriage practices have provided a focus for most of the classic ethnographic works in anthropology. In fact, most ethnographies reveal that kinship is intimately connected to all other aspects of a culture.

C. W. M. Hart and Arnold Pilling did ethnographic fieldwork among the Tiwi in Australia, 1928 to 1929, and 1953 to 1954, respectively (1979, p. vii). In their book *The Tiwi of North Australia*, the entire first chapter is devoted to discussing household organization, marriage, naming rules, levirate, sororate, and cross-cousin marriage—all of which provide the framework for discussing everything else in

Tiwi society in the remainder of the book. So important was kinship to the Tiwi that they had great difficulty interacting with people not related to them. To illustrate, Hart relates how he came to be accepted as a relative of the tribe. An old Tiwi woman kept harassing him for tobacco. He frequently told her to “Go to hell,” but she persisted in her efforts and, on one particular occasion, said, “Oh, my son . . . please give me tobacco,” to which Hart replied, “Oh, my mother, go jump in the ocean” (Hart & Pilling, 1979, p. 124). This exchange resulted in Hart being known as this woman’s son. The downside of being “adopted” into the Tiwi kinship system was that sometime later, Hart and all the woman’s other sons were asked to give their consent to “cover up” the woman who was getting too ill to take care of herself. This meant taking her out and burying her with only her head left above ground and thus causing her to die in the course of a few days. Hart gave his permission, and the woman was covered up, but he did not participate in the actual burying (pp. 125–126). The pervasiveness, social significance, responsibilities, and consequences of being a member of a kinship system are illustrated well in this ethnographic example.

Richard B. Lee had an experience similar in many respects to Hart’s on a different continent, Africa, and some three decades later, in the 1960s. Lee was “named” by the wife of a headman’s son. She referred to him as /Tontah (the / is a dental click), which was the name of her deceased uncle. The naming stuck and defined Lee’s relationship to the group (1993, p. 61). In *The Dobe Ju’hoansi*, Lee devotes two chapters to kinship, social organization, marriage, and sexuality. Those chapters are essential to understanding Ju’hoansi conflict, politics, exchange, religion, worldview, and relations with their neighbors.

It was also during the 1960s that Napoleon Chagnon first studied the Yanomamö, a forest people living along the border between Venezuela and Brazil. In *Yanomamö: The Fierce People* (1983), Chagnon found that simply asking genealogical questions can be problematic because of taboos against speaking the names of the dead, the mischievousness of some villagers, and the fact that some wives are obtained by raiding neighboring villages. Chagnon was routinely lied to during the first five months of his field research and said, “I had to throw away almost all the information I had collected on this the most basic set of data I had come there to get” (p. 20). Chagnon eventually figured out how to work around those obstacles to get the data he sought, but those obstacles also opened up many other productive avenues of ethnographic inquiry.

The examples chosen from these three ethnographies, which were selected from among many other possible examples, demonstrate clearly the importance of kinship as an organizing principle in culture. The description and analysis of kinship systems is the starting point for most ethnographic work. Describing and understanding kinship systems is still a primary activity in anthropological inquiry,

and the development of a comprehensive theoretical framework is still an important epistemological goal.

What Anthropologists Know About Kinship Systems

What do anthropologists know about kinship systems? What are some of the generally accepted concepts in kinship studies? What follows is a brief summary of thought in the discipline. This knowledge is a product of the seminal contributions of the anthropological works just discussed and the intellectual stimulus that those works, and others, have provided to many other scholars who have refined and extended the understanding of kinship systems.

Kinship Systems

All humans are classified, at birth, within a system of kin relations. This system of relations organizes a society in a systematic way, such that it provides for the continuity of those relationships, and for the continuation of the society, through time. Ideally, the kinship system is perpetual and classifies all children at birth and maintains those classifications even after death; people continue to be sons, daughters, fathers, and mothers, and so on. The depth of the genealogical memory of groups varies tremendously, however. In some groups, the knowledge of the genealogy of one’s ancestors can go back many generations, as in the lists of ancestors found in biblical genealogies. On the other hand, such knowledge in other groups may only go as far back as grandparents or great-grandparents, as is common in North America. The depth of genealogical knowledge is, however, not as significant as the idea that kin relations persist through time.

There are all sorts of rituals found in human societies that occur to bring about the incorporation of a baby into the social structure of the society into which it is born. Baby showers, infant baptisms, and the naming of the infant herself are some of the ways that the social position and classification of the new member of society are recognized and reified.

Kinship systems are also flexible regarding the formal incorporation of nonkin into kinship systems. For example, adoption, in various forms, exists in most human societies. Though the establishments of such relations are “fictions,” they are very powerful fictions. Other fictive kin relations include such practices as choosing godparents, calling religious affiliates brothers or sisters, using the title of “Father” for priests, and the practice of female husbands among the Nandi of Kenya—where a “woman pays bridewealth for, and thus marries (but does not have sexual intercourse with) another woman. By so doing, she becomes the social and legal father of her wife’s children” (Oboler, 1980, p. 69).

Kin relations consist of two fundamental types: *consanguineal* and *affinal*. Consanguineal kin relations are blood relations. When a person is born, he is genetically closely related to his mother, to his mother’s siblings and their

offspring, to his mother's parents, to his father, and to his father's siblings and their offspring, and to his father's parents. Consanguineal relations are the primary structuring categories of the entire kinship system.

Affinal kin relations are those created by marriage. When a man marries one's mother's sister, he becomes one's uncle by virtue of marriage, not because of blood-relatedness. Keep in mind, however, that in some social groups, marriage may occur between consanguineal kin, such as when the preferred marriage pattern for a male is to marry his father's brother's daughter, as is the case in some areas of the Middle East. In cases like this, the bride and groom would hold simultaneous kin classifications, one consanguineal (parallel cousins) and the other affinal (wife and husband). By extension, all other members of the society would have a dual classification for the two. For example, the bride's father would simultaneously classify his daughter's husband as his son-in-law and as his brother's son.

There are basically five different ways or patterns by which consanguineal kinship relations are classified. Three of those patterns distinguish between parallel cousins (the offspring of one's father's brother and mother's sister) and cross-cousins (the offspring of one's father's sister and mother's brother). The other two systems either classify parallel and cross-cousins as a distinct category (i.e., cousins), or classify parallel and cross-cousins as brother and sister. The five types are called Iroquois, Omaha, Crow, Eskimo, and Hawaiian.

In Iroquois, Omaha, and Crow one calls his father's brother "father," and his mother's sister "mother." Consequently, in these three terminologies, his parallel cousins are called "brother" and "sister." Also, in Iroquois, Omaha, and Crow, one's father's sister is called "father's sister" (i.e., roughly equivalent to aunt), and his mother's brother is called "mother's brother" (i.e., uncle). Beyond those kin relations just discussed, these three systems vary in important ways.

In the Iroquois kinship-terminology system, as just stated, a person's parallel cousins are referred to with the same kin terms used for brother and sister. However, cross-cousins are referred to collectively by some other unique term that could be translated as "cousins."

With Omaha kinship terminology, one calls her parallel cousins brother and sister, but refers to her cross-cousins differently than in Iroquois. In Omaha, her cross-cousins on her mother's side of the family are called "mother" and "mother's brother." One's father's sister's children are "nephew" and "niece," if one is a male, or "son" or "daughter," if one is a female. The reason for the different kin terms between males and females is due to the fact that if one is a male, the cross-cousins called nephew and niece refer to him as "mother's brother" (i.e., uncle), but if one is a female, those same cross-cousins, which she calls son or daughter, refer to her as "mother."

The Crow kinship-terminology system is a mirror image of the Omaha system. In Crow, one calls his parallel cousins "brother" and "sister." Cross-cousins on his

father's side of the family are his "father" and "father's sister." Cross-cousins on the mother's side of the family are called "son" and "daughter," if one is a male, or "nephew" and "niece," if one is a female. The cross-cousins referred to as son and daughter, or as nephew and niece, will use either "father" or "father's sister" (i.e., aunt) depending on gender.

The following two systems do not distinguish between parallel and cross-cousins. In the Eskimo system, one classifies all cross-cousins and parallel cousins into one category that can be called *cousins*. Similarly, one's father's brother and sister, and one's mother's brother and sister, are classified into two collective categories referred to as "aunts" and "uncles," depending on their sex. This classification system should be familiar to most North Americans.

Hawaiian kinship terminology classifies all cross-cousins and parallel cousins as "brother" and "sister." Consequently, one's father's brother, father's sister, mother's sister, and mother's brother are all called "father" or "mother," depending on their sex.

In the five general patterns covered here, only a very restricted set of kin relations—14 to be exact (father, mother, father's brother, father's sister, mother's sister, mother's brother, brother, sister, father's brother's children, father's sister's children, mother's sister's children, mother's brother's children, son, and daughter)—have been discussed. Remember that Morgan gathered data on 196 kin relationships. Kinship terminology beyond the 14 relations covered here includes a great amount of variability for more distant kin relations among different cultural groups. Nevertheless, these five basic patterns, allowing for some slight variations, underlie the categorization of all human kinship systems.

Note that depending on the kinship classification of a group, there are implications for what marriage patterns are possible. For example, the father's brother's daughter preferred marriage pattern is not found in cultures that classify kin in the Iroquois, Omaha, Crow, or Hawaiian systems. That is because marrying a brother or sister violates a universal incest taboo, and in Iroquois, Omaha, Crow, and Hawaiian, parallel cousins are classified as brother and sister. When anthropologists examine particular kin classification systems within the context of particular cultures, many other implications are frequently discovered.

Descent

In addition to classifying individual relationships, as we have just seen, kin groups also organize into descent groups, which create a collective identity by classifying a number of people into one group, according to a line of descent that is traced through either the father, the mother, or both.

When descent is traced through the father or through the mother, we refer to such groups as patrilineal or matrilineal, respectively. Collectively, the two are referred to as unilineal descent systems. A unilineal descent

system—patrilineal or matrilineal—can have, theoretically, any of the five kinship-terminology systems. Whether someone thinks of herself as a member of her father's or of her mother's family is a completely separate matter from the system by which one classifies one's kin relations.

A significant number of societies have both patrilineal and matrilineal, creating a more complex kind of descent system, in which identity with regard to both lines of descent is recognized and perpetuated. Such descent systems are called *cognatic*. Lévi-Strauss (1949/1969) suggests that a third of all descent systems are cognatic (p. 105).

Of course, lineal descent systems, whether unilineal or cognatic, always exist alongside systems of inheritance, status, marriage, and so on. Also, rather than thinking of patrilineal, matrilineal, and cognatic descent systems as three distinct systems that different societies map onto, it is better to think of patrilineal and matrilineal systems as two ends of a continuum along which varying degrees of emphasis on the mother's or father's line can be expressed, with full recognition of both lines being in the middle and called cognatic. As a special case of cognatic descent, a few societies allow a certain degree of freedom for individuals to emphasize or affiliate with one line or the other, and those systems are called *ambilineal*.

Many societies do not have lineal descent groups. Rather, they identify with both parents' families. Bilateral groups such as this can recognize a fairly large set of relations as family, or, in a special case, called the *bilateral kindred*, will recognize a smaller set of relations that are only the same for siblings. The bilateral kindred is typical for most North Americans, where a group of siblings recognize their mother, father, sister, brother, son, daughter, grandchildren, aunts, uncles, cousins, grandparents, and nephews and nieces as their family. The cousins of the siblings in the example just given will have a different set of people in those same relationships, and, consequently, they will have a different bilateral kindred.

What is clear is that how a society structures its understanding of descent has significant implications for how the group defines its identity. Consequently, there are significant effects on many other aspects of social organization.

Marriage

Marriage creates new social relationships between the family of the bride and the family of the groom. Marriage patterns vary significantly around the world but are reducible to a few general types, with some variation within each type. Those types are monogamy, polygyny, and polyandry.

Monogamous marriages are those between just two people. Traditionally, this has been defined as between one male and one female, and in many communities undoubtedly will continue to be defined this way, but a more contemporary definition incorporates the observation that many same-sex couples are marrying worldwide, and that

those marriages are being accepted within some groups. Also, in parts of the Western world and elsewhere, due to the prevalence of divorce—a formal legal and/or religious process for ending a marriage—the practice of serial monogamy has emerged, in which an individual may have several spouses throughout her or his lifetime.

As discussed in the previous chapter, marriage may also involve some form of economic exchange, such as brideservice, where a male renders economic service, such as gardening or herding, to the bride's family, in exchange for the opportunity to marry the bride. Bridewealth is found in other groups, where the economic exchange will take the form of money or other material wealth paid by the groom's family, either all at once or over a period of time, to the bride's family. Dowry is another form of exchange linked to marriage, in which wealth is given to the bride by the bride's family, and in many cases it functions as a sort of insurance policy against the loss of a husband because of death or divorce.

Polygynous marriages are between one male and more than one female. Polygyny has been common throughout human history. Various preferred marriage patterns have an effect on the social outcomes of polygyny. For example, there are social implications for a preference for exogamy (marrying outside one's group), or endogamy (marrying within one's group). There are further implications associated with a preference for either parallel cousin marriage, or cross-cousin marriage, and whether or not sororal polygyny (marrying a group of sisters) is allowed or prohibited.

Polyandry is very rare compared with monogamy and polygyny. In polyandry, a female is married to more than one male. As in polygyny, there are social implications for the particular preferred marriage patterns in a society.

Finally, many societies have mechanisms, such as polygyny, to ensure that most people, especially women, get married. To ensure that they remain married, many societies have additional practices. In some societies, if a woman's husband dies, the husband's brother or one of his other close male kinsmen must marry her. This practice is called the *levirate*. In some other societies, if a man's wife dies, her family must find another woman to marry the man. This practice is called the *sororate*. In both cases, not only is the structure of the marriage preserved, but also all kin relations created by the marriage are preserved.

Households and Residence Patterns

Once a person is married, the couple must live somewhere. There are several patterns found in the ethnographic literature. If the couple lives with the husband's family, the pattern is called *patrilocal* residence. If the couple lives with the wife's family, it is called *matrilocal* residence. If the couple forms a new household, it is called *neolocal* residence. Some societies allow for residential affiliation with either the bride's or the groom's family, and that practice is called *ambilocal* residence. Finally, there is the pattern in which a man and his new wife go to live with the man's

mother's brother. This pattern is called *avunculocal* residence (or *uxorilocal* residence in some older sources).

Households are a subset of a family that lives together and cooperates economically. Households can be *nuclear*, consisting of a husband, wife, and children; *patrilocally* extended, in which two or more patrilineally related nuclear families reside together; *matrilocally* extended, in which two or more matrilineally related nuclear families reside together; or *ambilineally* extended, in which both patrilineally and matrilineally related nuclear families reside together.

Future Directions

Much work remains to be done in kinship studies. Until recently, anthropologists have looked primarily at the larger, or macro, aspects of kinship studies with the goal of applying the comparative method to arrive at conclusions reaching across cultures and saying something universal. At the same time, anthropologists have left the smaller, or micro, aspects of kinship studies, such as family studies, largely to the sociologists. Anthropologists need to bring both the macro- and micro-aspects of kinship studies under scrutiny together. Currently, anthropology is headed in that direction.

Some of the original questions asked in kinship studies remain either unanswered or answered incompletely. Why do kinship classification systems vary? Why are there a small number of types? To what degree and how do kinship classification systems influence other social behaviors? And perhaps the most intriguing question: What is the relationship among the mind, language, and culture? This last question seems one of the most promising for furthering our understanding of kinship systems and the roles they play in human societies.

Just as important as the original questions are the emerging questions about power, cultural context, and group identity in relation to kinship studies. In what way do kinship systems articulate discourses of power? How does cultural context shape and reinterpret kinship systems? What aspects of kinship systems are most important to group identity?

All of those questions, and more that will emerge with additional research, need to be addressed in future kinship studies. New methodologies and new theories need to be developed and adopted in order to analyze kinship as process and to account for the variability that is observed from the micro- to the macrolevel of analysis. Kinship studies will stay a key focus of anthropological research, just as they always have. Most likely, kinship studies will become even more important as the place of kinship systems in culture becomes better understood over time.

Conclusion

From the very beginning of the discipline of anthropology, kinship studies have been at the center of the study

of culture. Kinship systems structure and influence many of our social behaviors and have a dynamic presence in the synergy among language culture, and the mind. The concepts and understanding gained from kinship studies are essential fundamentals of anthropological knowledge and continue to be applied in ethnographic research today. Future scholarship will undoubtedly generate new theoretical insights and lead to a more sophisticated and holistic knowledge of what it means to be human.

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POLITICAL ORGANIZATIONS

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Political anthropology is a subset of social and cultural anthropology, with a special interest in the political process as a way for societies to institutionalize common values. Specifically, British anthropologists in the 1940s helped to establish political anthropology as a subdivision of anthropology.

Politics is the arena of power relations, serving as the social institution through which power is acquired by people and groups. Government is a formal organization responsible for regulating relationships among members of a society and between a society and other foreign societies from outside of established boundaries. When resources are allocated by a governmental authority structure, the political process is in place and active.

Political organizations express power and authority in both traditional and modern communities. Power can be egalitarian and decentralized or it can be centralized and elite. In either case, political organizations interact with other parts of the community such as family life, religious beliefs, economic resources, and even physical geography. With these interactions, political organizations draw on the cultural life of the community for ideas. This is the political process that allows intangible ideas, important to the life of the community, to become concrete. The community sanctions leaders who have the power to control important human and material resources on behalf of everyone else. In smaller, more traditional communities, it is easier for all members of the society to share power more equally. In larger, modern

societies, power is distributed, often unequally, among highly defined classes of people with very distinct roles.

The most common forms of these political organizations identified by political anthropologists are bands, tribes, chiefdoms, and states. Foraging is often associated with bands, pastoralism with tribes, and horticulture with chiefdoms. Modern states and the city life that they support are often referred to as civilization. However, the definition of civilization is not exclusive to modern states alone. It has been applied to ancient cultures that show evidence of a certain level of material culture, such as writing for record keeping and the use of money.

The categories of bands, tribes, chiefdoms, and states were first developed in the 1940s as a way for political anthropologists to describe and discuss political organizations. By the 1960s, questions were raised about the meaning and usefulness of these categories. For the sake of a common conversation, these categories continue to be used within an ongoing discussion about the best and most useful way to describe political organizations within the discipline of political anthropology.

Definition

The most important issue that a society will confront is related to the means for survival—food to eat, clothing to wear, shelter from natural elements, and protection from

outside foreign intrusions. When a society organizes all of its resources around basic survival issues, anthropologists refer to it as a *subsistence culture*. Bands and tribes are often referred to as nonstate, subsistence cultures.

In subsistence cultures, all of the members work together to gather and distribute the resources needed to survive. The power or labor is shared equally among members, so the political organization of bands and tribes can be described as egalitarian. Some other aspects of subsistence cultures can include seasonal migration, limited capacity for food storage, and a sense of common ownership toward available material goods.

By contrast, chiefdoms and states are often permanent settlements that have evolved over time to include a city or group of cities within a well-defined geographic territory. In states, the population is especially dense. Technology permits higher levels of food production and storage, and instead of migrating and foraging for food, members of chiefdoms and citizens of modern states can rely on crops produced by agriculture. With food supplies readily available, the population can grow. The large population is then divided into specialized classes with specific responsibilities. The division of labor required by these large populations thus creates complex and unequal relationships among classes.

Societies can also be defined as *noncentralized* or *centralized*. Bands and tribes often fit into the noncentralized category, while chiefdoms and states generally fit the centralized description. The main difference between a noncentralized society and a centralized society is the role played by kinship to provide connections between individuals and groups and for making decisions that affect everyone. Noncentralized societies rely primarily on marriage alliances and kinship ties to integrate members into the society. A key characteristic of these societies' governance is that there is no formalized code of law used to justify punishments or the use of force by a standing army. Instead power is spread among the various groups of families that may connect with other families to form temporary groups for the completion of a specific task, such as hunting or defending from an outside attack. A noncentralized society will become centralized when political mechanisms for forming connections between people or groups, and for making community-wide decisions, become impersonal and permanent through the use of a codified law with a standing body to enforce this law.

Bands/Foragers

Since the 1960s, the use of the term *band* has become less frequent. Anthropologists are not able to reach a complete consensus about the features that distinguish a band from other political organizations. However, there are general characteristics that apply.

Bands are very small communities formed around one family who usually depends on foraging for survival.

The number of members in a band might be as few as 25 or as great as 150, but bands are still small enough that there is no special division of labor. The resources available will also be a factor in determining the size of a band. Regardless of age or gender, the members of the band have the same access to all of the resources, which are usually very scarce and restricted. Leadership is temporary and based on the situation and need. If the band is hunting, the best and most experienced hunter might be in charge. For religious ceremonies and celebrations, a shaman will take the lead. These leadership roles are not permanent, and as a group, the band will not permit any single member to coerce other members or place restrictions on resources. A band's search for food and resources is often seasonal, and migration allows the band to forage for the best resources available at any given time.

Tribes/Pastoralists

Tribes are a village or collection of family groups. Tribes are somewhat more organized than bands because herds of animals and horticulture supplement foraging. Tribes are thus able to remain more settled and less migratory by practicing horticulture. With herding and common land use, tribes can also develop some sense of communal ownership. In addition, by practicing horticulture and communal herding, the tribe has a domesticated food supply that may permit longer settlement regardless of the season, but the overall economy of the tribe is still at the subsistence level.

Tribe power is decentralized and egalitarian, but a leadership lineage might exercise some force from time to time. A strong network of kinship contacts keeps power largely in the hands of the entire band, although families with more animals may benefit from some extra status. Because of the relatively small size of the band and the decentralization of power, there is little specialization of labor or division of roles to accomplish political, religious, or economic goals. However, a headman may emerge from time to time because of unusual skills or wealth. Village councils might also form for the purpose of making emergency decisions. Overall, the lower population level in a tribe promotes sharing of labor. Small subgroups within the larger tribe might form temporarily to complete a specific task, then dissolve when the task is completed. Although the organizational level in a tribe is somewhat more developed than in a band because of communal ownership, power is still decentralized and there is little specialization of political, religious, or economic functions. Examples of tribes are the Shoshone and Paiute Indians of North America.

Chiefdoms/Horticulturalists

A chiefdom is a settlement of several hundred of members. Because the group stays in one place over longer periods of time, it relies on both crops and animals for a fairly stable subsistence, although food storage is limited.

Chiefdoms differ from tribes in two important ways: by practicing horticulture on regular basis and generating food productivity with some surplus. The food surplus allows the population to grow. To meet the greater demands of the higher population, the overall level of organization is more complex with some form of permanent, centralized authority able to provide ongoing leadership without interruption. As a result, chiefdoms have more complicated and more permanent mechanisms for collecting and redistributing economic and labor surplus. Instead of headmen or ad hoc subgroups that emerge to meet a specific task or immediate emergency, authority is successive, allowing for the development of a power elite and the development of a ranked society.

In a chiefdom, the chief is the symbolic provider in charge of the redistribution of resources. He has some ability to coerce subordinates and can collect taxes on food or other kinds of goods. While actual class stratification might not be evident in a chiefdom, there is a clear inequality of persons and groups in the society. Some individuals and groups are closer to the chief than others and receive the deference of subordinates at a lower rank.

States/Industrialists

The state, or nation, is densely populated with high levels of food surplus and permanent settlement or residence in one geographic area. In these systems, all political power is monopolized by a centralized elite. Division of labor is sharply divided and access to resources is dependent on social rank. Government is based on territory and property, and states are traditionally defined by sharp divisions among social classes; clearly defined geographic boundaries; and centralized, elite authorities who hold a monopoly on political power. The monopoly extends to the legal system, courts, and the armed forces, with power over national borders, citizenship, and foreign policy.

Anthropologists have an ongoing debate about how and why traditional, nonstate political organizations become modern states. Political anthropologists connect the decision-making process and the conflict-resolution process with the emergence of the state. The high population levels increase conflict over resources internally and externally that might lead to the formation of a state. Political anthropologists are still discussing the use of new technology to move a society from a subsistence mode of living to food supplies that then allow a traditional society to stratify into specializations and classes. Other useful theories explain the formation of the state as a result of environmental limitations, the use of irrigation to produce food in hostile environments, and in some cases, the influence of a previously existing state.

Most early states seem to have developed out of a combination of these factors interacting with each other in no special sequence. However, anthropologists have identified six early states considered to be examples of societies that

evolved into states with no outside influence. The primary states are Mesopotamia, Egypt, the Indus River Valley of India, the Yellow River Valley of China, Mesoamerica, and Peru. These states appeared hundreds and even thousands of years apart from each other. Their appearance raised the question of finding a universal process to work as an equal model for all events of state formation.

More recent definitions of states try to take into account the effect of rapidly developing global-communications technologies that have the capacity to create online, virtual communities on a global level. This new ability to communicate rapidly, yet intimately, on a global level affects all areas of life—financial, cultural, and social.

Evolutionary Theories

Theories of Evolution

Anthropology has its roots in Enlightenment ideals (1700–1800) about human development universally unfolding in clear, identifiable stages and therefore considered a law of science. The human race was assumed to have a common point of origin. This common origin gave the human race a psychological unity that made development parallel for all cultures. A final outcome of human progress and development was expected and recognized by the appearance of certain kinds of material and cultural experiences. Philosophical and historical traditions assumed that government and politics were the products of civilization and that lower stages were characterized by anarchy. This viewpoint, with an emphasis on the importance of civilization as the highest level of development and evolution, lends itself to asking questions about how the lower stages of anarchy moved to the higher stage of civilization.

One of the foundational thinkers for anthropology was the British law scholar Henry Sumner Maine (1822–1888). In his *Ancient Law* (1861), Maine defined one of anthropology's earliest and most difficult questions: Where did the state come from? And what accounts for the differences between highly evolved societies, civilization, and less-evolved societies, or primitive ones? Maine described kinship-based societies that held land and goods in common as *primitive*. Societies organized around the individual and based on the ownership of private property protected by law were described by Maine as *civilized*. Somewhat contradictorily, Maine's description of the sequence of evolution as moving through a family-based society to a tribal organization and finally to an urbanized and economically sophisticated society links him to evolutionary determinism. At the same time, he rejected the belief that human society always moves through the same series of changes.

Colonialism provided the context for the development of a theory of social evolution that placed Christianity and Western culture at the pinnacle. In the 19th century, theories about social evolution made Western culture the most

civilized. Non-Western societies were viewed as primitive but able and expected to become civilized by developing in defined stages from band to tribe, to chiefdom, to state. Developing through these stages was seen as social progress. Social progress was in turn viewed by many theorists as a law of history and therefore scientific.

The ideas of British naturalist Charles Darwin (1809–1882) in combination with the work of German political theorist Karl Marx (1818–1883) were very significant in shaping the anthropological point of view in the 19th century. Darwin's work with the process of natural selection postulated that life evolved naturally from simple to complex. Simple forms of life were lower and inferior; complex forms of life were higher and superior. When anthropologists applied the idea of natural selection to groups of people, it became an opportunity for ethnocentric points of view to categorize some cultures as simple and inferior, while other cultures were complex and superior.

The ideas of Karl Marx influenced anthropology by emphasizing and giving importance to survival and adaptation in the material world. Societies would reorganize and change relationships among individuals and groups as a result of the need to adapt to physical conditions in order to survive. Natural or primitive societies, sometimes called nonstate societies, lived in a condition of relative equality with no private property. In primitive societies, material goods were held in common and authority was diffused throughout the community. With the emergence of civilization, central authority gained control of the land. An unequal class system allowed the elite authority to remain in control. All modern societies take this form of states with unequal class distinctions.

The German philosopher Friedrich Engels (1820–1895) combined the ideas of Karl Marx with the work of American anthropologist Lewis Henry Morgan (1818–1881) to form theories that looked at internal class conflict as the catalyst for evolution. The earliest form of social organization was noncentralized and communistic. All members shared equally in the resources of the community, and personal property did not exist. When new technologies made agricultural surplus possible, a class of nonproducers developed to protect the supply. The new nonproducing class erected a strong centralized governmental mechanism to ensure that the producers could not share in the wealth that they produced. In the internal theory, the evolution is caused by economic and material developments, an unequal concentration of wealth, and the effort of an elite class to maintain unequal access to power. The class system requires strong centralized government to give a few elites access to resources while exploiting the majority of producers. The American writer Morton Fried (1923–1986) added to the class-conflict model with his book *The Evolution of Political Society* (1967). Here, Fried observed that social stratification destabilizes a society, forcing power to become fully centralized to prevent disintegration to a lower level of organization.

The English economist and philosopher Herbert Spencer (1820–1903) articulated the theory of external conflict as the process leading to state formation. Using Charles Darwin's ideas about the survival of the fittest of individuals, Spencer applied the idea to whole societies. If a society feared invasion from an outside intruder, it would organize using a strong, centralized form of government to create a standing army able to force or threaten an intruder to leave or stay away. The American ethnologist Robert Carneiro (1927–) generally agreed with Spencer, but he believed that conflict can only lead to state formation in specific situations and clearly defined conditions. His book, *Evolution and Cultural Anthropology* (2003), provided details about what conditions and situations can lead to statehood. When combined with environmental limitations such as mountains, seas, or deserts, external conflict could lead to the centralization of government for the sake of raising an army because the geographic barriers prevented escape. Without barriers to prevent escape, Carneiro believed that it was more likely that a society would disperse, rather than fight, when confronted with an external threat. Carneiro also took into account the pressures created by population expansion in a land area that becomes too crowded. In this case, small separate groups will unite into one larger unit. Smaller units continue to create larger units until a true state is finally formed with complete control over all of the available land area. Carneiro predicted the complete political unification of the entire planet by the year 2300.

The social scientist and writer Karl Wittfogel (1896–1988) believed that the ability to develop land for agricultural use could be as important as the need for military power in motivating the organization of centralized government that leads to the creation of a state. Water is always necessary to crop development. When a society is organized to supply water for agriculture, the result is a food surplus that permits population growth. Organizing and coordinating for the construction of an irrigation system then set the stage for the emergence of a centralized, state bureaucracy. Wittfogel used Neolithic Egypt as an example of a society that was dependent on natural flooding from the Nile River to irrigate crop fields once every year. Irrigation by natural flooding can produce at most only one crop per year, giving farmers the best possible motivation for seeking and slowly finding alternative ways to control the flooding process with a primitive system of dikes and reservoirs. As the land became more productive, the food supplies were able to sustain a higher population level, in turn requiring irrigation systems of even greater complexity. The specialists who emerged to control the construction of complicated irrigation systems became an administrative elite capable of controlling a centralized state government.

The work of Henri Claessen and Peter Skalnik in *The Early State* (1978) brings together cross-cultural data from numerous early states. Multiple factors in state development can be identified—population growth, warfare, trade,

environmental limitations, the need for irrigation systems, the use of innovative technology, and the influence of pre-existing states. However, it is not easy to say that any one of these factors is decisively causal. It is not always possible to distinguish among factors that cause the state to emerge and factors that function as qualities of the state after the fact of its emergence. Classen and Skalnik identified only four causal factors with certainty: population growth, war, conquest, and the influence of states already in existence. It is best to allow that most states develop out of a unique combination of multiple factors that may or may not be found in any other state. One classic work that remains useful is Lawrence Krader's *Formation of the State* (1968) from the *Foundations of Modern Anthropology Series*.

Anthropology recognizes the power of the idea of nationhood. It also examines the reality of what actually is or is not present in concrete experience through ethnographic research.

British Colonialism in the 19th Century

British anthropologists in the Victorian era (1860–1890) formulated the ideas about cultural progress and civilization to show specifically how bands, tribes, and chiefdoms became states. The development of a society from a small, simple band to a larger, more complicated tribe that led to the final, heavily populated, civilized state corresponded with British expansion into colonial territories, reinforcing the sense of superiority over the British colonies. Britain represented the modern, civilized state. The colonies held by Britain were viewed by British anthropologists as primitive and unevolved, not having yet become fully civilized states. Some of the British anthropologists of the Victorian era were Herbert Spencer (1820–1903), Edward Tylor (1832–1917), Sir James Frazer (1854–1941), and A. R. Radcliffe-Brown (1881–1955). Radcliffe-Brown is noted especially for his leadership in defining the theoretical aspects of anthropology.

British colonial anthropologists also included significant ideas from non-British scholars. Important thinkers and writers from outside of Britain during that same time period were the American Lewis Henry Morgan (1818–1881), Bronislaw Malinowski (1884–1942) from Poland, and Frenchman Émile Durkheim (1858–1918).

The term given to development from lower to higher forms was *unilineal social evolution*, a theory that originated with European anthropologists in the Victorian era. Civilization was defined as material culture, technology, cities, good surplus, monumental buildings, money, and writing.

During the British colonial period, anthropologists often viewed civilization as the inevitable and ultimate goal of the “lesser” societies—the bands, tribes, and chiefdoms. The evolution began with simple societies (savages), moving to somewhat more complex societies (barbarians),

and finally evolving into very complex societies (civilization) with large populations using advanced technology to maintain a settled way of life. Morgan outlined the three-stage sequence from savage to barbarian to civilization in the book *Ancient Society* (1877). Working in the United States, Morgan believed that native indigenous societies provided evidence of the development from primitive to civilized. The movement from the lower, primitive stage to the higher, civilized stage was measured in terms of leadership, complexity, and scale.

To explain the consolidation of civilization at its highest levels, Victorian anthropologists used the theory of structural functionalism. Structural functionalism is largely a consensus theory that explains society in terms of stable, balanced, orderly relationships. Relationships between social subgroups permit the society as a whole to maintain smooth functionality. Shared values and a common sense of purpose make it possible to agree on a moral order that is beneficial to the community as a whole. Through agreement and stability, the society maintains internal integrity and survives over time.

British anthropologist Edward Evans-Pritchard (1902–1973) is usually referred to as the originator of structural-functionalism. This approach consolidated the view that the modern state was the ultimate goal of development for human societies. The modern state was perceived to be harmonious and stable. With the social structure securely in place, individual parts of society could function effectively to keep the whole society in equilibrium. In the 1930s, Evans-Pritchard lived among the African Nuer people in Sudan and studied the problem of how a society without a political system or government of any kind—no chiefs or kings—could hold together and work. *The Nuer* (1940b) became Evans-Pritchard's most widely read book along with *African Political Systems* (1940a). *African Political Systems* helped to establish the four categories of band-tribe-chiefdom-state that, while recently called into question, remain part of anthropology's contemporary vocabulary.

Evans-Pritchard believed that structural functionalism explained why the African Nuer, a primitive, stateless society, could remain orderly and stable over time. The Nuer society was organized around kinship groups. Responsibility for certain social functions was passed from kinship group to kinship group by descent. Along with inheriting responsibility for certain functions in the community, the kinship groups also inherited territory. The sense of common purpose in the kinship group motivated that group to cooperate for the completion of their group task. Individual groups might come into conflict with each other, but the conflict among individual groups kept the community as a whole strong and stable. The groups, and the inherited land and responsibility belonging to the groups, were more permanent than any single member of the group. Individual members of groups were defined by their roles in the group, and the group roles remained stable from generation

to generation, allowing the Nuer society to perpetuate itself over time with no chief or king.

Criticism of structural functionalism points out that it is focused primarily in one place, the African Sudan, at one limited period of time, the 1930s, and does not include historical antecedents to explain events. Even though structural functionalism does give some attention to competition among subgroups, critics point out that structural functionalism does not account adequately for conflict and the disorder that often comes with change. Finally, the critics asserted, there was not enough real scientific evidence to support structural functionalism, and overall the theory was serving the cause of British colonialism.

Although structural functionalism as a theory no longer holds the dominance that it once did, the writings of Evans-Pritchard, *The Nuer* and *African Political Systems*, are still held in high esteem by anthropologists, and today function as important points of reference for the conversation among anthropologists.

American Response in the 20th Century

American anthropologist Franz Boas (1858–1942) criticized cultural evolution, arguing mainly against its basis in ethnocentrism. Western society was seen as most valuable—the most highly developed, the most civilized. Cultural evolution assumed that all cultures would follow the same path and progression with the same final outcome of a modern state. By making it a scientific theory, cultural evolution often justified racist practices connected to British colonialism such as slavery and inequality in industrial European economies.

By the early 20th century, other anthropologists used different methods to interpret data and arrived at a different conclusion about the evolution of societies. Boas rejected definitions of societies as “civilized” or “modern” and wanted to use fieldwork data that examined exactly what already existed, without imposing an abstract and fixed expectation for development in a certain way through a certain progression. States did not always develop as a result of geographic boundaries, outside invaders, or war. Boas wanted to shift from speculating on abstract, universal stages of growth from historic societies, to the direct observation of societies that were current and living.

As British colonial rule dissolved after World War II, definitions of the state based on a European model were brought into question. Prior to World War II, the state was defined by geographical territory. Within that given territory, the state could require and enforce loyalty above and beyond that of family, ethnicity, subcultures, and classes. Within its own territorial boundaries, the state could replace family and kinship ties with Enlightenment values such as a secularized government, citizenship, and equality mediated by an impersonal legal system.

While acknowledging the existence of a variety of sectors, the Enlightenment model of the state would

nonetheless encourage the creation of a national culture and the dominance of a single language. This form of the state as an “imagined community,” where most of the citizens never meet each other face-to-face yet hold a sense of common ideals and values, first became possible in 18th-century Europe with the advent of print technology and the distribution of pamphlets and newspapers on a wide scale. Ordinary people were thus able to learn about and identify with people whom they otherwise would have known nothing about.

Pamphleteers and publishers were able to undermine kings and contribute to the creation of a national consciousness by encouraging feelings of unity, since publications focused on a national cultural myth instead of a sense of personal allegiance to the ruling king. Before this, kings in Europe were often viewed as father figures, reinforcing the sense of drama that could accompany the revolutionary actions taken for the creation of a national state that would replace kinship ties with citizenship and equality before the law.

When British colonies became independent after World War II, the overarching nationalism imposed by the British authority gave way to smaller independent groups based on ethnic, linguistic, and cultural loyalties instead of geographic unity. When subgroups reemerged as an important force in political negotiations, anthropologists responded with a new way to explain the dynamics that occurred within smaller, coexisting groups that were no longer held together from the outside by a unifying national myth. The structural functionalism of Evans-Pritchard, with its view of society as an idealized whole, was replaced by a new process-oriented approach. When political actions are studied using the process approach, the emphasis shifts to competition, conflict, history, and change and away from norms, values, and impersonal social structures. For the study of postcolonial states, the process approach provided a flexible model that promoted an understanding of how individuals were able to influence the larger system, making room for the idea of individual agency. In the 1950s and 1960s, the process approach was able to replace structural functionalism as the dominant orientation for political anthropologists in the United States and Europe.

The result was a change of interpretation of the data that acknowledges differences among communities without making value judgments about them. By the 1960s, anthropologists substituted Morgan’s savagery, barbarism, civilization sequence with the three-state sequence of hunting and gathering, horticulture, and developing agriculture. The new rhetoric avoided making a negative contrast between civilization, viewed as most evolved, and savagery and barbarism, viewed as less evolved.

The change in the method of interpreting the data continued to develop, and by the 1980s, the new approach was identified as postmodernism. Many if not most of the earlier ideas of anthropologists such as Radcliffe-Brown were criticized for containing a subjective Western bias that

included the justification for 19th- and 20th-century colonialism. Enlightenment assumptions about anthropology as a science utilizing universal models were challenged and sometimes entirely rejected.

During the 1990s, the effects of economic globalization and the information and communications revolutions raised even more questions for anthropologists to consider. Some of the specific aspects of globalism considered by anthropologists in conversations about the state include sustainability and ecological justice, cultural assimilation, nativistic movements, and forced migrations. The state was more and more required to accept the outside influence of international forces on domestic policies. Parallel challenges then emerged from internal ethnic and identity politics, and there was a greater demand for all domestic cultures to receive equal recognition from the state. Internal, fundamentalist religious movements presented a challenge to the secular identity of the modern state. With this, assumptions about the linear movement of history toward democracy and secularism began to be questioned. Advanced industrial societies showed signs of moving toward postmaterialistic concerns. Cultural issues about the environment, human rights, and sexual orientation were also becoming at least as important as issues related to material well-being.

As the 20th century came to a close, the postmodern interpretation observed that new emerging world conditions required new assumptions. Some of the new assumptions formulated by postmodern anthropologists involved breaking down the distinction between domestic and foreign affairs, the growing irrelevance of territorial borders, basing security on mutual interdependence, and a growing rejection of force for resolving territorial disputes. Traditional and postmodern anthropologists currently use a combination of traditional and postmodern ideas; these are a new synthesis of the best and most useful ideas from both schools of thought.

Political Organizations Today

Significant changes have occurred in the way political anthropologists gather, discuss, and interpret data about the cultures and societies being studied. At the same time, some ideas have lasting influence. Political anthropologists today accept that reliable indications of the emergence of a modern state include the recognition of territories, an increase in population and conflict, class stratification, and a monopoly of coercive power.

Anthropologists also rely on political scientists for an understanding of how states develop and emerge. Political scientists have identified a series of five crises that lead to the development of the modern state: (1) Identity is the process of forming a common national identity. (2) Legitimacy is the confirmed acceptance of the state policies and institutions throughout the population. (3) Penetration is the early spread of the state's authority, including the establishment of a center and the use of force to stop resistance. (4) Participation is possible in the peaceful phase following the confirmed

acceptance of the state's authority, as the population looks for ways to become involved in the governance of the nation by voting and forming political parties. (5) Distribution is an ongoing conversation and debate about how to divide the nation's resources and wealth, with established political parties making demands on the government for fair and equitable taxes and the provision of a safety net for the underprivileged sectors.

Some significant questions have been raised about the formation of the state through a crisis sequence. Is the sequencing of steps inevitable? Can the crises reoccur? Does it matter if several crises occur at the same time? How easy is it to recognize and identify the formation of crises in historical studies? Are the steps universal or based primarily on Western experience? In defense of the theory, it can be pointed out that the steps define categories that might not be universal but are useful when they do apply. And if the sequence of steps does not apply universally to all states, it is still possible to recognize that a nation is formed through a series of steps, allowing for variations from situation to situation.

In 1975, anthropologist Elman Rogers Service published *Origins of the State and Civilization*, a detailed summary description of what anthropologists had learned over time about the specific characteristics of political organizations, including the importance of communities based on geographical territory. By the late 1980s, the growth of a world market sparked a debate about the changing relationship between a globalized economic marketplace and the territorialized national state.

Today the term *deterritorialization* is used to express anthropology's awareness of the many activities—economic, social, and cultural—occurring in the new “space” created by communication-extension technologies. Extension technologies include the Internet, e-mail, broadcasting, computer networking, and telephoning. For example, the Internet and electronic mail can be used by anyone, from any place at any time, with no concern for geographical place.

When politics and identities become detached from local places as part of the globalization process, anthropologists also use the term *deterritorialization*, in this instance referring to the lessening of state authority and the trend for some ethnic groups within the state to identify less with the state and more with their ethnic identities. It can be argued that the deterritorialization of politics is a positive process, making the world as whole a more democratic experience for more people. For instance, some indigenous groups are able to find justice in the global community when the territorial nation-state denies it. The global recognition of the need for environmental awareness often views indigenous groups as making a positive contribution to the environment. When indigenous peoples create transnational alliances based on their contributions to the global ecosystem, they position themselves to advocate powerfully for their own state-based conflicts with international human rights movements. For these

reasons, deterritorialized social movements such as global environmentalism and international human rights are increasingly able to transcend territorial sovereignty. Some political scientists and anthropologists suggest that the appearance of deterritorialized social movements indicates the end of state territorial sovereignty.

Future Directions

In 1994, the American Anthropological Association (as cited by Givens & Tucker, 1994) published a survey describing issues and trends in anthropology for the following 25 years. The survey predicted a “greater emphasis on the contemporary world and processes of global change . . . such as sustainable development, world ecology, environmental studies, comparative global perspectives, global interdependence, and internationalization” (Givens & Tucker, 1994, p. 1). The survey clearly defines areas of research and study that have been and are being addressed in recent publications, conference sessions, papers, and introductory anthropology texts. What new understanding do these areas of recent research bring to the study of political anthropology and political organizations?

The words *global* and *globalization* occur frequently in the latest literature from anthropologists. As recently as 1990, Anthony Giddens in *The Consequences of Modernity* defined globalization as “the intensification of world-wide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa” (p. 64). Globalization usually refers to an impersonal process that occurs with no reference to any nation. Examples include technological developments in communication, mass popular culture, and global finances. Globalization affects anthropology’s understanding of human relations as interactions become disembodied, place no longer determines identity, territorial boundaries are no longer constraining, and communities are not defined by territory. Globalization also affects the social/cultural experience through a rapid spread of ideas. Economically, there is a rapid change of economic conditions from one region to another. Demographically, migration promotes cultural contact among populations. Government that rules by territorial boundaries must consider people who migrate into the territorial boundary but consider themselves as still belonging to the “homeland.”

To account for globalization by the new technologies, anthropologists talk about the contemporary state as transcending physical boundaries. Many traditional societies were formed to protect geographic boundaries from outside invaders, but in the new global communities, war is no longer inevitable because global communities transcend physical boundaries. The global communities are defined as *transnational* and the citizens belonging to them are global as well. A transnational state is described as

abstract, less institutionalized, and less intentional than the previous description of the modern state.

Transnational is a frequently used term that overlaps with globalization but has some specific limitations related to the territorial national state. The term *global* can be appropriately used to describe environmental concerns affecting the entire planet. No specific national territory is the center of the wide awareness of the need to protect the environment. By contrast, transnational events, such as the migration of refugees from one territory to another, involve several nations but originate in a homeland that can be identified as the anchoring point.

Corporations operating on a worldwide scale are transnational because they are centered in a national country of origin. Examples of corporations that are transnational include Wal-Mart, McDonald’s, Sony, and Honda. Truly globalized corporations such as the World Bank, the International Monetary Fund, and the World Trade Organization can be said to somewhat reduce the power of the state by taking on some of the functions that were once exclusively monopolized by the state alone. Technological changes, international communication, global mass culture, global finance, and the world environment all influence transnationalism. With this, anthropologists are watching the contemporary state reemerge in a new form with fewer boundaries and limitations. Some theorists speculate that globalism will replace nationalism in the same way that nationalism replaced tribalism.

At the same time that globalism gives the abstract impression of inclusivity, anthropologists are noticing the reemergence of an awareness of identity and place experienced concretely in face-to-face relationships with others. For those who are experiencing the relationship, this reemergence of an awareness of the need for face-to-face social integration is sometimes referred to as *tribalism*.

Anthropologists continue to find new problems and topics to study as societies continue to change throughout the world. Communication and transportation allow people of all cultures to interact and experience each other, exchanging material goods and cultural ideas. An event from a very distant place can shape local experiences because of the links created by mobility, including space- and time-altering technologies. Anthropologists can no longer understand power as happening exclusively at the local or state level. Anthropologists now look at the changing relationship between the local and the global and how the two experiences interact.

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MAGIC AND SCIENCE

ISABELLE M. FLEMMING

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Religious and magical practices in primitive cultures were the focus of research among the first anthropologists in the 19th century. The attempt to distinguish religion from magic and define each sharply has continued to be a significant topic in anthropology. In more recent years, anthropologists have broadened their studies to include the practice of science along with the many other facets of human beliefs and endeavors. Cultural anthropology is one of the four fields of anthropological study, the others being archaeology, biological anthropology, and linguistic anthropology. All such research takes into consideration the context of the particular culture within which the study is focused, and accumulated records offer growing opportunities for the comparison and contrast of beliefs, rituals, and behaviors worldwide and across time.

Cultures are defined as human groups united by their social practices and beliefs, passed down in oral and ceremonial traditions. Cultural anthropologists consider every facet of cultures, both past and present. Art, industry, beliefs, rituals, kinship, and child rearing are among the topics studied. Methods of study involve fieldwork, direct observation, interviews conducted within the society, consideration of the manner in which various systems in the society relate to each other, and the comparison of observations recorded about other societies. This enables anthropologists to understand the culture's own value system and thought processes, and to discover the logic of its practices within the context of the culture.

Magic, science, and religion are related, each playing a part—to a greater or lesser degree—in societies across the world and throughout time. An ongoing area of anthropological study has been the attempt to define clearly the boundaries of each. Science is evident in the use of technology, agricultural techniques, materials and weapon production, and record keeping. Technology is the application of science and may develop by trial and error. Anthropological interpretation of the use of magic in primitive and nontraditional cultures has evolved over time. While some aspects appear fundamental to magic across cultures, such as the need to bring order and control to an unpredictable world, actual practices may differ among the cultures. Religion, often linked with magic, allows intercession with the gods and spirits and provides answers about the world and how it came to be.

Early anthropologists believed all human cultures developed within the same framework of stages, from savage to civilized. Information about non-Western groups came from explorers and missionaries who reported what they observed. Eventually, this theory proved too narrow to accommodate all facets of a given culture. In the 20th century, the discipline of anthropology moved away from those “armchair” scholars who based their theories primarily on anecdotal evidence. Researchers came to recognize the need for direct observation and even participation in the cultures they studied. What began as a study of religious practices among primitive, or nontraditional, societies broadened in scope as

anthropologists took to the field and experienced directly the richness of the many different cultures.

Today, studies may look at characteristics of human behavior common across boundaries, or they may view each culture within its own microcosm. It is impossible to understand another culture in terms of one's own, as the foundation will be different. At the root of the research is the necessity to learn the core beliefs upon which each individual society is based.

History of Anthropological Theory

Evolutionism

The 19th-century introduction of Darwin's theory of evolution and social Darwinism (a social theory that borrowed from it) led to the idea of the evolution of cultures. In the United States, Lewis Henry Morgan led the study of primitive cultures, based on the concept of evolutionism. He observed Native Americans in New York and found that direct observation made the internal logic of their cultures more apparent. In England, Edward B. Tylor, also an evolutionist, was the first anthropologist to advance a definition of culture, describing it as an inclusive unit where beliefs, customs, art, and other aspects of human behavior combined to form a cohesive whole. He believed that there were general principles of thought and action found in all cultures, but that different cultures were in varying stages of development. His influential book, *Primitive Culture* (1871/1958), was later published in two volumes. He proposed that magic was practiced by cultures at the lowest stages of civilization, by the "lower races," uneducated and superstitious. He suggested that a progression toward modern civilized cultures was based on an advanced education, which gave people the growing ability to use testing and experience as a means of forming opinions. Primitive "savages" erroneously assumed that associations in thought must necessarily occur in reality as well. Occult magic therefore was based on an association of ideas. Analogy and symbolism were the foundation of the magical arts, and Tylor likened them to superstitions still held by Europeans in his day.

The progression of cultures could be seen in the practice of religion, to which Tylor gave a basic definition of the "belief in spiritual beings," and to which he applied the term *animism*. Animism included the belief that souls of individuals could exist after death, as well as the belief in other spiritual beings that interacted with society and individuals on some level. He suggested that the notion of the existence of such spirits arose from dreams, hallucinations, and related experiences, and he saw no value or truth in the magical beliefs of primitive cultures. Tylor stated that the animistic spirits were what humans imagined their own souls to be. The spirits were meant to explain the workings of nature, based on the idea that all forces and things in nature were inhabited by various spirit forms—both good and evil.

The Englishman James George Frazer developed the idea of sympathetic magic in *The Golden Bough* (1890/1981), a book that grew into several volumes. He presented a complex picture of primitive magic, suggesting that the practice first arose from a need to control nature. Spells and rituals, by means of compulsion, were meant to have a direct effect on successful hunting and food gathering, and also on the weather. When coercion failed, pleas and propitiations to gods and spirits were introduced, and religion, as a separate practice, was born. When cultures grew more sophisticated, they would adopt the methods of science.

Frazer's book had a deep impact on many disciplines of study, discussing the myths and religions of a number of non-Christian cultures of the world, as well as sharing concerns such as birth and death. Like Tylor, Frazer saw a progression of intellectual development from the simple to the more complex. Cultures first used magic, advanced to religion, and finally to science. He described primitive magic as based on notions of sympathy, wherein an effect could be brought about by imitating it. In part, the evolutionary focus was the result of the biases built into the material Frazer collected from those who provided him with information, such as missionaries and colonialists.

Cultural Relativism

Franz Boas came to the United States in the late 19th century and contributed significantly to the growing field of anthropology during the early 20th century. Based on his experiences among other societies, he rejected the notion of evolutionism, with its cultural biases, and stated that every culture must be studied and understood in terms of its own system of values. Looking at cultures this way called for probing their individual histories. No longer placing them in a one-size-fits-all set of developmental steps, Boas valued each culture's historical development on its own merits. This is the theory of historical particularism. Boas defined culture as a set of learned behaviors. He emphasized research and promoted use of scientific methods by anthropologists, bringing the practice of anthropology into the modern era.

Functionalism

Functionalists moved away from a focus on historical context and studied the structures within a society. Each system or structure contributed to the integrity and stability of the whole society. This approach in the early 20th century also helped to shed the racist biases and evolutionist views of earlier theories. However, by ignoring history, functionalism did not account for change and did not provide for the changes that may take place in a society when it is transformed by exposure to the outside world.

There were two approaches to functionalism, as seen in the theories of Bronislaw Malinowski, who focused on

individuals, versus those of A. R. Radcliffe-Brown, who looked at the structure of the society. Malinowski attempted to disentangle religion from magic in *Magic, Science and Religion and Other Essays* (1948/1954). *Coral Gardens and Their Magic* (1935) addressed agricultural magical rites practiced by Trobriand Islanders of Melanesia. Malinowski considered magic to be nothing more than a specific set of acts, practical in their intent as a means to accomplish a goal. The emotions concurrent with the act were also critical to the success of the magic. He found that different types of magic acts were associated with different goals. Melanesians, for example, performed the most powerful magical rites when engaged in the most dangerous or uncertain operations. House building, although complex, presented little risk and therefore required no accompanying magic to ensure success. Fishing, when it involved such dangerous fish as the shark or others difficult to catch, called for a great deal of magical preparation. Magical forces played a part in certain human emotions and in forces of nature for the Melanesians, calling upon the need for associated magic rites and acts. Malinowski concluded that magic was not unlike science, since it called for acts toward practical ends and was governed by theory and principles that determined how the acts must be performed.

E. E. Evans-Pritchard expanded on the structural form of functionalism and specialized in the study of African cultures. Two of his books have had an especially strong impact in the field of anthropology. In *The Nuer* (1940), he examined the political organization of the Nuer society in detail. The book has become a classic ethnographic study. *Witchcraft, Oracles, and Magic Among the Azande* (1937) was a major study of the magical beliefs of a society based on non-Western thought. Evans-Pritchard demonstrated the internal coherence of the Azande culture and the logic of their magical beliefs within the context of Azande society. His rich, well-documented description of magic and witchcraft in Azande society can be contrasted with the practices of other groups elsewhere.

Other Notable Figures in Anthropology

Émile Durkheim, a French sociologist, strongly influenced the theory of structural functionalism. He wrote the book *Elementary Forms of the Religious Life* (1912/1965), which discussed the origin of religions in society. He separated magic (profane) from religion (sacred), stating that because magic was always performed in private, it could not be seen as part of religion, which was social. He viewed magic as a precursor to science, but preferred to focus on religion.

Ruth Fulton Benedict, an early 20th-century cultural anthropologist, did fieldwork among various Native American groups and wrote the classic *Patterns of Culture* (1934/1959). Like her colleague Franz Boas, she rejected theories of racism based on heredity and environment.

Margaret Mead, a major figure in American anthropology, used the ethnographic method to conduct field studies, focusing on child rearing and gender issues in Samoa, New Guinea, and Bali. She was a prolific writer, promoted women's rights, and was among the first to use photography as a way of adding to the record of a culture. Her best-known work is *Coming of Age in Samoa* (1928/1961).

The French anthropologist Claude Lévi-Strauss was strongly influenced by linguistics. He focused on those common characteristics of the human mind that produced an underlying structure among cultures. This theory is known as structuralism. He posited that the same set of general rules underpins all cultures. The thoughts of humans are patterned in binary oppositions arising out of the human need to classify. In *Myth and Meaning* (1978/1995), a collection of his lectures, he states: "To speak of rules and to speak of meaning is to speak of the same thing; and if we look at all the intellectual undertakings of mankind . . . the common denominator is always to introduce some kind of order" (pp. 12–13).

Clifford Geertz, a cultural anthropologist focusing on symbolism, was particularly concerned with symbolism evinced by a culture. He defined culture as an expression of the symbols used by a society. He posited that, in order to gain an inside view of a culture, the anthropologist must first learn how its individual members view selfhood. It is impossible to climb into the skin of another, Geertz said, but it is essential to understand what the individual really conceives that it means to be a human. The sense of self is not the same in every culture, and culture itself is transmitted through symbols that carry meanings. These symbols are what members of society use to communicate, and it is these symbols that shape the worldview.

Alice and Irvin Child coauthored the book *Religion and Magic in the Life of Traditional Peoples* (1993). It discussed and compared rituals and other religious practices conducted among the traditional societies of the world. They found trends and recurring elements of religion. Later, Irvin Child, a Yale psychologist, became interested in the paranormal and conducted research in the current practices of Western society.

Magic and Science: A Comparative Overview

Anthropologists, psychologists, and social scientists generally see the function of magic as a way of controlling and organizing the world. Magic, along with religion and myth, is a way of explaining the world and its natural history. This may serve to explain things, as in creation stories of how the world began. Magic, religion, and myth may also provide social control, help increase crop yields, and improve the hunt or predict the future. Science has its own creation myth, the big bang theory, developed on the evidence of astronomical and mathematical studies. The perception of

what is taking place when one practices science versus magic may be different, while the purpose remains the same. A culture's viewpoint and the instruments at hand will also determine which practice it is perceived to be by those *outside* of its culture.

Magic and science have elements in common. Mathematics is fundamental to science, but has also been considered a highly magical art. The Pythagoreans did much to develop mathematics, but they saw numbers as magical, possibly even the true foundation of reality. Other cultures viewed numbers as magical symbols. Magic involves ritual and symbol, and symbols are a cornerstone of magic, as they are in science. Magic relies on a belief in forces beyond the everyday world. Magic often requires a very orderly progression of routines and practices that, if done correctly, will lead to the desired result. It is generally practiced in secret and carried out by individuals or small groups.

Science, too, involves ritual in the proper implementation of experiment, and the scientific method calls for an orderly progression of routines. Symbols are used in all areas of science. Natural forces are a foundation of modern science, but these forces have been studied and described, and they are not viewed as spirits or gods. For the scientist, forces are a part of the natural world—as are spirits to those who believe in magic—but are explicable in concrete terms and are not whimsical in their behavior. Scientific forces are predictable in their operation, and they can be described mathematically and their effects demonstrated. Scientists share their knowledge, often building on the work of others.

Magic Practices

Magic may be recognized by ceremony and ritual practices, a demand for secrecy, and an attempt to control nature or other humans. Those performing rituals, whether in earlier societies or today, see these acts as transformative. There is not only a public act, but also an inner sacred experience. The magic arts can be part of a very complex structure or very basic and direct. The successful performance of magic is based on the belief in the underlying connection of all objects, peoples, and animals through a supernatural force—a perceived connection between similar things. Sympathetic magic, also referred to as imitative magic, is in practice when a voodoo doll is used to cause pain or illness in the person whose image is represented by the doll. Contagious or contact magic depends on the notion of a continuing tie between items or persons who have once been in contact. In some cultures, nail clippings or hair may be used to turn harm back on their original owner.

Mana was a Polynesian term that referred to a kind of power—a supernatural force—possessed by someone or something. Marcel Mauss studied the concept of mana extensively, believing it to have been a universal belief at an earlier time. This term came to be related to taboo,

which also refers to a power, generally of evil or pollution inherent in a person or object. The taboo power may only be temporary, and in some societies taboo also refers to the special power of a king, for example, where his position elevates him away from the common folk. Power was often construed as hierarchical.

Magic and religion are often difficult to separate when used to explain life itself. The mysteries of life and death hold great importance to humans. Archaeologists have found evidence of ritual burials from as long ago as 60,000 years. Deliberate burial suggests an awareness of or belief in something beyond the mortal body, and goods buried with a body could suggest ritual practices and the belief in an afterlife. This suggests the belief in souls that live on after human flesh decays. The notion of a soul could have contributed to the belief in supernatural forces, such as gods and spirits.

While pleas, prayers, and other propitiatory acts point to religious beliefs, the manipulation or coercion of forces to produce specific results may be defined as magic, according to Frazer (1890/1981). Magic can be divided broadly into good (white) and bad (demonic). Occult magic, used for either good or bad, is that which appeals to unseen forces, as *occult* means hidden. Attitudes and practices associated with magic vary widely from culture to culture, although the underlying theme remains that of control or manipulation of gods, demons, or other forces. Superstition, still apparent today in such acts as nailing a horseshoe above a door or carrying a rabbit's foot, expresses the remnants of ritual magical acts and beliefs.

Cave Drawings and Rock Art

The earliest evidence of magical practices is found in prehistoric cave drawings. Cave drawings and rock art are found throughout the world, some created over 30,000 years ago; the last of it perhaps died out in the 19th century with the passing of the San in southern Africa. Especially in Australia, oral tradition about the creation of rock art still exists. However, the religious and magical practices of societies do change over time, and what modern oral traditions describe may not capture the true meaning and purpose of much older work; care must therefore be taken when using that evidence to interpret the drawings of former centuries.

One of the most recently discovered sets of cave paintings is in Grotte Chauvet in France. The work is believed to be more than 32,000 years old and consists of paintings, geometric forms, images picked out of the rock by sharp implements, and hand prints. The many animals depicted represent animals actually hunted by those early people, as proven by the types of animal bones found in the area. Often the geometric forms are near the animals and perhaps suggest counts or rituals. The images of hands are more difficult to explain, but they could have been part of a ritual.

A recent comparative study of rock art in western North America led to the conclusion that Columbia Plateau rock art represented several different types of ritual, performed by different social groups at different times. The art was seen to represent rituals by shamans, such as vision quests, where the shaman entered a trancelike state to interact directly with spirit guides, and rituals associated with death. Some rock art was clearly sympathetic magic associated with the hunt. Interpretation of any such drawings or engravings may depend on time and place. It is doubtful that one interpretation fits all the cases.

Jean Clottes in *World Rock Art* (2002) points to certain themes and practices that are generally recurrent in cultures, such as birth, death, and initiation rites for some purpose, as well as coming of age and marriage. Any of these may be surrounded with ceremonies, some of which may be recorded or symbolized in rock art. Other themes could include the creation stories of a culture and those sacred stories or legends that are significant to it. Members of traditional cultures in both the recent and distant past saw themselves not as separate from, but as part of, the natural world. Seeing all of nature as related, they could believe that the images held the magic of spirits or natural forces. Depiction of the images therefore represented an attempt to influence, coerce, or seek help from the inherent power of the image.

One of the most puzzling recurrent depictions in cave drawings and rock art is that of hands. They also appear nearly worldwide. Sometimes the hand was pressed in pigment and then rolled onto a surface to leave the imprint. On other occasions, pigment was placed in the mouth and blown around the hand pressed against the wall in order to produce a stencil effect. It is still not possible to interpret the purpose, which could have been part of a ritual, or merely a means of leaving behind the identity of oneself. In some areas, the imprints include fingers that appear to be missing some bones. Clottes noted that, in Australia, these images were a form of sign language and could be the same elsewhere. He found that sign language was used for communication, especially in hunter-gatherer cultures, often during a hunt. But sign language could also have been used to communicate with the spirits.

Images of humans and animals are common motifs in cave drawings and rock art. Animal images might have been intended to enhance success in the hunt, although some argue that the evidence is open to other interpretations. Some images resemble humans in other guises, suggesting shamans interceding with the spiritual world. Such *therianthropes*, as they are called, may have shown persons in costumes, but for traditional cultures these probably held a greater significance, perhaps of a shaman passing into the animal or spirit world. The latter images appear most often in Africa and the Americas. Other universal designs include patterns referred to as geometrical designs, objects, and shapes engraved or gouged out of the rock. Despite similarities in appearance, any of these would need to be studied within the context of place, time, and culture.

Anthropologists interpret the drawings and engravings found in rock art by noting several variables. The methods by which the images are depicted, along with their locations geographically and within the cave, are considered. Comparisons are also made with the ethnological record. Caves were viewed as other worlds. Art created far in the depths of the cave could have been especially sacred, as the cave was seen to exist in another realm. Other sacred places included “boundary zones,” those areas where one physical geography came into contact with or connected to another. Such examples included where mountains touched both earth and sky, or where the depths of canyons connected deep earth and water. The accumulating records of anthropological study show that there are some basic similarities of thought and action found among cultures in like stages of development. Because humans are the same in terms of physical makeup and needs, the foregoing records permit some analogy to be made between more recent and more fully documented rock art with that of the ancient past.

Shamans

Shamans are specialized practitioners who can enter a state in which they have direct contact with spirits or animistic elements of matter and life. By asking or compelling, shamans obtain assistance from the spirits on behalf of their tribe or individual members. Healing often plays a key part in the shaman's role. Shamans exist now, just as they did millennia ago, and they are powerful members of their societies.

Traditionally, shamans seem to have appeared most often in hunter-gatherer cultures. Their practice often involved the trance state, reached through any one of several methods. Enduring excessive pain, fasting to the point of near starvation, dancing to the point of exhaustion, and taking some form of powerful drug were among the many routes to the altered state necessary for the shaman to journey into the world of the spirits. The “New Age” has seen the rise of neoshamanism, prompted by the belief that there is something valid in shamanism. Mircea Eliade contributed to this explosion of interest when he described shamanism as a form of ecstasy in his book *Shamanism: Archaic Techniques of Ecstasy* (1951/1964). Although some points in this classic work have been questioned by more recent anthropologists, it nevertheless remains an important study.

A key to shamanic practices has been the belief that multiple worlds exist in the cosmos, either alongside or within the world of everyday existence. Here, science and magic seem to meet, for the many worlds theory (parallel universes) is accepted by many physicists today. Shamans could interact directly with creatures of the other worlds in order to obtain help, practice healing, or wreak evil on other members of the society. Usually, those who dealt evil

were considered sorcerers rather than shamans, however. In many cultures, particular animals served as helpers or guides for the shaman. In such cases, the shaman was believed to transform literally into the animal itself. Often, shamans were associated with healing. Through ritual, dance, and a variety of other techniques, shamans have successfully cured members of their tribal group. A key to success was the belief that they truly had power to cure.

Other Magic Practitioners

Depending on the culture both present and past, witches, sorcerers, shamans, wise men or wise women, or some combination, were set apart as powerful figures to contend with the hidden spirits of nature, demons, and gods. For each culture, the training might be different, yet such figures had access to magic potions, prayers, amulets and talismans, or trances in order to manipulate the magic. Religions, too, had access to supernatural powers, and the line sometimes blurs, depending on the point of view. For example, the 16th-century Reformation saw Protestants accusing Catholics of practicing magic because liturgical books contained rituals for blessing wells and animals, for driving away thunder, for exorcising evil spirits, and for the miracles claimed to occur at holy shrines.

E. E. Evans-Pritchard (1937) lived among the Azande, an African tribe, making careful note of all systems and practices within their culture. He learned that, among the Azande, witchcraft was literally a physical characteristic, a specific material present in the bodies of certain individuals. Witchcraft was inherited and was performed psychically, without rites or spells. Sorcerers, however, did harm by using bad medicines in magic rites. Diviners were consulted to identify witches. Evans-Pritchard suggested that for the Azande, witchcraft explained why bad things happened and provided a way of dealing with those occurrences.

The curse of a witch doctor was no idle threat. The beliefs of the one cursed and of his fellow tribe members were shaped by the views of the culture. The cursed one was shunned, because he was polluted, a term related to taboo. Hopeless, ostracized, and convinced of the curse's power, the member would die, providing proof of the magical powers leveled against him. Success reinforced the belief and the magic was validated.

A number of Native American tribes incorporated fears of witches or sorcerers into their belief systems, and this may have offered a form of social control. Mental illness has also been attributed to witchcraft in societies that embrace magic. Witch doctors or wise women appear in some societies as healers, using spells, rituals, and special medicines to drive out the evil spirits that produce illness. There are countless examples of these beliefs and practices. Differences may be great or subtle, so care is taken in evaluating magic activity within a given culture.

Divination uses any of a variety of methods to predict the future, such as the outcome of a battle, or to locate an item or person. Oracle bones, animal livers, tea leaves, and the position and movement of stars and planets are among the varied sources used by diviners. Early astrology was a complex form of divining that required a familiarity with the motions of the stars and planets. *As above so below* developed out of the tenets of astrology. This practice, begun in ancient Babylonia, was based on constant observation of the stars and planets, which were regarded as gods or other supernatural beings. Their activities could be used to make certain predictions about occurrences in the world below. Astrology passed on from culture to culture, with embellishments and reinterpretations added over time. Careful observations made by astrologists and recorded over a long period of time gave real information upon which scientific hypotheses could eventually be made. This contributed to the growth of astronomy. Even in this era, there are people who rely on astrological readings to assist in decision making.

The belief in the link between the heavens and earth served as an underpinning for the practice of alchemy, a form of magic prevalent in medieval and Renaissance Europe. The preparation, the incantations, the secrecy involved, and the connection with astrological symbols bespoke magic. Yet, practitioners would argue that the labor, the time involved, and the withdrawal into an inner world were necessary to move up to a higher, purer level of existence as good Christians. References were made to heavenly bodies and their influence on the world below. At the end of the alchemist's journey, she should have both created gold and achieved a position among the elite. Alchemy continued to be practiced into the 17th century, and while it involved magical rituals, many of its early laboratory practices served as precursors to chemistry.

Magic Today

Western society has seen the reemergence of magic after the so-called rationalizing influences of the 17th and 18th centuries and the rise of science. Witchcraft, or secret societies with magic rituals, attempts to contact the departed through psychic mediums, and Ouija boards are just one of the forms this has taken. Wicca, or modern witchcraft, is often seen as an expression of feminism and as benign in its practices. Its chief ceremony is the Drawing Down of the Moon, where the goddess is drawn into the high priestess.

In 1888, Dr. Wynn Westcott established the Order of the Golden Dawn, a secretive society based on various historical magical traditions, such as the Kabbala. Members desired to achieve the goal of emerging into the light—a spiritual rebirth—by ascending the Kabbalistic tree of life in sacred ceremonies. Aleister Crowley was a well-known wicked magician, a controversial member of

the Order of the Golden Dawn. This group of practitioners helped to restore an interest in magical practice in modern times. A need for greater fulfillment, disappointment with what current religion has to offer, or a desire to turn away from an increasingly complex world and embrace a more rural, natural world may contribute to the desire to practice magic today.

For the first time in human history, a cyber world exists within our own. Access to computers and the Internet has led to increasing communication via new technologies, such as social-networking pages, blogs, online games, and interactive Web pages. As technology advances, it may become difficult to separate our world from the virtual world—the joining of magic and science in ways never dreamed of before.

The Scientific Method

Through research and experiment, scientists manipulate nature according to specific methods that could be interpreted as ritual, yet science differs from magic. The way science is practiced is what sets it apart and validates science's findings and creations, according to a scientific worldview. Accurate observation and careful, replicable experimentation is part of the scientific method, and what is proven must also be falsifiable—able to be proven false based on newer data or other findings. If a new experiment yields better interpretations, then the old theory is discarded. Fundamental to science is the ability for an experiment to be repeatable anywhere, anytime, in any culture.

Science consists of both theory and application. Technology is the application of scientific principles to create machines, medicines, or other aids to human progress. Technology has always been with humans. The principles of science behind the practice need not be understood. The discovery of making bronze to create stronger weapons is one example. It was not necessary to understand the chemistry of metals to produce the new substance—trial and error probably led the path to discovery.

According to sociologist Thomas Kuhn, the process by which consensus is reached in the scientific community is not a smooth accumulation of information over time. In his landmark book, *The Structure of Scientific Revolutions* (1962/1996), he explained the process. First, there is a stable belief system, based on a particular worldview. The world appears to function within the tenets of that system, and certain predictions can be made based on it. When consensus breaks down—as it may with the appearance of many inexplicable events, observations, or experimental results—attempts will be made to explain these oddities within the old system. Scientists will go to great lengths to save the system that is the entrenched worldview. As negative evidence builds up, the old system gradually breaks down. When every

effort has been exhausted to fit the oddities into the current science, a new science may erupt. According to Kuhn, it will be a revolutionary leap, a paradigm shift, and will be completely incommensurate with the system it replaces. Consensus is reestablished only gradually, but when it is reached, the new science becomes the “true” science. The shift from a belief in an earth-centered planetary system to the sun-centered heliocentric system is an example of such a shift.

Careful observation is the first step in the process of the scientific method. Cultures now and in the past were keen observers of nature. In this respect, most cultures may be said to practice the first step. The next step is to create a hypothesis, or test description, based on the results of the observations or experiments. The experiments must be reproducible by anyone and yield the same results. Anyone should be able to make the same observations. Consistency of measure, observation, and results is the key to a sound scientific method.

The third step calls for scientists to make predictions based on the developed hypotheses and then test the predictions through further experiment and observation. If additional testing does not support the hypothesis, it must be revised or perhaps changed completely. With consistency of results and predictability of further results, the hypothesis may become a theory.

Finally, a theory must be both repeatable and falsifiable. Falsifiability means that some further observation or experiment could prove the theory untrue. On the other hand, if one claimed to hear voices from Mars and further claimed that he alone was a special agent of that reception, it would not be a falsifiable theory. Science is not individual, nor is it secret. It is designed to accommodate change, while magic is generally a very traditional system.

Science and Technology in Magical Societies

Cultures based on the use of magic often used science and technology for practical purposes. Agricultural societies found it necessary to develop a method for determining, in advance, when planting or reaping should begin. By closely observing natural signs, such as the regular movement of the sun, moon, and stars through the seasons, cultures learned to recognize the signs. The development of calendars grew out of this. As with so much else, the calendars might also involve magic for prediction or as indicators of times appropriate for particular rituals and practices. Careful observation, record keeping, and mathematical skills were required to create accurate calendars. The creation of bronze and iron, of pottery and glass, all required much technical skill. Metal making, in particular, was associated with magic and secrecy, as the scientific reasons for success were not understood.

Conclusion

Magic served practical purposes, was based on a belief in the interconnectedness of all things in the world, and could be put to good or bad uses. Magic helped to introduce order to a complex world marked by unpredictable events and often served as a means to preserve social order. It could explain why things happened and how the world came to be. Creation myths are among the most powerful foundations of cultures and shape a worldview, sometimes even dictating how physical structures will be laid out in the landscape. As a means of explanation and as an application of acts toward a practical end, magic can be likened to science.

For some, magic was seen as the means to obtain ultimate power. For others, it served and continues to serve as a form of religion. In practice, magic tends to be individual, while science depends on the work of others. While magic and science both operate with natural forces, the understanding of what those natural forces are and how they may be harnessed is different. Each approach is logical within the realm of the culture that engenders it. Magic may be compared to science as a way of creating order and achieving success in human endeavors that promote health and well-being. Magical acts sometimes contributed to scientific ideas, yet the two can exist side-by-side, founded on entirely different views of the world.

Anthropological Studies

The Present

In the recent past, anthropological studies have expanded and enriched the study of other cultures, incorporating biological, psychological, or gender aspects. In addition, structuralism—associated with linguistic factors and symbolic anthropology—has added greatly to the understanding of both traditional and nontraditional societies.

Daniel O’Keefe’s *Stolen Lightning: The Social Theory of Magic* (1982) and Stanley J. Tambiah’s *Magic, Science, Religion, and the Scope of Rationality* (1990) have contributed to the recent understanding of magic. O’Keefe’s book discusses both how and why magic works in various societies and breaks it down into the many categories found in practice. It is a very comprehensive book about all aspects of the supernatural. Tambiah’s book explores the evolving worldview of the Western European tradition as it has shaped the understanding and interpretation of magic, science, and religion in other cultures. He emphasizes the “continuities in experience” and the “psychic unity of mankind.” Tambiah, who did his field studies in Asia, considers how anthropologists, rooted in the Western worldview, can analyze and describe the magic, science, and religion in comparative studies of other cultures.

The Future

Investigations into the nature of virtual reality are on the cutting edge of studies. *Technopagans* are those who are comfortable in the changing world of cyberspace, where reality can be modified, as well as in the world of computers and electronics. An article in the *Anthropology News* (Gusterson, 2004) pointed out how religion and science can overlap. Recent political decisions in the United States show evidence of this mixture where there has been a call for banishing the teaching of evolution in schools. This is an area that calls for investigation. The same article discusses “the way that magic and science, far from being opposites, are increasingly fused at the hip.” The return to magical practices and witchcraft in modern societies calls for study. Shamanism has reemerged as well, but shedding its trappings of superstition and sorcery. There is a need to understand how it fits into modern society, and why.

With the advances made in genetics and cognitive studies, earlier theories may need to be reconsidered. Questions will address which concepts and behaviors are passed on genetically rather than culturally. Further studies of the human brain have revealed a more formal and organized structure than was understood in the past. Studies in linguistics, and in the use and comprehension of symbols and signs, provide fertile ground for further exploration.

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SHAMANISM

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Shamanism has commanded scholarly and intellectual attention in Western academia since the 18th century. Current anthropologists discredit much of the historic literature as methodologically unscientific, revealing more about the biases and fascinations of Western writers than about their subjects. Nevertheless, the ethnographic record on shamanism is rich and has informed scholars from numerous disciplines, including religious studies, history, and psychology.

Anthropologists use *shaman* in several different ways. Most narrowly, and arguably most appropriately, it denotes magico-religious specialists of the Siberian Tungus people. The word *saman* comes from the Tungus verb *sa*—"to know." Noting similarities and cultural diffusion, scholars expanded the term to indicate similar practitioners in other circumboreal cultures and central Asia. Most commonly, shaman refers to a theoretical category of magico-religious specialists in cultures all over the world and across time. Scholars debate vigorously about what constitutes shamanism in this broader sense. Indeed, they argue about whether such a global phenomenon really exists, or is just a construction of the modern Western imagination.

This chapter provides an overview of shamanism, first reviewing theories that advance core characteristics of shamanism, and then summarizing the critiques of the category of shamanism. Next is a discussion of several major topics: the shamanistic worldview; the call and training of the shaman; the shaman and altered states of consciousness;

the work of the shaman in the community; and neoshamanism, a recent form of shamanic practice developed in Western urban areas. The chapter concludes with suggestions for future lines of inquiry and a select list of core works on the topic for further reading. Discussion of specific cultures is beyond the scope of this chapter.

Definitions of Shamanism

By the 1930s, the term *shamanism* was applied indiscriminately to almost anything "supernatural" outside the "world religions" and became virtually meaningless. To discover their essential characteristics, Shirokogoroff (1935) returned to the Tungus shamans. Acknowledging that shamanic methods differ from culture to culture, he perceived a complex that extends beyond cultural boundaries that would be recognizable to the shamans themselves. He reported that the Tungus shamans and the Manchu shamans recognize each other's power without knowing each other's methods.

Shirokogoroff's Definition

Shirokogoroff proposed six formal characteristics of shamanism. First and putatively most important, shamans are masters of spirits. Shamans control the spirits and their interactions with them in sharp contrast to those controlled or possessed by the spirits.

Second, the shaman masters numerous spirits. The spirits in the shaman's arsenal have various qualities under the shaman's command. Typically, the shaman begins with one or a few spirits, and then learns to master others with their help. In many cultures, the assessment of a shaman's power is directly proportionate to the number of spirits mastered.

Third, there are culturally recognized methods for working with spirits. The techniques include means of contact and breaking contact, and ways of attracting and caring for spirits and maintaining right relations with them. These practices vary from culture to culture and continually develop and change, yet they exist in some form wherever there is shamanism.

Fourth, except perhaps where shamanism has been outlawed, shamans in every culture use paraphernalia, costumes, or special equipment to enhance their power.

Fifth, for shamanism to exist, there must be some accepted theoretical basis. A belief in spirits and an understanding of their characteristics and modes of operation is essential. Moreover, people must believe that humans can interact with spirits and "master" them. The level of theoretical sophistication varies from shaman to shaman, but shamanism is always rooted in a theoretical foundation.

Finally, shamans play a recognized and integral role in their culture. A shaman does not master spirits for the sake of mastering spirits, but to serve the community.

Eliade's Theory of Shamanism

Shirokogoroff's work strongly influenced the Romanian historian of religion Mircea Eliade (1951/1964). Eliade was not an anthropologist. He was the quintessential armchair scholar, fluent in several European languages (but not native languages) and well versed in the literature. Philosophically, Eliade believed in a core human nature and therefore common types of experiences. However, he acknowledged the variety of ways the core experiences can be expressed and interpreted in different cultures. One type of core experience is what he called a *hierophany*, a direct experience of the sacred. In the ethnographic record of shamanism, Eliade believed he had discovered archaic techniques that enable direct perception of the Divine. He called shamanism "techniques of ecstasy," from the Greek *ekstasis* of the Dionysiac mysteries, "to stand outside oneself."

Eliade built on Shirokogoroff's definition of shamanism, enunciating a more general pattern of shamanism that he claimed is universal, justifying his theory in a *tour de force* review of the literature. One emphasis added to the definition was a focus on the shamanic sickness as initiation. This sickness is ecstatic and often contains experiences in which the shaman-to-be is dismembered, descends to the underworld, and ascends to the celestial world. During these experiences, a spirit being—usually a tutelary spirit—informs the future shaman of his calling. The training from the tutelary spirit operates simultaneously with that provided by elder shamans.

In Eliade's conception, the soul journey, or magical flight, is the quintessential shamanic experience. The soul of the shaman can go into the spirit world, including down into the underworld, elsewhere in the middle world in an "out of body" state, or up into the celestial world. All of these are linked by the *Axis Mundi*, often understood as the cosmic or world tree. The ecstatic flight or journey is highly visual and strongly geographic. The shaman also experiences the other senses in trance. Like Shirokogoroff, Eliade excluded trance states in which the individual is possessed by spirits. Eliade's work emphasized the psychological and mystical state of the shaman, touching upon, but not deeply analyzing, the role of the shaman in the community.

Other Definitions

Shirokogoroff and Eliade remain powerful influences in the continuing debate about shamanism. This section will summarize some of the major directions of the debate.

One of the most significant points of contention is whether categorically excluding possession trances is correct. In numerous cultures, shamans call the spirits and are possessed by them rather than going on a soul journey to the spirit realm. In many of these rites, the shaman maintains full consciousness and control. The exclusion of possession trances, then, is related to the concept of mastery. At first glance, it seems as though those who are possessed by spirits are mastered by them rather than being the master. A closer look reveals that often both soul-journey trances and possession trances are practiced in a single culture, and sometimes by the same individual. The *medium* often deliberately invokes and concludes the trance, rather than being controlled by the spirits. There is not agreement among scholars about whether possession-type trances should be considered as a type of shamanism. Some researchers refer to such practices as "shamanism of the possession type," whereas others exclude it. Hultkrantz (1973) presents a phenomenological definition that accepts the emic view. In this definition, the shaman is a professional, inspired intermediary who has direct contact with the spiritual world through ecstatic experiences and uses this contact on behalf of the shaman's society. What, therefore, separates a shaman from a different type of professional intermediary is the use of ecstatic experiences.

Another key issue in shamanic studies is the tendency to emphasize ecstasy to the neglect of investigating the role of shamans in relation to their societies. Porterfield (1987) advanced a definition of shamanism that emphasized the role of the shaman's body as the locus of symbolic activity. Shamans embody symbols in performance on behalf of their community, and the meaning ultimately resides not with the shaman but with the audience's interpretation of the performance. Porterfield's attention to the interactive and social nature of shamanism is a corrective to theories that neglect this aspect. However, this and similar theories

are criticized by some scholars for being materialistic and reductionist, the spirits being defined as “disguised representations of human desire” (p. 736).

Problems With the Category of Shamanism

Generating a clear, agreed-upon definition for shamanism is a difficult undertaking. Anthropologists worry that classifications across cultures may overgeneralize from the particular cultural data. As a result, such universalized, conceptual categories may reveal more about the culture of the scholars than the cultures they study. Therefore the construction of the exotic “other” is not and has never been politically neutral. In addition, contemporary anthropologists are gravely concerned not to harm the subjects of their studies. Shamanism is a particularly worrisome category because of how closely it is bound to Western attitudes toward indigenous peoples.

The history of shamanic studies is problematic from the beginning. Cultural anthropology began with evolutionary notions that the so-called “primitive” societies were vestiges of earlier developmental stages and represented the “past” of modern, Western industrialized man. All societies deemed primitive were non-Western and nonindustrialized, and they were not state-based societies. Shamanism was, therefore, considered a more primitive form of religion and was often mentioned in the company of words like *superstition* and *delusion*. The category was applied fairly indiscriminately to specialists who had some dealing with the supernatural. Eventually, the field of anthropology changed and smaller-scale and nonindustrialized cultures were no longer interpreted as being vestigial.

The next significant phase in interpreting shamanism focused on the putative insanity of the shaman. Now a new Western norm, derived from the modern field of psychology, determined the understanding of shamanism. The shaman was typically diagnosed as neurotic or schizophrenic. In some studies, especially prominently in Soviet studies, the shaman was portrayed as a huckster, manipulating the naive and credulous populous for personal gain. Either way, these interpretations undermined indigenous epistemologies and served an agenda of acculturation. Shirokogoroff (1935) and others challenged the view that shamans were insane, demonstrating the integrity of the worldview of the Tungus and the shaman's place within it.

Eliade's tome, *Shamanism: Archaic Techniques of Ecstasy* (1951/1964), marked a significant shift. Suddenly, shamanism was idealized rather than pathologized. However, critics of Eliade's work have argued that he was careless in generalizing from particulars, overstating the case in support of his larger philosophical project. Eliade relied on numerous sources, but not all were of high quality, and he did not spend any time in field studies. Instead Eliade spent his life trying to uncover the nature of religious consciousness. In shamanism, he saw direct apprehension of the sacred. He believed

the pure and continual revelation of the sacred had been dissipated and removed from direct experience by the institutionalization of the historical world religions. In shamanism, it had not. For this reason, Eliade and some scholars who have used his theories in their own works are criticized for romantic primitivism, the projection of an idealized simpler and more sacred way of life onto a people deemed more pure and primitive.

Some scholars, like Kehoe (2000), question whether the concept of shamanism is anything but a Western construction of a stereotyped “other.” This school of thought limits the study of shamanism to the Siberian practitioners from whom the term was derived. More commonly, scholars replace a universalist concept with the idea of *shamanisms* or use the adjective *shamanistic*. But the category of shamanism is still widely used.

The Shamanic Worldview

Most contemporary scholars of shamanism acknowledge that while there is considerable variation in practices and beliefs among cultures that contain shamanism, there are several core theoretical elements in the shamanic complex that are shared. First and foremost is a belief in the spiritual, or noncorporeal, worlds. Not only are the spiritual worlds real—they are populated. Human beings can communicate and interact with these spirit beings.

There is also a particular understanding of the composition of a human being. All people have at least one *free* or *separable* soul; that is, a person is not contained within her body but has an aspect that can travel in the noncorporeal worlds. This ability to travel in the spiritual worlds enables shamans to be mediators between the spirits and their communities. This understanding of the body as a host for a separable soul or souls is also behind the theories of the illnesses that shamans cure.

Other beings, including animals, plants, and natural phenomena, also have separable souls. Therefore, all beings are conscious or are linked to a spirit in the spirit world; it is important for communities to maintain harmonious relations with these other beings so that the spirits are not motivated to harm them.

Societies with shamanism often observe an annual rite of renewal. Frequently, a pole or tree symbol unites the upper, middle, and lower worlds. Sometimes rivers flow into the spirit worlds, or special holes with ladders make the connection. Regardless of these differences, there is some symbolism linking the physical world and the spiritual worlds, and this “geography” is used by shamans to move between the worlds. For the shaman, this geography is not metaphoric but experiential.

The relationship of the shaman to his spirits is central to this worldview. The shaman demonstrates mastery in relation to the spirit helpers. Typically, one spirit plays a special role with the shaman. Often it is the first spirit the shaman

works with and is sometimes called a tutelary, guardian, or familiar spirit. This spirit teaches the shaman-to-be about the spiritual worlds and helps her master other spirits. Spirits often have areas of expertise or particular personality traits, and the shaman's powers are related to the number and qualities of the spirits mastered. These spirits may take on multiple forms, including animal forms.

The shaman's relationship with the tutelary or familiar spirit is different from the relationship with other spirits, sometimes a type of marriage. This main spirit may be an ancestor who was a shaman or the spirit of a recently deceased shaman. In some traditions, the shaman may merge with this spirit, enabling the shaman to shape-shift in the spiritual worlds and enabling the spirit to act through a corporeal body.

Spirits perform numerous roles for the shaman. They teach. They deliver messages and inspire. They travel and gather information. They assist the shaman in journeys in the spiritual worlds. They may possess the shaman in order to act in the physical world. They assist with healing.

The Shamanic Vocation

The shamanic call, or vocation, is one of the most analyzed aspects of shamanism. The literature usually discusses the spontaneous call, but in various cultures people choose the vocation.

In Siberian shamanism and elsewhere, the calling is involuntary and spontaneous. The shaman-to-be experiences uncontrolled altered states of consciousness in which he is possessed or tormented by spirits demanding that the candidate learn to shamanize. This state, sometimes called the *shamanic sickness*, was widely analyzed in terms of a type of hysterical psychopathology that, through the process of learning to shamanize, does not lead to mental illness. Common symptoms include lethargy, erratic behavior, shaking, uncontrollable weeping, or significant physical illness. Seeking solitude in culturally abnormal ways (e.g., running away to live in the wild with animals for a period of time) may be a symptom. The spontaneous calling frequently occurs at the transition to sexual maturity, although for women it may be as they are passing out of their child-bearing years.

The psychological state of the candidate includes unsolicited and often unpleasant or frightening contact with spirits. The shaman-to-be may have visions and dreams, but these are fragmented and not controlled. Although not universal, experiences of being killed and resurrected by spirits while in an altered state of consciousness are common. At some point, the candidate accepts the call to become a shaman and starts learning to shamanize. Often this acceptance is accompanied by a belief that it would be fatal to resist.

From the emic perspective, the candidate receives training from two sources. First, the shaman is trained in an

altered state of consciousness by the spirits who called the candidate. Second, the candidate begins training with an elder shaman, learning techniques and culturally specific aspects of the worldview. Through this process, the new shaman gains control over the altered states of consciousness, entering and leaving them at will. The new shaman also masters the knowledge and techniques essential for the societal role. Through this training and communal service, the shaman is recognized by the community as being a shaman. The assessment of whether an individual is a real shaman and the strength of the shaman's reputation is in the hands of those served, based on whether the work is deemed effective. The community, including other shamans, also judges whether the shaman's work is benevolent or malevolent. The initiatory levels or structures vary, but the ability of shamans to continue to gain supernatural power and corresponding prestige continues throughout their career.

The classic model of shamanic vocation is involuntary and spontaneous. This does not necessarily conflict with the fact that it is quasihereditary in many cultures. Often families are known to produce shamans. In those families, specific individuals are not predetermined to be shamans, but it is likely that someone will have the shamanic illness. More unusually, there are cultures in which candidates wishing to be shamans seek apprenticeship with experienced shamans without a spontaneous vocation.

The Shaman and Altered States of Consciousness

The aspect of shamanism that has generated the most discussion concerns the shaman's ability to enter a normal state of consciousness. This section explores the characteristics of these altered states, the techniques used to induce them, and the significant explanatory theories. The terms in the literature vary. Early studies often used words that pathologized these states of consciousness—*hallucination* or *fantasy*. Eliade used the term *ecstasy*, which many others adopted. Unfortunately, ecstasy has a connotation of emotional excess in contemporary English. Later, to be more objective, scholars used *trance* or *altered state of consciousness* (ASC). Michael Harner (1980) postulated a specific shamanic state of consciousness, yet for the purposes of this chapter, ASC and trance refer to the state of consciousness experienced by shamans during their work.

Characteristics of Shamanic Altered States of Consciousness

There are two types of ASC in shamanism. The first, sometimes called the soul journey, is most often referred to as *magical flight*. The second is spirit possession.

Magical Flight

From the emic perspective, the magical flight is the travel of the shaman to the world of the spirits. The magical flight is a controlled visionary state and is strongly lucid and powerfully multisensory. The shaman in this state of consciousness believes these experiences to be as real as those experienced in the physical world during ordinary consciousness. The shaman is in control throughout. The magical flight has three phases: the journey to the spirit world, the experiences within the spirit world, and the return to the physical world. The shaman believes the experiences to be objectively real. However, shamans can distinguish between the spirit world and the physical world.

The shamanic spirit flights, from the perspective of the audience, appear very active. Shamans may speak as or embody the spirits, or make reference to them in dance or through the use of culturally shared symbols. They may describe what is happening on the journey or enact it. There is communicative interplay between the shaman and the audience during the séance. At the end, the shaman may give a fuller account of her adventures in the spirit world.

Spirit Possession

Although some scholars believe that spirit possession is not shamanic, many do identify a possession type of shamanism. In reality, shamans in most cultures perform both types of ASC. A shamanic-possession ASC may be distinguished from a mediumistic ASC by the fact that the shaman controls his possession. In this type of ASC, the shaman initiates the possession, allowing a spirit to use his body, and determines the duration of the possession. Sometimes a spirit may speak through the shaman, although in some cases the spirits enlighten the shaman who then conveys the information to the audience.

One area of inconsistency is whether the shaman remembers the possession trance. This seems to be largely a function of cultural expectations concerning the nature of possession. If the cultural theory is that the soul of a possessed shaman is no longer in the body, then the legitimacy of the possession is partly established by the fact that the shaman does not remember the trance. Numerous studies attest that in such societies, if pushed, the shamans usually remember. Possession type trances are more common among shamans who occupy oppressed positions within a society, particularly among women shamans in male-dominated societies. The putative amnesia functions to protect the female mediums from retribution. This calls into question whether or not the memory loss is feigned. In cases of spirit possession, as with magical flight, there is interactive communication between the shaman and the audience during the séance.

Depth of the Altered State of Consciousness

In both types of ASC, the shaman may be in a deep or a light trance. In the deeper state, she may appear to be

comatose, even if full memory is retained afterward. In a lighter state of trance, the shaman may appear to be in an ordinary state of consciousness, but believes she is communicating with spirits. In the course of a séance, there is often a rhythm in which the shaman moves into deeper and lighter states of the ASC. It is usually not a steady state.

Techniques for Inducing Altered States of Consciousness

Although the methods for inducing the shamanic ASC are culturally specific, there are some common means by which these states are achieved. A particular culture may use multiple methods in combination, even within the context of a single séance.

Music

Many cultures employ types of music, and sometimes dancing, to induce trance. The instruments are often believed to be independent beings. Siberian shamans speak of riding the spirit of their drum to the other worlds. Rouget (1980/1990), a musicologist, studied the types of music in various cultures that lead to an ASC. Musically, there were no common elements that could explain the trance-inducing properties. He concluded that in each culture the specific type of music that induces trance is identified as such and used within those contexts, and there is an expectation that it will produce an ASC. He proposed that the expectation creates the ASC.

Psychopharmacological Methods of Trance Induction

Some cultures use hallucinogenic substances to induce the ASC. The use of hallucinogens is most prominent among shamans in Central and South America but is found in other traditions. For example, Siberian shamans sometimes use the *fly agaric* mushroom to induce an ASC.

In many traditions using hallucinogenic plants, the plant ingested is understood as the body of a being that exists in the spirit world. This being is frequently met in the ASC and may act as a spirit helper. For example, the serpents encountered in ASC induced by *ayahuasca* are believed to be the spirit of the vine itself. These plants may be interpreted as “teachers.”

Meditative Techniques

Not all techniques for entering an ASC are as externally obvious or performative as those that use music or hallucinogens. Some shamans enter an ASC by quietly using internal imagery and contemplation. These methods may utilize sensory deprivation. As with all forms of shamanic trance, the shaman remains in control of the state of consciousness. These techniques are common in many North American tribes and, because of the quiet internal nature of

the induction and the degree of lucidity, have sometimes been overlooked by researchers who did not realize the shaman was in an ASC. The significant difference between a shamanic trance induced by meditative techniques and one induced by meditation is that shamanic ASC is intended to enable shamanic work, which requires interaction with others. The goal of meditation is usually to achieve a state of absorption in which awareness of the outer world ceases.

Explanatory Theories

Scholars have advanced numerous theories about the shamanic ASC. There is no consensus about any of the theories.

Acceptance of the Emic Theories

Anthropology uses participant observation. In the course of research, some scholars have both undergone shamanic initiations and arrived at the conclusion that the emic theories about the shamanic ASC are correct. The most influential is Michael Harner (1980). From the emic perspective, there are legitimate, nonrational epistemologies that reveal the real, although noncorporeal, spirits and spirit worlds. Scholars convinced of the reality of the emic perspective believe that the other scholarly explanations are reductionistic and are modern Western overlays that reinforce the hegemony of Western materialism. Critics of those who accept the emic perspective call attention to the requirement in the scientific method that anyone be able to replicate the experiment. They are unwilling to accept the testimony of the anthropologists who had shamanic experiences in the course of their fieldwork. The rejoinder is that anyone who is willing to take the time and go through the arduous training to become a shaman can have such experiences. If, upon doing so, their testimony is automatically discounted by those who have not done the training, then the argument is circular and biased. If, on the other hand, a candidate who goes through the training and does not have shamanic experiences is always interpreted as being insufficiently prepared, then the argument becomes circular on the other side.

Insanity

Although not currently accepted, the theory that the shamanic ASC is the result of insanity has a long history. Most commonly, the shaman's claim to see and talk to spirits that others could not see was interpreted as a type of schizophrenia.

Drug-Induced Visions

The use of hallucinogenic substances yields a variety of explanatory theories. For some, the use of hallucinogens is interpreted through a purely materialist lens involving

delusions that arise from manipulations in brain chemistry. On the other side of the spectrum, some of the strongest advocates of the emic perspective come out of traditions that used psychoactive substances to induce the ASC and see the physical changes as only one part of the experience.

Cultivation of the Imaginative Faculties

Noll (1985) analyzed shamanic training in terms of cultivating both the vividness and controlledness of visions. In the training process, the master shaman helps the apprentice develop high-imaginative vividness by systematically reinforcing those aspects of the apprentice's experiential reports that are highly sensory. In this theory, the contact with spirits is understood as an increase in the vividness of the imaginative faculties, and mastery of the spirits is an increase in how well the visions are controlled. This theory is ontologically neutral. It does explain the shamanic ASC through the active use of imagination, but it makes no claim about whether or not imaginative experiences are also real.

Role-Taking Techniques

This theory emphasizes the shaman's understanding of his or her role, the expectations that go with it, and the community's understanding and expectations of the shaman's role. The ASC is interpreted symbolically and is determined by the cultural construction of the nature of the spirits and appropriate relationships with them. The shaman embodies this cultural script. This theory does not deny that there are psychological effects on the performer, but the emphasis is on the social role. What is particularly significant is the importance of the shaman's body as a symbol. The shaman embodies, through his performance, the interaction with the spirits or the struggle of a sick person toward healing. Shamanic experiences are a type of performance art. It is not to be inferred that the shaman is performing without belief. In this way, it is different than theater. Much as with self-hypnosis, the expectation of what should happen allows the expectations to be met. This theory can be combined with other theories.

The Work of the Shaman in the Community

The shaman's ASC is not an end in itself. The purpose is to work on behalf of the community. Shamans may have specialties and may not perform every function, but generally shamans work as healers, perform divination, serve as psychopomps, and facilitate hunting. The shaman maintains harmonious relations between the community and the spirit world and may fulfill other duties to this end, such as serving as a sacrificial priest.

The Shaman as Healer

Arguably the most central and universal role of the shaman is as a healer. Within the shamanic worldview, disease has two origins, both related to the separable soul. The first is when the soul or a part of the soul is separated from the body, creating *soul loss*. The second occurs when some foreign element from the spirit world is introduced into the body. This object is typically conceived as having a consciousness of its own and an independent existence in the spirit world. This type of sickness is called *intrusion*. Sometimes the two combine in a form of possession in which an entity from the spirit world occupies the body to the extent that the separable soul of the patient is forced out.

During the course of the cure, the shaman may use either magical flight or lucid possession. In many instances, the shaman may move back and forth between modalities in the course of a *séance*.

Soul Loss

The possibility of soul loss is implied in the separable soul theory. Causes are often attributed to psychological reasons, such as fright, grief, social stress, difficulties in adjusting to life transitions such as puberty, and so forth. In these cases, the psychological tension of the patient is strong enough that a part of the soul becomes severed from the body. In other cases, the putative cause of soul loss is supernatural. The patient's soul was stolen and often imprisoned by a spirit. The soul might be taken by a lonely ghost, or it might be in retribution for either some ill the patient has caused in the spirit world, such as violating an ancestral taboo or trespassing into forbidden territory, or in response to something the whole community did that disrupted right relations with the spirit world.

The shaman's work in healing a patient of soul loss is twofold. First, the shaman diagnoses the cause of illness and locates the missing part of the soul. The shaman may journey into the spirit world or send spirit allies to investigate. Once the soul is located, the shaman and spirit allies travel to retrieve the patient's soul, often engaging in supernatural battles to win it back. The healing *séance* is typically a highly dramatic affair, attended by the shaman, the patient, family, friends, and other members of the community. It is extremely interactive, with the shaman acting out what is happening in the spirit world and showing, through her body, the struggle for the soul of the patient. The shaman employs many of the methods of theater, including special costumes, lighting, sound effects, and what could be considered "special effects." Sometimes there are physical interactions with the patient's body, including blowing part of the soul back in, or touching the body with special objects to call the soul back. The audience—including the patient—participates, supporting the shaman and actively demonstrating their concern for the patient's well-being. These theatrical healing sessions powerfully dramatize the community support for the patient's healing and are emotionally stirring events.

Intrusion

In sicknesses caused by intrusion, the explanation is that something has become lodged in the patient's body that does not belong there. This foreign entity also exists in the spirit world and must be removed from there as well. There are similarities between this type of healing *séance* and the type used for soul loss. Both are theatrical and involve not only the healer and patient, but also an audience. Both call on the spirits and use dramatic effects. In curing intrusion, the shaman identifies what is in the patient that should not be, where it is located, and how it got there. The latter is particularly important if the intrusion was sent by a magical practitioner using baneful magic, or from a spirit in retribution for some slight.

Once the intrusion is identified, it is removed. Methods vary, but some frequent motifs include sucking the intrusion out, blowing it away, sweeping it away, cutting it out in the spirit world, or convincing it to leave the patient's body. The *séance* is interactive. In some cultures, it is common for the shaman to produce some physical object at the end of the *séance* that is claimed to come from the patient's body. Early scholars used these sleight-of-hand performances in which the shaman produces an object as evidence of their charlatanry. Later scholars who asked shamans about this use of special effects discovered that, from an emic perspective, the shaman understands the real object to have been removed in the spirit world and does not see a conflict between that and theatrically producing an object to reassure the patient.

Support for the Cure

Once the *séance* is over, there is usually a dramatic change in the state of the patient, who soon recovers or dies. During the *séance*, the shaman may receive guidance about activities to perform afterward. These may include prescriptions for native medications. These remedies, especially if they are from particular plants, are often understood as spirit allies who assist the healing. The patient, the family, or the whole community may perform propitiation or protection rites, especially if the illness was diagnosed as spirit-inflicted. Increasingly, there may be a referral to Western medicine for a particular treatment.

Explanations for Efficacy

The efficacy of shamanic healing has been demonstrated repeatedly. Medical anthropologists and ethnobotanists have evaluated some native remedies. Most explanatory theories focus on similarities between shamanistic cures and psychotherapy, prompting some scholars to call shamans psychologists. In the course of the cure, the patient's state is externalized through the drama of the *séance* within a context of overt social support and care, and catharsis is achieved. The patient, by virtue of his belief in the cure, has an expectation of full recovery.

Scholars have suggested that this creates a placebo effect. The difficulty is that, far from being truly explanatory, this takes us into domains that remain inexplicable. The placebo effect is one of the greatest mysteries of medicine. Why should a powerful conviction that one is cured produce a cure? Why is catharsis healing? How do mental states cause disease and why can changing a mental state eliminate disease? Why does the demonstration of communal support affect an individual's physical health? These are all questions that deserve further research, and the dynamics of shamanistic healing is one arena in which they can be approached.

The Shaman as Divine Solicitor

Shamans may use their skills to gather information, for example, to find lost or stolen objects, find lost people, locate game, investigate conditions in a distant location, or uncover the causes of some ill that an individual or the community faces. Again, shamans may go into the spirit world to find answers, send spirit helpers to find answers, or allow a spirit to use their body to communicate the answer in a possession-style séance. The etic explanations for the shaman's success in divination typically posit that shamans are skilled observers of both individuals and nature, that the séances are interactive with the shamans soliciting answers to questions, and that the shamans make wise guesses based on their deep knowledge. Depending on the nature of what is discovered, the shamans may prescribe certain activities to restore right relations with the spirit world.

The Shaman as Psychopomp

A *psychopomp* is a guide for the souls of the dead. This role arises from the separable soul theory. If a soul can exist and travel outside the body, then at death it enters the spirit world. However, since a soul can get lost, the soul of the dead may not know where to go. In many cultures with the separable soul theory, there is fear that the soul of the dead will remain around what is familiar to it, causing problems for the soul of the dead person and danger for the living.

Shamans play a unique role because they can move in and out of the spirit world at will and know its terrain. Therefore, shamans have the responsibility of ensuring the right relationship between the spirits and the community. The shaman must lead the soul of the newly dead person to where it is supposed to be. Through the dramatic enactment of the psychopomp journey, the shaman reassures the community of its safety from the dead and provides comfort to the grieving who witness, through the performance, that their loved one, although dead, is fine.

The Shaman as Facilitator for Hunting

Some scholars restrict the use of the term *shaman* to hunting societies. Facilitating hunting is an important role. Shamans often divine the location of herds. The animals are

conceptualized as being under the protection of spirit beings who must be consulted and propitiated. Part of the shaman's work is to contact the game-giving spirits and convince them to agree to sacrifice the animals without threat of retribution.

The Shaman as Keeper of Harmonious Relations With the Spirit World

Virtually all the shaman's work involves maintaining or restoring harmonious relations with the spirit world. In the course of uncovering the cause of illness or some other blight upon the community, the shaman may recommend rites to restore harmonious relations. If this is the case, then the shaman may preside as a sacrificial priest. The shaman may also proactively ensure right relations through regular rites of care, feeding, and direct contact with the spirits on behalf of the community.

Neoshamanism

Neoshamanism has a unique, and sometimes uncomfortable, relationship with anthropology. Neoshamanism is a spiritual movement in the contemporary West in which practitioners—typically belonging to a network of like-minded people—believe they are practicing shamanism. Neoshamanism can be considered a subset of neopaganism, both of which are flourishing in the cultures where they are found.

A significant inspiration for neoshamanism is the ethnographic record. Some anthropologists, such as Michael Harner, actively contribute to the development of neoshamanism. Harner's *Way of the Shaman* (1980) posits the theory of "core shamanism," derived from his research. The idea is that the culturally specific content in shamanic practices can be stripped away to reveal a culturally neutral "core" that can be learned by any person in any culture from any religious background. His book, his workshops, and the method that is taught by his Foundation for Shamanic Studies are intended to help modern Westerners become shamans. The proponents of core shamanism emphasize presumably safe methods and eschew the use of hallucinogens.

Additionally, some groups teach neoshamanic traditions borrowed from existing cultures. Cultural insensitivity and gross commercialization of the sacred traditions of oppressed peoples is a decided risk. Many anthropologists are concerned that their ethnographic work may be used in ways that violate their professional ethics. Other groups attempt to reconstruct cultural traditions of the past, such as Celtic shamanism. Although these groups are not ethically problematic like some that borrow from existing cultures, the popular authors and teachers often make historical claims that are insufficiently rigorous to satisfy most academics.

Among the few ethnographic studies of neoshamanism, Jakobsen's (1999) work is a stellar exception. This study explores the similarities and differences between traditional shamans of Greenland and contemporary neoshamans

from Denmark and England. A significant difference is that neoshamanism is primarily individualistic. The neoshaman's relationship with the spirits typically concerns the spiritual path of the individual, rather than functioning within a particular role for the sake of the community. Another distinction is that the spirits are not mastered in neoshamanism and they are not threatening. They are transformed into benevolent spiritual guides. Neoshamanism democratizes shamanism, in that every person can become a shaman by putting forth effort; this is quite different from traditional shamanism, where the shaman-to-be is chosen, often unwillingly, by the spirits. Jakobsen concludes that neoshamanism responds to stress caused by having spiritual experiences in an increasingly materialistic and desecralized society that provides no basis for understanding these experiences.

Future Directions

This chapter discussed shamanism in broad strokes. While most material on shamanism is part of the ethnographic record, the ethnographies that cover shamanic practices often are old and the communities have changed dramatically. It would then be worthwhile to repeat the studies from the past, track any changes, and investigate reasons for them. More thorough explorations of shamanism's interactions with gender, social hierarchy, and other categories of difference would be useful.

Another future possibility is to explore syncretism between shamanic and other traditions. An intriguing syncretism exists between shamanic healing techniques and modern Western medicine, both in the West, where shamanic-style healing has become a form of complementary medicine, and in traditional societies that now have access to Western medicine.

Ethnographic studies of neoshamans should yield interesting insights into the construction of meaning in Western societies. It might be particularly enlightening to investigate how practitioners reconcile the epistemologies of shamanism with the epistemologies of the dominant society in which they live.

The placebo effect and the mind-body connection in health and healing are among the greatest unsolved medical mysteries. Shamanic healing séances provide a context where these topics can be investigated. Continued research in medical anthropology and ethnobotany is also needed, especially in endangered ecosystems.

Finally, an exploration of shamanic epistemologies from a philosophical perspective would be fascinating. The shamanic worldview claims that there are nonrational ways of knowing that yield true information, yet there has not been a systematic attempt to uncover the rules of shamanic epistemologies. Shamanic traditions provide potentially powerful case studies for exploring nonrational epistemologies.

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WITCHCRAFT AND SORCERY

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The belief that some individuals have supernatural powers allowing them to harm others is present in many societies around the world. Regardless of whether these individuals are said to use psychic power or magic to do their work, whether they do harm intentionally or not, or whether they are born with these powers or have to learn them, they are often feared or reviled by members of their societies—embodying traits that are defined as immoral or evil according to local cultural norms. Based on ethnographic fieldwork over the past century, social and cultural anthropologists have described witchcraft and sorcery beliefs, and the practices associated with them, in various societies around the world. With this, they have examined cross-cultural patterns in what are seen as the causes of witchcraft, the characteristics and actions of witches, actions that can be taken against witches, and patterns of accusation. This has allowed anthropologists to elaborate various theoretical models explaining the existence of witchcraft and sorcery beliefs, as well as the mechanisms by which people deal with the results of these practices.

Anthropologists are interested in witchcraft and sorcery beliefs because they constitute an important part of the worldviews of many peoples. As such, these beliefs and practices are an essential component in understanding the total cultural contexts within which they are located, as well as in understanding the means by which humans create explanatory schemes for the world around them.

Terminology

Anthropologists apply the terms *witchcraft* and *sorcery* to concepts in various cultural groups, referring to practices that involve the manipulation of supernatural forces or energy to malicious or evil ends, such as physical harm or misfortune. Although the two terms are often used interchangeably in Western popular culture and in lay conversation, anthropologists have tended to distinguish between the two practices. The term *witchcraft* usually applies when the ability to do harm is innate and when the manipulation of supernatural energy is done primarily through the power of one's mind. Sorcery, on the other hand, is often used for practices that are learned and require the magical use of special equipment such as tools, herbs, and potions. However, this distinction is not always applicable. Indeed, Victor Turner (1967), an anthropologist of note, pointed out that this distinction was elaborated by E. E. Evans-Pritchard (1937) with specific reference to the Azande of Sudan with no intention to apply it across cultures. Nevertheless, the terms have retained this particular usage in much of the anthropological literature on the topic, although they are sometimes used interchangeably. In this entry, the terms used by the authors of the works consulted are maintained, regardless of the degree to which they correspond to their respective usage in the model described above. In general discussions that do not refer to specific examples, witchcraft inclusively refers to both witchcraft and sorcery.

Another important distinction is the one between the anthropological use of the terms *witchcraft* and *sorcery* and the way the terms are used in Western popular culture. The general understanding of the term in the West stems largely from films and literature that draw from Christian conceptions of witchcraft. Anthropologists apply the terms in reference to culturally specific practices that often have little to do with the European and Euro-North American understanding of what witches and sorcerers actually do. It is also important to clarify that societies with belief systems that include the practice of witchcraft or sorcery have their own terms for these practices and the people who are said to employ them.

Finally, it is important to clarify that the traditional anthropological definition of witchcraft as described here does not take account of the neopagan practice of witchcraft, or Wicca. Wiccan witches perceive witchcraft as a spiritual practice with beneficial outcomes, rather than as a practice driven by malicious intent.

Ethnographic Case Studies

The following case studies, based on ethnographies and historical studies, provide an overview of beliefs and practices related to witchcraft in various societies. It is important to note, however, that there can be as many differences as there are similarities between neighboring groups. Therefore, these case studies should not be taken as representative of witchcraft beliefs and practices in their entire region. Rather, they should be read as examples among many others.

These case studies provide a brief description of cultural behaviors and are therefore useful in seeing how witchcraft belief systems operate in various societies. The sources of this information, listed in the bibliography at the end of this entry, contain more complete descriptions of these systems, as well as their wider social, cultural, and historical contexts.

The Azande (Africa)

The most widely cited anthropological work on witchcraft is Evans-Pritchard's (1937) *Witchcraft, Oracles and Magic Among the Azande*. Evans-Pritchard conducted ethnographic fieldwork among the Azande (singular: Zande), an indigenous African society, in the 1920s. The Azande occupied a territory referred to as Zandeland, on the Nile-Congo divide. Evans-Pritchard conducted his work in the portion of Zandeland that extended into Sudan.

According to the Azande, witchcraft, or *mangu*, had a physical cause. Some individuals were born with "witchcraft-substance," also named *mangu*. This substance caused the individuals that carried it to have powers that could be used to cause harm to others. *Mangu* was transmitted from mother to daughter and from father to son,

grew with the rest of an individual's body during his lifetime, and could be found during autopsies. Indeed, definitive proof that someone was a witch could only be obtained after death. Moreover, accused individuals could claim their innocence by pointing to the fact that none of their close deceased relatives of the same sex were found to carry *mangu*.

More immediately visible indicators that would lead people to suspect someone of being a witch were found in personalities and behaviors. Bitterness, spitefulness, greed, and an ill temper were all mentioned as signs that someone was a witch. Furthermore, habits perceived by the Azande as dirty or disturbing, such as urinating in public, eating without washing one's hands, or insulting and cursing others, were read as signs that an individual was likely to perform witchcraft. Women and men were equally likely to be witches.

Although *mangu* was said to have a physical cause, its manifestation was through psychic means. Zande witches could cause harm without resorting to spells or charms. Through the power of their will, they would send forth *mbisimo mangu*, or the soul of witchcraft, from their bodies to their victim in order for it to eat the soul of their physical organs. In this way, after many psychic visits, witches would eventually kill their victims. These visits tended to occur at night, and the Azande claimed that a light could be seen in the sky along the path of the flying *mbisimo mangu*. However, witches could project this psychic power at any time. Interestingly, the Zande knowledge system posited that these powers could be active without the witch knowing. Moreover, an individual possessing *mangu* might not have used her powers at all.

Witches, according to the Azande, could cause various sorts of harm to other individuals. Physical harm, and even death, resulting from illness or accidents were major forms of harm that were considered to be results of witchcraft. Other common misfortunes included harm to their crops. As farming was their main livelihood, it stands to reason that crop failure could have dire consequences for a family.

A classic example of the way the Azande induced that witchcraft had occurred is the case of the fallen granary. Granaries were elevated structures, built on wooden posts, in which the Azande stored their grains. People would often sit underneath granaries to get some shade in the middle of the day. Because of the gradual work of termites, the granaries would occasionally fall. If this should happen while people were resting underneath, the obvious cause was witchcraft.

As with other misfortunes, the Azande knew that there were physical causes for this misfortune. For instance, they were aware of how termites operate, which is why they would inspect the posts on a regular basis and repair the structures as needed. Nevertheless, they also knew that witchcraft was the cause for the granary falling at that particular moment when there were people underneath. Witchcraft on one or more of those individuals was the obvious cause. The falling granary, or any other physical cause

of misfortune, was merely a tool used by the witch to exercise harm on others. The actual result that needed explanation was the harm on a particular individual or group.

Although the effects of witchcraft constituted a prominent threat to safety and livelihood for the Azande, they were not helpless before its effects. Indeed, there were a series of actions that could be taken to determine whether witchcraft was the real cause of an event, and then to determine the identity of the witch. The Azande had recourse to various modes of divination to answer these questions, some of which were available to all individuals and some which required the intervention of a specialist. Evans-Pritchard described Azande oracles in detail in his ethnography.

Once a specialist determined the identity of a witch, a relative of a victim of witchcraft could ask a person in authority, such as a prince or deputy, to confront the witch. They would provide the prince or deputy with the wing of a fowl that they had killed in the witch's name. That person would then bring the wing to the accused. Generally, since the Zande system included a belief that these powers could be active without knowledge or intent, the accused would claim that they were unaware of the actions of the *mangu*. The accused would also state their good intentions toward the victim, take water in their mouths, and blow it on the wing as a sign of good will. However, a witch found guilty of causing death could be expected to give some form of compensation. If one had caused multiple deaths, this individual could be subject either to formal persecution or vengeance magic.

The Diné (North America)

Another well-documented example of a witchcraft belief was found among the Diné, or Navajo, of the southwestern United States. Clyde Kluckhohn (1967), in the course of ethnographic fieldwork among the Diné in the 1930s through the 1950s, was able to collect data on witchcraft beliefs in this area in spite of the reluctance of many Diné to discuss this topic with non-Diné. He described the results of his research on this topic in *Navaho Witchcraft*.

The Diné described different types of witchcraft, each with its own Diné name. Kluckhohn used the terms *witchcraft*, *wizardry*, *sorcery*, and *frenzy witchcraft* to differentiate between them. However, witchcraft is used in this chapter to include all these forms of what the Diné considered to be evil magic.

Among the Diné, witchcraft was something that was obtained or learned, usually from relatives. Diné accounts point to the murder of a sibling as part of the initiation that allowed the novice witch to learn and acquire powers. Both males and females could be witches, but more male than female witches were reported. The Diné attributed greed, as well as other traits considered as antisocial, such as vengeance or envy, as major characteristics of witches. They met together to practice immoral acts such as incest, cannibalism, and necrophilia. In short, witches displayed

traits and behaviors that went against the core values of the Diné, which were balance, harmony, and equal access to material resources.

Diné witches were said to take on various animal forms, such as wolves, coyotes, or sheep. Consequently, they could be seen fleeing homesteads at extreme speeds and frequently left tracks, allowing people to find them. Evidence of someone's identity as a witch could be found in a wound that matched one inflicted upon an animal thought to be a witch in disguise.

The actions of witches ranged from grave robbery to causing illness or death. In many cases, witches were said to act on their greed to accumulate wealth. Two witches could enter a partnership in which one witch would cause an illness and the other would offer the victim a cure for a fee. Greed as a common characteristic of witches reflects the social pressure against the accumulation of wealth among the Diné at the time of Kluckhohn's study. Indeed, sharing was an important social norm, and the acquisition of wealth constituted grounds for witchcraft accusations.

The Diné believed that witches harmed their victims through various means. One primary technique was the use of *corpse poison*, a powder made from the flesh of human corpses. Witches were said to introduce this powder into the mouths or noses of their sleeping victims, for example. Other techniques included burying of items belonging to the victim—such as nail clippings, feces, hair, or body dirt—with corpse poison and chanting spells over them; the insertion of small pieces of human bone into the victim through magic; and the use of narcotic plants. Effects of witchcraft included intense pain, seizures, emaciation, and illnesses leading to death.

The Diné had some means to prevent the work of witches. Since witches were thought to work at night, people would avoid walking around alone after sunset. Also, it was usual for people to hide personal material that could be used by witches, such as nail and hair clippings. There was also knowledge of some plants that could offer some protection. In addition, individuals with ceremonial knowledge were seen as strong enough to withstand the actions of witches against them. Curing ceremonies, which were typically held in cases of illness, would include additional elements that would turn witchcraft back against a witch in the case of witchcraft-induced illnesses. A witch who was targeted by a curing ceremony or made to confess was said to die by magical means. Alternately, individuals accused of witchcraft were sometimes put to death if they were captured but refused to confess. Finally, witches who remained uncaptured were assumed to eventually be killed by lightning.

Among the Diné, witchcraft was not automatically assumed in the case of illness. The primary causes of illness were seen as transgression of the norms that enabled individuals to live a harmonious life and to maintain order in the universe. Indeed, the central tenet of Diné life was the maintenance of order. This was accomplished by

observing a number of taboos concerning food, work, and social interactions. Failing to observe these norms could lead to punishment by the *Holy People*, the Diné deities, in the form of illness. Another common cause of illness was the action of ghosts. However, if an illness seemed mysterious or persisted despite the usual curing techniques, witchcraft was considered to be the most likely cause.

The Burmese (South Asia)

In the early 1960s, Melford E. Spiro (1967) conducted fieldwork in Burma. While he concentrated on small villages, he gathered data in cities such as Mandalay and Rangoon. Spiro noted that the spiritual system of the Burmese was colored by both Buddhism and the indigenous folk religions based on animism.

Spiro's research brought to light the existence of a gender division in terms of the types of witchcraft that were practiced. Female witches, or *souns*, were said to be much more numerous but less powerful than male witches. Souns usually acted within their own village. Their actions were known to be based on spite, malice, and sexual jealousy. Spiro's informants claimed that they could identify souns by the dimness of their eyeballs and the inverted reflection in their pupils when they looked directly at another. For this reason, they claimed, *souns* would avoid looking directly at other people.

Some souns were born with the ability to cause harm because of bad karma, while others learned their abilities from ghosts and other malevolent supernatural beings. Those who were born with powers were considered stronger. Thus the illnesses that they caused were fatal since they were immune to the actions of exorcists. Souns who were born that way could also perform other feats such as flying, transforming into animals, and animating inanimate objects. Both kinds of souns ate human feces.

The Burmese, according to Spiro, identified four primary techniques, all involving some form of food poisoning, that souns used to cause illness. A soun could offer a meal to a victim and then verbally curse the person; mix a foreign element such as a human hair or piece of leather into a person's food so that the element would multiply inside the person's stomach; transform feces into food and feed it to her victim; or poison a fish made from a palm frond by rubbing it against her vulva, which, like male genitals, was attributed with evil qualities. Souns also acted by cursing something associated with a person, such as hair, feces, or spittle, or by taking someone's soul when it left their body during a dream.

If souns acted out of personal spite, male witches, or *aulan hsayas*, usually acted on behalf of paying clients. However, they were still considered malicious. Unlike souns, *aulan hsayas* were found in other villages. The Burmese specified that it was impossible to identify one since they pretended to be moral and religious. The Burmese attributed greater power to the *aulan hsayas*, who

were not born with their powers but had to learn them. These practitioners caused harm by coercing ghosts and other evil beings into doing their bidding.

The Burmese employed some means of protection against witchcraft, such as leaving food outside the house at night to placate a witch who was thought to be lingering in the area, wearing amulets, or practicing Buddhism. Practicing Buddhism was said to render one immune to the effects of witchcraft, while exorcism was used to cure people who were ill as a result of witchcraft. In the case of death caused by witchcraft, the witch became a target of retaliation by magic or legal punishment.

Witchcraft Beliefs in the Western World

In mainstream Western culture today, witchcraft beliefs are largely perceived as superstition, and the media-driven image of the female witch with the green face, the black pointed hat, and the broomstick is predominantly found at Halloween, when children dress as various supernatural figures to collect candy from neighborhood households. Historically, Western witchcraft beliefs are commonly associated with intense periods of witch trials in Europe and New England. Furthermore, there is a growing movement of people who practice a neopagan religion called Wicca, mentioned earlier. Wicca practitioners have reclaimed the term *witchcraft* and associate it with the use of magic for beneficial purposes.

European and American Witch Trials

Although European beliefs in witches began far earlier than the time of the famous European witch craze starting in the 1400s, this period of time is renowned in the West for the intensity of witch hunting and persecution. Rebecca L. Stein and Philip L. Stein (2005) point out that, in medieval times preceding the witch craze, witches and other heretics were occasionally brought to trial due to accusations by individuals. However, in the 1200s, the Franciscan and Dominican orders began seeking out witches by holding inquisitions. Very few accusations led to executions in these early inquisitions—the goal was to allow the accused to confess and repent.

In the 1400s, Heinrich Kramer and James Sprenger, two inquisitors of the Dominican order, wrote an influential book called the *Malleus Maleficarum* (*Hammer Against Witches*) in which they described the characteristics and behaviors of witches. Witches were characterized as extreme heretics. Not only did they renounce Catholic ideology; they signed pacts with Satan, offering him their service in exchange for the power to work evil magic that would cause economic misfortunes such as crop failures as well as illness and death, often among infants. Witches could cause harm with the mere power of their gazes. They could also place evil charms in someone's property to cause harm.

Women, especially those without social support such as widows, were the most likely candidates for witchcraft, according to church authorities and reinforced by Kramer and Sprenger. Described as less intelligent and more likely to succumb to Satan's charms, they were said to have intercourse with him during their nighttime gatherings, to which they flew on broomsticks. They would also engage in orgies where they would kill infants as a sacrificial offering and practice cannibalism.

Throughout the two centuries that followed the end of the Middle Ages, the sanctioned inquisition of the Catholic church reached its peak. With this, witches were sought out in various regions of continental Europe. Innocence was nearly impossible to prove, and a mere accusation was enough to condemn a suspect. Extreme torture was used as a means of eliciting both confessions and further accusations. Whether or not suspected witches confessed, they were condemned to burning at the stake.

In the American colonies of the 1600s, the witch craze was a more localized phenomenon. The most well-known case is that of the Salem witch trials from 1692 to 1693, when girls and young women suffering from convulsions that the community's physician could not explain led to a series of dramatic witch trials. As a result of these trials, 19 people were executed by hanging. Stein and Stein point out that, as in England, tried witches were hung rather than burned. Burning was reserved for religious heretics and, in England and its American colonies, witchcraft was a civil offense even though witches were still said to engage in pacts with Satan.

John Putnam Demos (1983) demonstrates, however, that witchcraft beliefs and the resulting trials and accusations had been present in the decades leading up to the Salem witch craze. Witchcraft was an ongoing concern in New England communities such as Salem as part of a struggle between good and evil that was manifested in daily activities. Misfortunes ranging from capsized boats to beer going bad in the barrel were enough to lead people to ponder a potential case of witchcraft. Demos specifies, however, that these ponderings led to witchcraft accusations only if the victims could recall a recent conflict with specific individuals who were likely to engage in witchcraft. Therefore, there were no actual witch hunts, but witchcraft remained a plausible cause for misfortune.

Wicca

Practitioners of Wicca generally identify as witches. However, they describe witchcraft as a beneficial, rather than evil, practice. The word *witch* itself is often taken by Wiccans to derive from ancient English terms meaning "wise," and to be a witch signifies accessing wisdom relating to nature. Based on the works of Margaret Murray (1962) and Gerald Gardner (2004), many Wiccans see Wicca as a continuation of pagan beliefs and practices dating back to pre-Christian Europe. Persecuted by the church

during the period of inquisitions, pagan practitioners hid and continued to pass knowledge through the generations, resulting in their revival in the 20th century. Not all Wiccans adhere to this particular explanation for the origin of Wicca, however.

The Wiccan belief system is rather flexible and allows for the belief in many deities of the practitioner's choice. Some Wiccans believe in a single Goddess, others believe in a Goddess and a God, and others incorporate various deities taken from Roman, Greek, Norse, Egyptian, and other mythological systems. Many Wiccans also give special regard to the elements of earth, fire, water, air, and spirit, using the pentagram to represent these five elements. The cycle of birth, life, and death—often associated with an agricultural way of life such as that found among pagans in pre-Christian Europe—is important to the Wiccan ritual system, and eight yearly sabbats mark important times of the year.

Some Wiccans practice in solitude and base their belief and practice on their own blend of traditions whereas others practice in covens. Magic is an important element in the practice of most Wiccans. Magical rituals are performed to achieve good ends such as personal success in work or studies; the maintenance of good health; or simply a connection with deities, elements, and spirits. A common element of Wiccan belief is that one can do as one will, provided that it does not harm others. This, as well as variations on the threefold law, where both good and evil come back to the practitioner threefold, are incitements for Wiccans to practice good magic.

Theoretical Perspectives

As is the case with all cultural practices related to beliefs in the supernatural world, anthropologists are not concerned with proving or disproving the truth, validity, effectiveness, or morality of witchcraft and sorcery. Rather, anthropologists are interested in how various societies conceptualize these practices. Some of the goals of the anthropological study of witchcraft, sorcery, and other ritualistic activities are to examine how these practices tie in to a larger cultural framework and how beliefs related to these practices vary across societies and through time. This allows researchers to outline cross-cultural patterns and variation with respect to beliefs in the origins and causes of witchcraft and sorcery; ways people have to deal with effects of these practices; and connections to political, economic, and familial systems within a society. This also allows researchers to establish theories about why humans have these belief systems. Another goal of studying witchcraft and sorcery in a cross-cultural context is to increase our knowledge about how humans interpret their world and develop strategies for coping with the problems that occur as a part of human life. Anthropologists want to understand the benefits that human belief systems have for humans

and their societies. In brief, anthropologists are interested in *how* and *why* human societies have the types of belief systems and practices that they do.

Social and cultural anthropologists, as well as sociologists and psychologists, have utilized various theoretical models to explain the ubiquitous existence of beliefs in witchcraft and sorcery. As with theories regarding religious and spiritual beliefs and practices in general, these models are based on data gathered in ethnographic research. The models then attempt to make sense of these beliefs and related practices by locating them within wider social and cultural processes.

Many scholars working in the earlier part of the 20th century applied a functionalist approach in their analyses of witchcraft beliefs and other beliefs and practices pertaining to the supernatural. This enabled them to locate various ways in which these practices fulfill human needs such as understanding the world around them, alleviating anxiety in a world that is out of their control, forming community, and maintaining social norms.

One of the universal needs found among humans is the need to understand why bad things happen. Illness, threats to food sources, and other misfortunes may sometimes have apparent physical or environmental causes, but the existential question of “why this person or this group at this particular time” remains unanswerable. A functionalist analysis of witchcraft beliefs shows how these beliefs help fulfill this explanatory need. Evans-Pritchard’s (1937) case of the fallen granary among the Azande is a classic example. Rather than rely on the possibility of coincidence when a granary happened to fall when people were underneath, a belief in a specific cause such as witchcraft gave meaning to something that might otherwise have been meaningless.

Keith Thomas (1970), in his contribution to Mary Douglas’s (1970) volume titled *Witchcraft Confessions and Accusations*, argued that the explanatory function on its own is insufficient to support the existence of witchcraft beliefs. In the case of witchcraft beliefs in England from the 1500s to the 1700s, other supernatural causes for misfortune, such as punishment by God, were prevalent. If witchcraft was used as a frequent explanation, it was because a belief in witchcraft carries with it a course of action to which people can resort to prevent or reverse its effects. In societies where there are witchcraft and sorcery beliefs, there are usually corresponding practices devoted to protection from the effects of malevolent practitioners, divination to determine their identity, or practices to cure individuals who have been targets of their practice.

In societies such as the Diné, among many others, where witches or sorcerers could make use of things like human hair or nail clippings, the act of hiding these things was one such practice. Divination techniques such as those found among the Azande and rituals such as Burmese exorcism or Diné curing ceremonies are other examples. All of these practices enable people to assume control in

the face of the many misfortunes that can happen in all human societies and over which they would normally have no control.

Other functions of beliefs in witchcraft and sorcery that anthropologists have elucidated involve group cohesion and the maintenance of social norms. In terms of community and group cohesion, Douglas (1970), in the introduction to her edited volume, commented on the variability with respect to patterns of witchcraft accusations. In some instances, people tend to accuse people that are close to them, either in terms of kinship bonds or geographical location, whereas in others, people tend to accuse distant people who are sometimes not directly identifiable. In situations where the accused tend to be outsiders to the community, more attention is paid to curing the victim than identifying the witch. This can lead to greater group solidarity.

On the other hand, when the witches are insiders, they become emblems of social deviance. This provides a clarification of social norms and moral codes. In many societies where these beliefs are present, witches and sorcerers are said to embody many of the characteristics that are diametrically opposed to those that are encouraged among the population. Indeed, Kluckhohn’s (1967) work demonstrated that greed, which is considered one of the trademark characteristics of witches, stands in stark opposition to the value of sharing in Diné ideology. One who accumulates wealth therefore stands a chance of being accused of witchcraft. This portrayal of greed—and other traits and actions such as murder, cannibalism, and incest—as traits of witches thus enforces adherence to the social norms.

While this description reveals a possible social function of witchcraft beliefs where adherence to norms is implicitly promoted through the vilification of persons who go against these norms, Marvin Harris (1974) suggested that a belief in witchcraft, specifically in medieval Europe, was used more directly as a mechanism for the maintenance of power on behalf of the church and the state. The characterization of witches in this particular context posited them as people, mostly women, who would sign pacts with the devil, pledging to do his work. While antisocial behavior, or behavior that went against the church-established norms, was said to be typical of the actions of witches, Harris proposed that there was a conscious desire on behalf of those in power not only to encourage adherence to the norms but also to keep the population divided due to mutual fears of witchcraft or accusations. This division would prevent people from identifying the economic oppression perpetuated by those in power. According to Harris, then, a belief in witchcraft could serve as a tool for political power.

In relation to accusations within a community, Evans-Pritchard (1937) also pointed out that allegations helped to bring underlying social tensions to light. This was the case in accusations between Azande cowives, for example.

However, these tensions could also be alleviated by the ritual described earlier, where the accused blew water on a fowl wing and expressed good will toward the victim. This act served to acknowledge the potential that witchcraft occurred without the accused's knowledge and helped to diffuse the existing tension.

Witchcraft beliefs may serve functions at the societal level, but several authors have pointed to functions for individuals as well, both those who claim to be victims of witchcraft and those who are accused. Kluckhohn (1967) elaborated on some of these functions with reference to his work with the Diné. He argued that some individuals might actively seek to become witches to gain supernatural power, especially if they were unable to achieve such powers through socially approved channels such as becoming singers, who have important spiritual roles among the Diné. Thomas (1970) also discussed the possible point of view of the accused in his historical work. Since people tended to accuse individuals who were economically and politically marginal, such as elderly widows, and who were dependent on neighborly goodwill for support, these individuals could benefit from the way people's fears would keep them from withdrawing such support. Being seen as a witch, according to Thomas, could therefore serve as a mechanism of empowerment for those who were poor and marginal.

Kluckhohn (1967) also pointed out that Diné individuals who claimed to be targets of witchcraft were often people with low status who could get some kind of attention and support from other community members through their claims. Moreover, he argued that witchcraft beliefs and accusations served to channel people's feelings of aggression and hostility, and desires for drama and excitement, in a way that would be socially approved. Similarly, fantasies about incest or necrophilia could be mentally played out in guilt-free ways when these actions were ascribed to witches.

If the theoretical explanations described here seem appealing, there has been criticism of the functionalist approach on the grounds that it tends to reduce human activities to mechanical processes. Demos's (1983) work presents an outline of some of the major criticisms. For example, some scholars have argued that functionalism posits static models of culture, neglecting to examine the effects of social change, and that it presents a potentially disruptive social phenomenon, such as witchcraft accusations, strictly in positive terms. However, functionalist analyses of witchcraft and sorcery beliefs have remained useful in anthropology as a means of understanding how beliefs and practices surrounding witchcraft and sorcery are located within social and cultural structures.

More recent scholars who focus on witchcraft and sorcery have often confirmed the applicability of the traditional functionalist approaches. These approaches have emphasized the ways in which witchcraft beliefs worked to fulfill certain human needs, such as explaining misfortune or providing a course of action against it. For example, Alexander Rödlach (2006), like Evans-Pritchard and

Kluckhohn, has noted various functions served by witchcraft beliefs. In contemporary Zimbabwe, in the wake of much health-related misfortune and economic turmoil related to the HIV/AIDS epidemic, witchcraft accusations abound. In addition to serving the functions of explaining and dealing with misfortune, witchcraft beliefs, according to Rödlach, often reflect social relations that are strained by the stresses and uncertainties caused by such massive social crises. Moreover, the authors cited in the remainder of this entry all acknowledge that explanatory and social functions are, indeed, fulfilled by these beliefs.

However, there has been a tendency to explore other layers of analysis while acknowledging that these functions of witchcraft belief exist. Indeed, several anthropologists since the days of Evans-Pritchard and Kluckhohn have found the functionalist approach incomplete in explaining social phenomena, especially in an intellectual context where anthropological thought has moved away from the idea of culture as a bounded, internally coherent whole. Rather, internal heterogeneity with respect to access to prestige and power is increasingly recognized, as are external influences and the ways in which people adapt to them or contest them.

As early as the 1960s, anthropologists such as Victor Turner and Melford E. Spiro were expanding on earlier functionalist paradigms by considering witchcraft beliefs, among other supernatural beliefs and practices, in social and psychological contexts. Turner (1967), in his work among the Ndembu of central Africa, espoused a processual approach where rituals and their associated beliefs were intertwined with processes in the community in which "social dramas" took form. These dramas, based on existing social tensions, unfolded through various mechanisms. These then led to the redefinition of social boundaries by casting people as outsiders because of their witchcraft practices.

Spiro (1967) was more concerned with psychological factors that motivated individuals to believe in witchcraft. He argued that a strictly functionalist explanation limits itself to explaining the belief system in terms of its latent results. He stated that it is essential to also examine the perceptual, cognitive, and motivational explanations for human belief in witchcraft, sorcery, and other ways in which people suffer at the hands of supernatural power.

Based on fieldwork in Burma, where beliefs pertaining to the supernatural were influenced by both Buddhism and animism, Spiro claimed that fear of aggression from witches or sorcerers was a projection, or displacement, of the inner turmoil that resulted in an individual after the brutal rejection that all children faced from their parents at a certain age after an initial period of tenderness. Believing in witchcraft allowed individuals to externalize the anxiety and to project it onto something that they could deal with directly. It also avoided exacerbating feelings of antagonism toward one's parents. Moreover, possession through witchcraft, which was one of the ways Burmese witches

were said to attack people, allowed the possessed person to engage in acts of aggressiveness that would otherwise have been unacceptable since it was, in principle, the witch who was acting through this person. It is interesting to note that this is similar to one of Kluckhohn's (1967) theoretical points about socially sanctioned feelings of aggression. However, whereas Kluckhohn included this as a latent function of witchcraft beliefs, Spiro located it as a motivational psychological factor of these beliefs.

Spiro also explained the role of cognition in the continued belief in witchcraft among the Burmese. Learned knowledge about witches and witchcraft informed an individual's interpretation of events; events that were interpreted as involving witchcraft, in turn, substantiated their knowledge. To Spiro, this approach took greater account of human interpretation than the majority of functionalist explanations.

As with their predecessors from the 1960s, anthropologists dealing with witchcraft beliefs since the 1980s have not denied the validity of functionalist explanations for the existence of witchcraft beliefs. However, they have increasingly considered the impact of changing political and economic contexts as well. The consideration of interactions between traditional local systems and the remaining ideological systems of colonizers is now considered essential to an understanding of indigenous beliefs and practices in any location. Furthermore, power dynamics within and across national boundaries are an unavoidable factor given the relationship between witchcraft ideology and social power.

In this vein, Pamela Stewart and Andrew Strathern (2004) have employed a theoretical perspective, largely based on Victor Turner's processual approach that considers local social dynamics as a basis for the study of witchcraft beliefs. In a cross-cultural study that examines witchcraft beliefs in Africa, Europe, India, Indonesia, Papua New Guinea, and Sri Lanka, they argued that these beliefs are intertwined with the social processes of rumors and gossip. Accusations of witchcraft, they asserted, are based on pre-existing rumors and gossip that circulate within communities and that reflect ongoing tensions and conflicts. These tensions escalate in moments of social crisis, leading to accusations that will result in some sort of outcome—in the form of resolution by trial or further conflicts.

Similarly, Isak Niehaus, Eliazaar Mohlala, and Kally Shokaneo (2001) focused on the relationship between witchcraft and power in the South Africa Lowveld in the 1990s. Their analysis of this postcolonial context, where people of various ethnic backgrounds coexist in a society that has been impacted by colonialism, apartheid, and Christianization, attempts to balance the explanatory function of witchcraft with the role of power dynamics in witchcraft beliefs and accusations. They described how the oppression of people by dominant powers and attempts to repress local ideological systems, including witchcraft beliefs, contributed to the marginalization and poverty that

actually helped to maintain these beliefs as an explanation for the misfortunes that people had to deal with. Witchcraft beliefs, then, can be perceived as a tool of empowerment.

Alternately, as Peter Geschiere (1997) as well as other contributors to Henrietta L. Moore and Todd Sanders's (2001) volume addressed, witchcraft beliefs can operate as power mechanisms for both those with official power and those without. In the case of the former, perceived access to supernatural powers related to witchcraft or sorcery can legitimize or solidify their social power. In the case of those without social power, it can operate to level out social inequalities since those in power will fear the effects of witchcraft.

Neil L. Whitehead and Robin Wright (2004) argued that this leveling mechanism operates on a larger social scale among various peoples of Amazonia. In many of these societies, shamans are as capable of harming as they are of curing. Sorcery, then, is seen as a necessary counterpart to healing practices. Although this duality leads to some ambiguity toward shamans within their communities, their potential power over outsiders can work to give people a sense of integrity with respect to outside threats.

As can be seen from this recapitulation of theoretical approaches to the analysis of witchcraft beliefs, anthropologists over time have sought to explain the existence of these beliefs and associated practices in various social and cultural contexts. It is generally acknowledged that these beliefs, along with other beliefs related to the supernatural world, help fulfill some basic functions in human societies such as the desire to understand misfortune and the maintenance of social norms. However, recent scholarly works on the topic have been careful to relate their analyses in social and political processes that operate both within societies and between societies, and how these processes influence the social dynamics within which witchcraft accusations take place. Witchcraft beliefs are therefore one example of the ways in which humans both make sense of their worlds and find ways in which to influence the course of their lives.

Ongoing and future work in the field will undoubtedly continue to explore the ways in which indigenous beliefs and practices related to witchcraft and sorcery intersect with various religious, political, and economic forces that circulate in an increasingly globalized world. It will also be interesting to consider how members of the societies where anthropologists have documented witchcraft beliefs react to these ethnographic documents. Undoubtedly, anthropologists will continue to debate the accuracy of the terminology that is used within the discipline to refer to the variety of local beliefs and practices that exist in the world.

Conclusion

A belief in witchcraft or sorcery is found in many societies around the world. Certain individuals are believed to be

able to cause misfortune to others either through the power of their own will or by the magical use of substances. These individuals are sometimes said to be born with these capacities, inherited from one of their parents, but they usually are said to learn witchcraft or sorcery. Certain types of people are more likely to be the target of accusations. Very often, people who are marginal in some way and have little social status are easy targets. People who are perceived as embodying antisocial traits are routinely subject to accusations and symbolize the traits that a society's members should avoid displaying. In some cases, individuals such as healers who are responsible for the well-being of others are potential objects of scrutiny since their powers to do good are counterbalanced by their powers to do harm.

Where there are witchcraft beliefs, there are also means of protection against witchcraft or of reversing the misfortunes brought about by it. People resort to charms, the hiding of substances that witches or sorcerers can use against them, or, in case of witchcraft-induced illness, curing ceremonies. In some cases, the process of accusation and confession can solidify community bonds, and in others, they can lead to greater conflict.

Rather than attempt to validate or invalidate witchcraft beliefs and associated practices, anthropologists have attempted to understand why they exist and how they manifest in various cultural contexts. Anthropologists generally agree that these beliefs serve certain functions in human societies such as explaining misfortune, giving people recourse in the face of misfortune, maintaining social norms or power, and providing psychological outlets for both individuals who are accused of witchcraft and those who claim to be victims. Recent work has focused on power dynamics within and across groups in the face of economic, political, and religious changes and how people use witchcraft beliefs to maintain or improve their lot in life.

While the general attitude toward witchcraft beliefs in mainstream Western culture is one of amusement at best and ethnocentric scorn at worst, anthropologists maintain that witchcraft and sorcery beliefs make sense as an element of the systems of thought and of the social contexts in which they exist.

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RELIGIONS AND BELIEFS

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Religions and beliefs are of great importance for anthropological research on the development of humankind and its history, as they represent the human reaction to an extrahuman, holy, transcendent, or divine object. Almost no other terms of the mental and intellectual human life seem to have such a big and colorful variety as “belief” or “religion.”

At first, a look into the past: The term *religion* has its etymologic and historical roots in the ancient Roman world. A different context can be found for the terms personal *belief* or universal *faith*; they have their semantic origin in the Greek word *pistis*, which Saint Paul used in his letters, or in the Latin *fides*. Whereas religion gives the framework, belief fills this framework with individual religious activities. Faith means the universal religious activity of a group of people of the same religion. The Latin noun *religio* stems from the verb *re-legere*, which has the meaning “to do something diligently, to do something again, to re-read something,” according to Marcus T. Cicero (106–43 BCE). The prefix *re-* could even be translated as “to do something diligently again and again.” The careful execution of rituals was prescribed by rules, which were only valid through their exact observance. Therefore in the ancient Roman culture, the Latin noun *religio* expresses the right observance of cults and, as a consequence, the respect for the gods. The verb *re-legere* is the opposite of the verb *neg-legere* (to neglect).

The derivation of the noun *religio* from *religare* (to connect, to reconnect) is in general problematic, because

this reconnection can be seen in a feeling of an inner attachment to something transcendent, which was not common to classical beliefs. In its character, *religio* is in Roman antiquity rather a virtue than a kind of feeling. Central in the diligent performance of rituals was a kind of “pious awe,” which was not so intensive that the acting person in religious affairs was moved inside. This is one of the reasons why ancient Roman *religio* is basically incomprehensible to us. Nowadays, the adjective *religiosus* means “pious.” In a later development, *homo religiosus* means “member of an order,” a person who lives according to the three evangelical counsels: poverty, chastity, and obedience. This person wants to be, in his religious life, a good example to others. It was this meaning of the word *pious* (*religiosus*) that brought the noun *religion* into the Christian-shaped, Western culture, and less the Latin noun *religio*, in the ancient Roman sense.

To exhaust the full meaning of religion or belief, it is not sufficient to speak only of *devoutness* or “expression of devoutness.” Religion and belief also cover the sentence *fides quaerens intellectum* (faith or belief that searches for insight). Therefore, it has also to do with rationality and the search for reasonable causes. Saint Augustine (354–430 CE), as an exponent of Christian antiquity, and Saint Thomas Aquinas (ca. 1224/5–1274 CE), as a philosopher of high scholasticism, shaped the concept of *religio* as identical with Christianity. Other, non-Christian religions or beliefs could only be classified as *lex*, *secta*, or *fides*.

The meaning of the term *lex* is universal, according to our expression “denomination” or “total structure of life.” There is also a *lex Christianorum*, which means “doctrine and law of the Christian faith.” By no means is the forming of the concepts “religion” and “belief” steady or logical. Within the historical development, beginning with classical antiquity up to the advent of Protestantism in the 16th century, it is not possible to find a strictly continuous development to the modern term *religion*. So, *religio* cannot be translated by or equated with religion or belief in today’s meaning.

If the Christian context of the word *religion* is left aside, then religion and also belief can be defined as the relationship of a human to a personal or impersonal transcendent, in whatever shape of “the Real”: a divine *persona* or *impersona*. The meaning of the Western terms *religion* or *belief*, influenced by Christian thoughts, changes in other European and non-European languages from “something that is owed to the transcendence” to “law/doctrine” and “eternal, never-ending structure.”

As a result, the term *religion* is more objective than the rather subjective term *belief*. Also, the concepts of belief—characterized as individual, personal belief, or conviction—and faith—characterized as universal belief—can be differentiated. Religion is in general the system of faith that people of the same conviction have in common. Belief is the personal activity, the “personal” faith, within the framework of religion. *Belief system* is very near to religion, but it emphasizes the personal religious activity more than universal faith.

Further Development of Religions and Beliefs: Historical Perspectives

After this etymological study, the paradigmatic development of the modern terms *religion* and *belief* will now be described in order to give a contemporary view on them. A religion that prescribes a belief in a deity of imaginable terms is marked as rational, according to the Lutheran theologian and historian of comparative religion Rudolf Otto. In his classic work, *The Idea of the Holy* (1917/1925), Otto also asked for the objectivity of religion or belief, and emphasized the “contrast between Rationalism and profounder religion.” One cannot do justice to religion or belief only by rational terms. The two opposite characterizations of religion are, as Otto pointed out, the *tremendum*, or the “awefulness,” and simultaneously the *fascinans*, or the “fascinating.” The *tremendum* shakes people in awe in sight of the mysterious, completely different being, God. This form of fear is by far different than the “natural,” or ordinary fear of a human, and applies more to the general “world-fear.” The *tremendum* derives from a “numinous dread” that terrifies and fascinates people at the same time.

The Romanian historian of religion Mircea Eliade, who worked at the University of Chicago, addressed Rudolf

Otto’s reflections at the beginning of his book *The Sacred and the Profane* (1957/1959). Eliade focused on the nature of religion or belief, describing the manifestations of religion and the religious in a world that dissociates itself more and more from religious dimensions. But even in a secular world, there is something sacred that is characterized by humans as the opposite of the profane. The process is always the same: the “completely different” is a reality that is not of our world and manifests itself on things that are components of our natural, profane world.

Eliade repeatedly spoke of *homo religiosus*, and he wanted to make clear that religion and belief belong to the human nature. Therefore, people live as long as possible in the sacred universe. By the word *sacred*, the dimension of the religious is described. This dimension surrounds, carries, and holds the human as a religious being. On the other side, a secular person, who is able to live without any religious feeling, has a completely different, secular experience of the universe. She lives in a desacralized world. The religious feeling has to find its way by another, maybe hidden means. The secular person lives totally differently from the *homo religiosus*.

Almost 150 years earlier than Eliade, Friedrich D. E. Schleiermacher, a German Lutheran theologian and philosopher, classified religion and belief as a “feeling,” as the French philosopher Jean-Jacques Rousseau did before him. Schleiermacher called religion a “feeling of infinity” in his second speech, “On the Nature of Religion,” of his five speeches appearing in *On Religion* (1799/1996).

The German philosopher of the Age of Enlightenment, Immanuel Kant, stood in strong contrast to the definition of religion or belief as “feeling.” In his work *Religion Within the Boundaries of Mere Reason* (1793/1998), Kant proved that there was no way to conclude the certain feature of direct divine influence by a feeling. Hence, according to Kant, religion must be based on reason alone in order to be universal. For Kant, religion had to be a “pure religion of reason.” Although these two characterizations of religion as a “feeling” (Schleiermacher) or as a “pure religion of reason” (Kant) are opposing, these two definitions of religion may be coincident in the fact that religion or belief is something agreed according to human nature. Therefore, around the year 1800, a concept of internal religion developed, which remains effective today.

Statements on religion or belief by the Protestant theologians Ernst Troeltsch (1912/1981) and Paul Tillich (1955, 1961/1988) underlined this fact. In another way, Tillich’s works can be regarded as examples of the effective power of the concept of religion or belief. In a different approach to Immanuel Kant, he distanced himself to consider “feeling” as the basic determination of religion. If religion could be connected to the pure subjectivity of emotion, then it would decline, because religion would lose its seriousness, its truth, and its highest sense. Without a highest content, religion would stay empty. In his essay “Religion as a Function of the Human

Mind?” (1955/1988), Tillich defined religion as “something that concerns us immediately,” in the deepest sense of the universe. That which “concerns us immediately” referred to all creative functions of the human mind. However, this did not mean that religion and belief are fictions of the mind, created by human beings.

According to Tillich, the human mind is able to be creative in relation to both itself and to the world. But this creativeness is limited by the relationship to God. Religions and beliefs contain all areas of the human life and of the mind, as they build the substance, the basis, and the depth of the human intellectual life. Therefore religion or belief is not based on a function of the mind at all. Religion is universal; belief is individual. They are consequently the unconditioned components in every situation of human life. Being moved by religion is always related to a religious object. In this context, Tillich emphasized two points: (1) Religion and belief are always related to a content, which cannot be explained in the end; and (2) religion has always a social dimension, too. Nobody is alone in being religiously moved or in feeling any kind of religious emotion. Therefore, the objectivity of religion is founded by its social dimension, according to Tillich. As a consequence, religion and belief are situated in the human being, who is touched by a “revealed unconditioned being,” by a religious object. This can generally be applied to everyone. “Religious reality,” however, goes along with a secret consciousness: *tua res agitur*, “your situation is concerned.”

Two definitions of the concept of religion can be found in Tillich’s work. Both differ crucially from the traditional one—religion or belief as the human answers to the transcendent. (1) Tillich spoke of an “autonomous religion” that does not know a representational God, nor, consequently, any form of prayer. But in contradiction to that, religion is not impious or lacking a God. It just does not know any kind of ecclesiastical objectification of God. With mysticism, it is different again, because mysticism elevates itself beyond the objectification of God. (2) In his later essay, “Christianity and the Encounter of the World Religions” (1961/1988), Tillich mentioned *quasireligions*, which are similar to religions and have some features in common with religions. But quasireligions are only related to secular objects and consequently to secular institutions. Tillich differentiates between quasireligions and *pseudoreligions*. Both pretend intentionally to be similar to religions. The expansion of the concepts of religion or of belief as inward phenomena, which have been developed since the beginning of the 19th century, became clear in Tillich’s considerations.

The two concepts of quasireligions and pseudoreligions must be strictly distinguished from traditional, historical religions. Similar to quasireligions is what Eric Voegelin (1938/1999) and Raymond Aron (1965/1968) spoke of as *political religion*. An explosive nature is exhibited in the relationship between religion and politics, as it is demonstrated in the concept of political religion, and later on in the concepts

of state religion or civil religion. The term *political religion* has its roots in *religio politica*, going back to the early 17th century. Since the 1930s, it served to classify the political-totalitarian mass movements of this time in a critical attitude toward ideology. This modern “political religion,” however, must be clearly distinguished from the “political religion” of classical antiquity and the later concepts of state religion and civil religion, which tried to institutionalize the relationship between religion and politics, not always in a fruitful way.

Generally speaking, it is possible to identify religion or belief as being situated in a person. Religion or belief must be further defined as a relationship and interchange between a human being and transcendent reality, which is relevant for humans. But the relationship to transcendence is not the only decisive criterion for a religion or a belief. Religions and beliefs are rather connected by a kind of “family resemblance,” as defined by Ludwig Wittgenstein (1953/2001). They are determined by overlapping qualities, including holiness, prayers, and services. Religions and beliefs also show similarities that connect them. These similarities, however, must not necessarily be alike in every religion or belief. Regarding those similarities, the reference to transcendence plays, of course, an important role. John Hick (2005) pointed out that another fundamental “family resemblance” of religions and beliefs, in addition to their reference to the transcendence, is their soteriological content, which describes the ability of a religion or belief to redeem human souls and allow salvation. However different their contents and traditions may be, this soteriological quality is a feature that all religions and beliefs have in common in various manners. Also, the validity of religious traditions was of great importance for Hick.

Religion and belief in the modern ideology can carefully be defined as generic terms, or concepts, which slowly have grown in importance in our modern age. These concepts are very different from the ancient meaning of the word *religio*, which first described all imaginations, attitudes, and actions of a person concerning the ultimate reality. Humans accept the ultimate reality as powers or a power, spirits or demons, gods or God, the “Sacred” or the “Absolute,” or just “Transcendence.” In ancient times, religion was not used as a collective name for each belief or as a universal term, in which various beliefs were summed up. The term *religio*, representing the past view on religion or belief, was used in a very narrow sense from antiquity up to the 16th century. At first, religion referred to the exercising of the rituals prescribed by law, but only later with regard to the Christian denomination. In general, it took a long time before *religio* and later “religion” had achieved their meaning, which led to the modern understanding of “religion.” Religion is more than the mere name of a personal belief. It expresses that humans are concerned about something beyond them. Also, death obtains a different meaning within a religious worldview. Romano Guardini (1940/1998), the Catholic priest, theologian, and philosopher of religion, considered death as

the gate to the other side of human life, which remains secret to those who still live in this world. For religious people, death is no longer the end of life but, instead, is the turning point to a different reality.

Summing up, the terms *religion* and *belief* can be characterized by the following three points:

1. There are no universal terms for all religions or belief systems of humankind in each epoch.
2. There is no term that includes all aspects of what is meant by religion or belief today. Even all these terms together cannot cover every aspect now meant by religion or belief.
3. Earlier terms of *religio* or religion stand in contrast to the modern meaning of religion. They emphasize the external practice of religion, the observance of ritual instructions and regulations, and the obedience to religious laws.

These three points, however, cannot unambiguously classify religions or beliefs and they do not ultimately define them. But they do outline the broad frame of the modern concept of religion and belief.

Early Explanations for Religions and Beliefs

Since ancient times, as many sources teach, people have had various religious or pseudoreligious systems. In the past, religions and beliefs were the result of natural phenomena, which led people to fear and to require that these natural phenomena be explained. Also, social facts and mechanisms had to be explained through religious patterns. Ancient Egyptian, Greek, and Roman religions show this function of early religions or belief systems. These religions and beliefs were polytheistic (i.e., there were many different gods, who had different things to take care of). In many cases, one god is honored as supreme among the others (e.g., Zeus in ancient Greek religion or Jupiter/Jove in ancient Roman religion). The holy or the deity was often linked with nature. Humans found in nature the powerful influence of God: Therefore trees or fountains or mountains (esp. the peak, like Mount Fuji in Japan) were adored as holy, or as the place where the deity lives. Also in *totems*, things of everyday life or symbols or even animals, the spirit of a deity is believed to be effective. Therefore, it is forbidden, it is a *taboo*, to kill an animal in which a deity is believed to be present. These original religious aspects can be found within African religions and beliefs, or within the religions of the Pacific islands.

In the Egyptian and Roman traditions, the emperor was adored as a god and found his place in the Pantheon after his death. Archaeological proofs of these ancient religions and belief systems can be found in the pyramids in Egypt, as well as in the ancient Roman temples around the Mediterranean Sea. From the onset of European

culture, politics, religion, and society were interconnected within the ancient state, the Greek *pólis* or the Roman *civitas*. So religions and politics were interlinked in ancient European societies. Later on, these three aspects differentiated more and more. Today, politics, religions, and societies are almost separated, but one should be aware that humans are oriented toward religious belief, as civilians within a political state and a civil society. So it is useful to respect religion and belief even within a political point of view.

At the beginning of ancient Greek culture, the explanations for the reasons why the universe came to exist, and why it exists the way it does, were given in the myths of the writers Homer (ca. 8th century BCE) and Hesiod (ca. 8th century BCE). Next, there was a shift from *mythos* (myths) to *lógos* (reason). This shift can be found in the quotations and fragments of the pre-Socratic philosophers, who turned their interests toward nature and the reasons for natural phenomena. Thales of Miletus (ca. 624–546 BCE), for example, a philosopher of nature living on the Ionic coast (today's Turkey), gave a precise forecast for a total eclipse by calculation, but people took him almost for a prophet, and, what is more, he could forecast a rich bearing of olives, so that he lent all the olive presses in his country for a small amount of money, and consequently he was able to borrow them for a very good price. The next step from myths to reason can be found in the philosophy of Plato (ca. 428/427–348/347 BCE), a disciple of Socrates (ca. 469–399 BCE). Plato underlined his arguments in his dialogues with myths, in order to explain them better to his disciples. Among them, there was another important philosopher, the educator of Alexander the Great, Aristotle (384–322 BCE). Aristotle was also very interested in investigating natural phenomena and in explaining the world by reason, not by myths.

The general aim of this early Greek philosophy was to explain the universe by using human reason rather than mythical explanations. As a result, the soul of a human should not be in a disturbed situation, but in a quiet state, which is characterized as *eudaimonía* (felicity). The early philosophical schools in ancient Greece always had the intention of caring for the soul by giving reasonable explanations for the universe and its existence. Consequently, these early philosophical schools played the role that religions or beliefs play in our own time.

Major Religions and Belief Systems

There are many religious systems, including ancient systems or natural religions, or smaller derivatives from the major religions or belief systems. All religions and belief systems aim to provide answers to human questions on the transcendent and to major questions on life and death. People thus find orientation for their lives within these major religions and belief systems.

Eastern and Western Traditions

In general, Eastern traditions differ from Western traditions. Among Eastern traditions, which have more the character of belief systems than religions, there is Hinduism and Buddhism, but also Confucianism in China, which concentrates on the ethical life, and the animistic and polytheistic Shinto in Japan, which honors and prays to the ancestors. These are known as very old religious traditions in the Eastern part of the world.

The Western traditions are better described as religions than as belief systems. The most important are Judaism, Christianity, and Islam. All three of these religions refer in quite different ways to Abraham (ca. 2000 BCE) as an ideal of a pious and religious person.

Also, Zoroastrianism is counted among the major religious traditions or belief systems. It is considered to be the first monotheistic belief system, with Ahura Mazda as the universal God. But it is also a dualistic system; *asha/arta* is the principle of “truth” and “order” whereas *druj*, “lie,” is the opposite. Both principles “fight” against each other in the world. Zoroastrianism was founded by the prophet Zoroaster, or Zarathushtra, in the farmland area of today’s Western Iran. The main teachings of Zoroastrianism can be found in the scripture Zend-Avesta.

Hinduism

In Asia, the Hindu traditions are well known; the religion of the Vedas and the Upanishads is grounded in very old scriptures (e.g., the Bhagavad Gita or “Song of God”). The beginning of these traditions is about 4,000 years BCE in India. The Hindu traditions have a polytheistic basis, with Shiva and Vishnu as the central deities, but only one eternal aim: the unification of the individual soul, *atman*, with the highest spirit, Brahman. After several lives, the soul can enter the Brahman, leaving the system of reincarnation (*samsara*), if the *karma*, the balance of all individual actions, is good enough. Five elements are considered to be central for Hindu beliefs: (1) *dharma* (ethics and duties), (2) *samsara* (cycle of reincarnation), (3) *karma* (action and resulting reaction), (4) *moksha* (liberation from the cycle of rebirth), and (5) *yogas* (paths and practices). Though it is controversially debated among scholars whether the caste system is an important part of Hindu teaching, this social system remains strong even today. There are four castes, called *varnas*, beginning with the highest cast: (1) Brahmins (teachers and priests); (2) Kshatriyas (warriors, nobles, and kings); (3) Vaishyas (farmers, merchants, and businessmen); and (4) Shudras (servants and laborers). The caste system is very rigid. Marriage is only possible within one caste. People outside the caste system, Parjanya or Antyaja (or now Dalits), the “untouchables,” have almost no chance to progress in social life. Therefore, this system has often been criticized as discriminatory (e.g., by Mahatma Gandhi [1869–1948], whose ideal was absolute peacefulness).

Buddhism

Also in Asia, the Buddhist tradition is founded on the philosophy of Siddhartha Gautama Buddha (ca. 563–483 BCE), who was a teacher of spiritual wisdom. There are two main traditions in Buddhism: the Mahayana (great vehicle) Buddhism and the Theravada (ancient teaching) Buddhism. A smaller tradition is the Hinayana (low vehicle) Buddhism. Central Buddhist teachings contain the Four Noble Truths: (1) the nature of suffering (*dukkha*), (2) suffering’s origin (*samudaya*), (3) suffering’s cessation (*nirodha*), and (4) the way (*marga*) leading to the cessation of suffering. This “way” (*marga*) is characterized by the Noble Eightfold Path: (1) right view, (2) right intention (wisdom), (3) right speech, (4) right action, (5) right livelihood (ethical conduct), (6) right effort, (7) right mindfulness, and (8) right concentration (concentration). The Noble Eightfold Path contains the ethical “program” of Buddhism.

One aim of Buddhism is to bring cessation from suffering to the human soul. There are several traditions within Buddhism. Among them, there is Zen Buddhism in Japan and Tibetan Buddhism, whose head is the Dalai Lama. The monastic tradition is also very common in Buddhism, because its discipline helps the adherent to succeed in achieving the aim, the *nirvana*, as a unity of the individual soul with the universal in the absolute nothingness (*nirvana*).

Judaism

The Mosaic tradition, later Judaism, is historically the first major tradition in Western culture. Christianity and Islam followed. In Judaism, humankind has been given the advice to follow God’s law, which was revealed on Mount Sinai, or Horeb to Moses. This revelation took place during the Exodus, the Jews’ escape out of Egyptian slavery. Moses was the leader of the people of Israel during that time. A life in accordance to the law will end up in felicity and prosperity, even after death. The prophets played a major role, because they renewed the concentration on God’s revelation within his law. During the reign of the Babylonian emperor Nebuchadnezzar II (ca. 630–562 BCE), the Jewish people were kidnapped and taken to Babylon. The Babylonian Talmud was written during this time, a commentary on the Torah, with respect to other commentaries and the oral tradition, in order to give a set of rules for everyday life. Literature interpreting the Torah is known as *midrash*.

When the people of Israel returned to the Holy Land, they built the first temple. In the year 70 CE, the temple was destroyed by the Romans, and the rabbinic phase began in Judaism. Rabbis are teachers of the Holy Scripture and they interpret for believers. They also give advice to pious Jews on how to manage life and how to decide in problematic situations. The *halakha* means to follow properly the way of the Jewish tradition.

Judaism today is quite various. There are liberal branches, as well as orthodox branches, whose believers

observe the traditional religious law very strictly. As predicted in the prophecies of the Hebrew Bible, Jewish people still wait for the Messiah, who will come in the future in order to complete the divine law in his person.

Christianity

In Christianity, Jesus Christ is believed to be the son of God, who came to redeem people. After the original sin of Adam and Eve, humankind survived for the redemption. The redeemer is Jesus Christ, who was crucified by the Romans after being accused, by the Jews in Jerusalem, of heresy for pretending to be the Messiah, and whose resurrection after 3 days astonished people, especially his own disciples. After another 40 days, Jesus Christ went up into heaven. After another 9 days, the Holy Spirit was sent down to earth in order to lead the faithful and to give consolation to them. God is the Holy Trinity in Christian tradition: God-Father, God-Son, God-Holy-Spirit.

Later, the Christian church developed into a more and more powerful institution, which secures the tradition of belief and teaching. Although crusades have occurred, the Christian doctrine is against force and tends toward peace on earth. In the year 1054 CE, the Eastern Greek Church turned away from the Latin Roman Church with the pope, the bishop of Rome, as Vicar of Christ and head of the church. Formally, there were two reasons for the East-West Schism: First, the Western and the Eastern traditions could not find a proper date for Easter, and second, the Eastern tradition could not agree to the *filioque* (“and by the Son”) within the credo, the big confession of the faith. The *filioque* means that the Holy Spirit was sent by the Father and Son together.

In the 16th century, the Protestant Reformation movements began with the Augustinian monk Martin Luther (1483–1546) in Germany, Huldrych Zwingli (1484–1531), and John Calvin (1509–1564) in Switzerland. The theologians Erasmus of Rotterdam (1466 or 1469–1536) and Philipp Melancthon (1497–1560) both followed the Lutheran teaching and supported the Protestant teaching in the academic sector (e.g., by writing important letters). The Protestant Reformation movements wanted to renew the Western Church (e.g., by providing new translations of the Bible, and a new structure by changing the hierarchy). But in the end, these movements divided the church again as a result of a second big schism. Protestant Christianity then divided again into the many small movements and churches, or denominations, of today.

In 1534, the English Church separated from the Roman Church, and as a result the Church of England or Anglican Church was founded. The king or the queen of England is the head of the Anglican Church, and meanwhile the Archbishop of Canterbury exercises this office worldwide in the Anglican Church (e.g., the Episcopal Church in the USA). Whereas the High Church is near to the Catholic Church, the Low Church is nearer to the Protestant Church. So the Anglican Church regards itself as a “middle way” between Protestantism and Roman Catholicism.

In contrast to Protestantism, the Catholic Church keeps up its 2,000-year-old tradition and discipline, although the Second Ecumenical Council of the Vatican (1962–1965) has changed some elements in this tradition.

Islam

Islam was founded by the prophet Muhammad (ca. 570–632 CE), who had a direct revelation from God (*Allah*). This revelation is written down in the Koran, the holy book of Islam. In 622 CE, the first year of the Islamic calendar, Muhammad went from Mecca to Medina; this event is called the *Hijra*, or “walk,” which was the founding act of Islam. Sometime later, Muhammad returned to Mecca with his soldiers and gained a lot of followers and power. Islam regards itself as the final religion, which is based on the ultimate revelation given by God to Muhammad. This revelation gave perfection to the Mosaic and Christian revelation. Muhammad, the prophet of God, is the last and the highest of the prophets.

In the Islamic tradition, on each Friday there is a ritual prayer in the mosque. Ritual prayers are among the most important elements of Islam, the so-called Five Pillars of Islam: (1) fasting in the month of Ramadan, (2) the pilgrimage to Mecca (hajj), (3) ritual prayers (*salát*) several times a day, (4) charity (e.g., giving money to the poor), and (5) the profession of faith. Also, the observance of religious law (*sharia*), which contains rules for all areas of human life, is central to Islamic teaching. Islam is a religion or belief system of strict discipline, and it has gained a lot of influence in the states of both the Near East and the Middle East, as well as in Indonesia and Africa.

Religious Objects, Symbols, and Rituals

Each major religion or belief system knows certain objects and symbols, as well as rites. The rite is often connected with specific objects or symbols. In Buddhism, for instance, the wheel is a symbol of the recurrence of life and, more important, the Noble Eightfold Path. In the Mosaic tradition, the Star of David is the central symbol of identification. In Christianity, the cross, on which Christ was sacrificed, is the core symbol. And in the Islamic tradition, the half moon, as well as the sword, is central.

Symbols serve to give meaning to rites. In Jewish service, for example, the scrolls of the Torah must not be touched by humans, because they are absolutely sacred and represent God’s presence. Therefore signs exist, sometimes formed like a human hand, with which the scrolls of the Torah can be touched in order to follow the lines, which have to be cited. Another symbol in Jewish service is the *shofar*, a horn (e.g., from a ram, which is blown in preparation for and during Yom Kippur, the Day of Atonement, when humans reconcile with God). Yom Kippur is celebrated 10 days after Rosh Hashanah, the Jewish New Year.

In the Catholic Holy Mass, wine and bread are leavened and then transubstantiated into the blood and body of Christ as an unbloody renewal of the Crucifixion of Christ. The Host is then essentially Christ, and it is carefully venerated and adored. Also, the Virgin Mary is venerated in the Catholic faith as the Mother of Jesus Christ (i.e., the Mother of God). In the Protestant traditions, the transubstantiation is interpreted in a different way. The essential real presence of Christ is limited to the moment of the transubstantiation. Also, the veneration of the Virgin Mary and the saints is not common in the Protestant tradition. In order to venerate the *Corpus Christi* (body of Christ), the Virgin Mary, or the saints, there are often processions of Christians, especially in the Catholic tradition.

The pilgrimage (*hajj*) to Mecca, one of the holy cities of Islam, has its aim in circling around the *Kaaba*, or “cube.” The Kaaba is a thousand-year-old small building and the most sacred place in Islam. In the Eastern corner of the Kaaba, there is the Black Stone, the most important feature of the “cube.” All Muslims pray in the direction of Mecca, as it is the center of Islam.

Also, ritual dances or specific music or songs help to bring people into a state of mind that leads them toward a deeper understanding of the transcendent. The location for rites is, in most cases, a sacred place or a temple (in Christianity, a church), which can be seen as the house of God. These “houses of God or gods” attach a specific place to religions or beliefs, thereby providing an identity for them; also, they provide a meeting point for the believers as a kind of “home.”

Religious Manuscripts and Teachings

Religions and belief systems express themselves in teachings, on the one hand manifested by oral traditions and on the other by sacred manuscripts. The basis for most of the teachings is a divine revelation.

The most common religious manuscript in our times is the Holy Bible, the “book of books.” But in the Far East, we have a lively tradition of Holy Scriptures: In the Vedas and Upanishads, Indian religious wisdom is written down, as in the Bhagavad Gita, or Song of God, as mentioned earlier. In the Bhagavad Gita, Sanjaya, who has a supernatural eye, tells the blind-born king Dhritarashtra about the big battle (between the near-related royal families of the Pandavas and Kauravas) that took place in the region where now the city of Delhi is located.

Judaism and Christianity refer in different ways to the Holy Bible. The Mosaic tradition is based on the five books of Moses, the Mosaic law or the Torah, the books of the prophets, and the psalms. Another important writing of Jewish tradition is *The Guide of the Perplexed* by Moses Maimonides (ca. 1135–1204), which considers religious and philosophical aspects, and helps to interpret the Jewish law properly. Maimonides’s influence on Jewish thinking

still remains intense. Christianity is also based on the Old Testament, partly equivalent to the Hebrew Bible (*Tanakh*), but also on the New Testament: the Four Gospels, the Acts of the Apostles, the Epistles of Saint Paul, and the General or Catholic Epistles, as well as the Apocalypse of Saint John.

In the Koran, or “the recitation,” the holy book of Islam, the revelation to Muhammad resulted in the central teachings of Islam, which are the core of the religious law, the *sharia*. Furthermore, the *sunna*, the history of the life of Muhammad, is the model of a good life for a Muslim. In Islam, the religious law, the *sharia*, has a great meaning, so the most important religious leaders are judges.

Teachings of all religions provide explanations for the beginning of the universe, as in Genesis, the first book of the bible, moral teachings, and orders for a good life, which must match the will of God. These moral teachings belong to the realm of natural rights, which are similar in all religions and belief systems and their teachings. Natural rights follow human nature and therefore human rationality. Religious teachings give answers to crucial human questions concerning the universe, ethical problems, and life and death.

Future Directions

In the field of religions and beliefs, many fruitful future research areas can be found. The humanities, especially the studies of religion, which are linked to anthropological and sociocultural research, create new research areas: using the structuralistic method of the French ethnologist Claude Lévi-Strauss, rituals are analyzed in order to discover the common structures of rituals in different religions or beliefs. Furthermore, the discourse of religions and beliefs are examined as well. Therefore, the dynamics and controversies within this discursive process are analyzed and described in order to obtain more results concerning the relationship between different religions and belief systems.

Also, the aesthetics of religions or beliefs are currently under scrutiny. Religions and beliefs can be described as aesthetical systems or systems of symbols, which influence the human realization of reality. The aesthetics of religion build up a systematic coherence for religions and belief systems. Another field of interest is the influence of religions and beliefs on different human societies and politics, because religions and belief systems provide ethical rules and values. Psychological studies examine the inner processes caused by the personal beliefs of a human being, for example during religious examinations, such as prayers or meditations. Very important for future research on religion is the investigation of human nature. All religions or belief systems provide concepts of human nature. This question of human nature is important for answering many questions and solving many problems in terms of the sciences in the future (e.g., in human-genetics research).

Also, in philosophy and theology, there are new areas of research, especially the examination of the relationship

between rationality and religion or belief. For example, the context of metaphysical considerations of late antiquity and the appearance of Christian revelation in the first centuries, beginning with early Fathers of the Church like Origen (185–254 CE) and ending with Saint Augustine (354–430 CE). During that time, theology has its origins in the confrontation of philosophy and religion. A major rational concentration on religious thoughts can be found in the Middle Ages (e.g., in the *Summa Theologica*, written from 1264–1274, of Saint Thomas Aquinas). The rationalism of the European Enlightenment emphasized critical views grounded in logic and nature. After rationalism, German idealism included religion systematically within philosophy as a philosophical perfection of the spirit. The German philosopher Friedrich Nietzsche (1844–1900) understood his philosophical work as a negative profile of religion in contrast to Christian thinking, which, he posited, is not suitable to human nature. But in the 20th and 21st centuries, religions and beliefs soon came back to the intellectual agenda. Therefore, religions and beliefs are truly fruitful objects for future research, as well as for anthropological research.

Conclusion

Summing up, the following three points are important for an anthropological perspective of religions and beliefs:

1. Religions and belief systems want to give humans a special place in the universe and within reality itself, which is of course a different orientation from the scientific worldview, but nevertheless one way to consider the universe and humans within it.
2. People may not want to refer to religion or beliefs as something entirely made by humans. For many people, religions and beliefs should include a serious transcendental relationship (e.g., based on a revelation). Otherwise, religion is in danger of becoming an ideology, which may lead people to the use of force and cruelty, as in totalitarian political systems. Such systems are often characterized as political religions, like fascism, national socialism, or communism.
3. Moreover, religions and belief systems need not be rigid systems of moral teachings in order to suppress others. Religions offer guidelines for life respecting the truth, with the aim being a future life (of the soul) in truth and peace. In religions and belief systems, people want to live their lives in accordance with God, as fruitful and successful individuals. And, what is more, people want to gain the hope for eternal life or redemption after death, which thereby gives a meaningful sense to human existence, like a gate to paradise, near to God or the transcendent.

Religions and beliefs belong to many fields in the humanities: theology, philosophy, sociology, history, religious studies, and psychology (among others). It is very

important that, in many perspectives on human life, religion and belief play a role as an answer to the question of the sense of human life and death. In religions and belief systems, humans seek answers to many other questions as well, especially in terms of ethical questions and the question of a good life. As a result, religions and belief systems play a major role within anthropological considerations of any kind.

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COSMOLOGY AND MYTHOLOGY

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The term *cosmology* comes from the Greek word *kosmos*, meaning “the world or universe as an ordered and harmonious system.” A cosmology is any composition or cultural construct relating to the structure and process of systems of creation: the origins of physical elements of earthly or astronomical spheres, the genesis of the material world, the order and function of the observable universe. In philosophy, it is taken to mean that part of metaphysics dealing with the idea of the world as a totality of all phenomena in space and time.

According to Greek thought, *cosmos* came out of chaos—the formless void, or a state of utter confusion and disorder—by separating the different elements. The concept is often associated with *cosmogony*, referring to a theory or system of the generation of the universe.

In social anthropology, the definition of cosmology is closely connected to the empirical study of religious myths. Edmund Leach (1982) defined it as “the system of beliefs and practices which social anthropologists commonly refer to as ‘primitive religion’” (p. 229).

If, however, one tries to abide by the more rigorous definitions, then cosmology in anthropological usage encompasses both more and less than religion. In some way or another the study of cosmology means taking account of the relationship between the whole and the parts: the macrocosm and the microcosm.

Because the word *kosmos* can mean “order” as well as “the world of order,” in Greek thought, microcosm can

signify not only humans in relation to the universe, but also any part of a thing, especially a living thing that reflects or represents the whole it belongs to (Guthrie, 1962).

In anthropology, Hocart (2004) was an early theorist who tried to elaborate this point. His aim was to establish that the root idea in human existence is the procurement of life. This, he claimed, is done through ritual that derives its meaning from the “life-giving myth.”

The Importance of Dreams in Ancient Japanese Mythology

Dreaming is a subconscious activity that occurs while a person is sleeping. Images occurring in dreams have been interpreted in various ways by different cultures. In our modern, materialistic and scientific culture, we tend to treat dreams as irrational and personal. However, in many cultures of the world, dreams are still considered very important, not only on a personal level but also in a public way. In these contexts, dreams are believed to foretell actual events that will occur in the future, represent the dreamer’s physical and mental condition, communicate with supernatural forces, and so forth. Thus, these cultures use dreams as devices to predict the future, to communicate with others, to make day-to-day decisions, to educate the youths, to heal the sick, and to enforce rules and laws. Japan is one culture that particularly emphasizes this type

of significance for dreams, connecting its own rich mythology very closely with the concept of dream.

Definition of Historical Phases

Six phases in Japanese history have been defined by anthropologists to describe the evolution of dreams in Japan and the connection with cosmology:

- *Phase 1 (Jomon period, 10,000 BCE onward):* Archaeological evidence reveals that the societies were small, with a simple social structure, of which the dominant economy was hunting and gathering.
- *Phase 2 (500 BCE onward):* Paddy-field rice cultivation was introduced to Japan from China, through Korea. According to Chinese documents, a queen in Japan regularly brought tributes to the emperor and reported that a civil war continued in her land. This means that the society grew large and complex enough to have the formation of tribal territories. Such a process is reflected in the mythologies compiled in *Kojiki* (Record of Ancient Matters) (see Philippi, 1968) and *Nihongi* (Chronicles of Japan) in the 8th century (see Singer, 2002).
- *Phase 3 (5th century CE onward):* Japan was established as a state and became a member of the East Asian political system, adopting Chinese law. The highly developed philosophies of Confucianism, Buddhism, and Taoism were introduced and well-accepted.
- *Phase 4 (9th century onward):* As the political and economic system matured, the aristocratic culture of literature and religion developed in the court, amalgamating alien and indigenous elements.
- *Phase 5 (13th century onward):* The Samurai class came into power. They were realistic and practical entrepreneurs who demolished the old aristocratic sociopolitical system.
- *Phase 6 (19th century onward):* Japan started to accept the influence of Western culture. It began in the 16th century, but the process was slow until Japan's ports opened in the latter half of the 19th century.

In the period following Phase 6, Japan aggressively learned the techniques and philosophy of Euro-American culture.

Iconography During Phase 1

For this prehistoric stage, few data are available to help to understand the socioanthropological dimension of the culture, and no written records remain. The only possible clue is iconography, or the study of art. The realistic figures found from this phase are limited to humans and animals and are probably the most conspicuous feature of the Jomon period. Human figures were most popular throughout the period, figurines made of clay or stone. Almost all of the figurines were female, of whom the bosoms, bellies, and buttocks were exaggerated. Masks usually hid their faces. Figurines have been found in various situations at the sites; placed alone in a stone structure or in a dwelling. Many pieces were discarded in holes. They were sometimes

goddesses of fertility and at other times used as substitute human beings for curing sickness as votive gifts.

Snakes are another noticeable motif in the art. Realistic figures have been found from middle Jomon sites in central Japan. Snakes often decorated vessels of peculiar shapes, but later, these were replaced by abstract designs such as spirals or waves. Such designs were characteristic decorative motifs of this culture throughout the period. During the late Jomon period, figurines of bears and wild boars were produced in the eastern and northern regions. Some scholars claim that monkeys, dogs, fish, reptiles, and insects were used as motifs, but others believe that the expressions are too vague to determine exactly what they are.

Symbols and Cultural Changes

Two eminent icons, humans and snakes, offer us an interesting suggestion. In Japanese mythology, one of the popular themes is that the snake was the spirit (god) of the land but was subdued by a hero of royal blood in the course of forming Japan. This theme may reflect a transition period with a change of culture and population. Another theme in mythology is that a snake transforms itself into a man and visits a woman at night to fertilize her. There has also been another anecdote saying that a man visits a woman only to find out that her natural shape is that of a snake. He runs away as a fierce snake chases him. This kind of story is referred to in many localities, where particular groups believe that their ancestors were snakes. The fact that the Jomon figurines always wore masks may indicate that they could transform to any shape at will.

The philosophy of merging humans and animals can be observed in many cultures. This is based upon animism, the belief that living beings are composed of two elements, spirit and body. Spirits are eternal and intangible, while visible and tangible bodies are temporal. If this is so, there is no limit on where a spirit may rest in humans, animals, or plants, or even in natural objects. Such a mythic world, where waking life and the life in dreams exist in the same horizon, has been experienced in Arnhemland, Australia. In Australian Aboriginal society, dreams are considered sacred and important. They have named their mythological era *Dreamtime*, which in fact rules their actual life. They use dreams to discover pregnancy and the birth of children, bad accidents, the visit of friends, and so forth. Dreams can also allow discovery of causes and the ways of curing sickness or preventing accidents. Artists in this society claim that they create designs and write poems revealed in dreams.

What happens in dreams was considered real and true, and waking life was temporal or just one of the possibilities of what could happen in the world. Aborigines believe that the world of dreams is operated by spirits: ancestral, powerful, good, and bad. We might consider that a similar atmosphere could have existed in the Jomon period.

Cosmology and Dreams During the Second and Third Phases

It has been estimated that more than one million people moved in and occupied central Japan from about 500 BCE, pushing the Jomon stock out to the southern and northern margins of the Japanese archipelago, Hokinawa and Hokkaido. It is not difficult to assume that they brought in a vast number of new cultural elements. As for the archaeological remains, iconographic characters have been found both in drawn and figurine form. The line-drawn figures were simplified signs that which decorated the surface of pottery vessels or bronze bells. Motifs were expressed either as a single figure or in scenes of daily activities such as hunting, harvesting, or seafaring. Human, deer, and boar motifs were most popular. Dogs, waterbirds, turtles, fish, dragonflies, spiders, and dragons have been observed occasionally.

Figures of humans and birds were made of wood, stone, or clay. It is noticeable that these two characters fly. This coincides with the fact that newcomers believed that they were descendants of celestial gods of the land in mythology. The newcomers also used mirrors as a symbol of the sun. A quantity of Chinese bronze mirrors have been excavated from large-scale tombs—apparently very important artifacts, with decorations on the backs of some of the mirrors depicting Taoist cosmology.

Dreaming took on an important role in governance as well. In written records, Chinese history reveals that the queen governed her nation by shamanism. They used oracle bones to foretell the future and make decisions. Pieces of deer bones and boar bones, with incised lines or small perforations, have been excavated from many sites. *Kojiki* (as cited in Philippi, 1968) describes how dreaming was used to decide national policy. Emperor Sujin had a sacred bed made so that he could dream in order to make a decision in a crisis, for example, to stamp out epidemics or to nominate the heir to the throne. He often listened to the dreams of his subjects in order to make national policy. It is clear that during this period people still believed in the supernatural world, and dreaming was considered a domain where qualified persons communicated with powerful spirits.

As Japan started to actively participate as a member of the East Asian political order, it had to adopt the contemporary Chinese system and philosophy that was a combination of Confucianism, Buddhism, and Taoism. Confucianism denied admission of irrational supernatural phenomena into its own scheme. Taoism is the science of deciding calendar and time, but it also involves supernatural features such as fortune-telling by astronomy and omens. An octagonal building in Horyuuj Temple is said to have been built by Prince Shotoku so that he could shut himself up in isolation for days to get inspiration. It is called the Dream Hall, which reminds us of the sacred bed of Emperor Sujin. A continuation of old ideas and customs can be observed in various archaeological remains: figurines of humans, animals, and various tools for cursing and votive gifts. The

characteristic of the third phase may be described as the confinement of dreaming to the private realm.

New Cultural Contaminations

As the sociopolitical system matured, a strong recurrence of the old psychology could be seen, including fear of supernatural beings such as ghosts, demons, furies, wraiths, and incarnations. The practice of reading omens, fortune-telling, cursing, and pointing was also more widespread. Buddhism adopted a lot of Shinto elements and Shinto shrines were reactivated. Novels and diaries written by aristocratic female artists described vividly such a social climate. Dreaming continued to play an important role as a device to see the future. Dreams could be discoursed by actions and interpretations—they could buy, give, or steal. Some temples or shrines had special compounds for dreaming. People rushed to such places all at once and stayed until they had a good dream. By now, there were professional dream interpreters and dreamers by profession. Nightmares and sleep disorders were commonplace during this period.

The signs of rational individuals can be observed from Phase 4. The author (known as Mother of Michitsuna) of *Kagero-Nikki (The Gossamer Years)* commented that an interpretation of her dream given by a priest was a “stupid lie.” Myoe’s description of his dream was as subjective as modern psychological analysis (see Tanabe, 1992). The Samurai, the realistic warrior class who emerged from entrepreneurial farmers, also brought in rational thinking. According to the *Taiheiki (Chronicle of Great Peace)*, Aoto refused to receive an award after being told that his lord wanted to give it to him because he dreamed of Aoto’s distinguished service. He said he couldn’t receive such an irrational award. What would have happened if he dreamed another way? For such people, the difference between dream and reality was clearly distinct. So, after the Samurai class came to power to rule Japan for centuries, such a rational and pragmatic way of thinking prevailed and provided a suitable precondition for the smooth assimilation of Western culture and philosophy.

The Role of Dreams in the Last Stage

How to evaluate dreams, real and important or fantastic and absurd, depends on the cosmology of the culture. Japanese people today believe that they are a rational and scientific nation. However, millions visit Shinto shrines on New Year’s days, put portable shrines in computer rooms, and have charms in their cars. Most young adults believe in the existence of the soul, and a majority of them practice more than two religions.

Although it has been deformed in the course of history, it is believed that people have retained animism since the Jomon period. In such a psychological climate, they can smoothly shift to soft, personal, irrational, and transient reality in order to avoid the difficulty of hard reality. There, they can enjoy pleasant sleep and dream. For anthropologists, this

is a very interesting characteristic of the Japanese, whose image varies from one of purely economic human types to one of quiet peaceful people in the eyes of Westerners.

Significance of the Struggle in Ancient Norse Mythology

Anthropologists frequently emphasize the newfound interest in cosmology as, to a large extent, attributable to the influence of the work of Lévi-Strauss. Although in his early writings he does not use the word *cosmology*, and hardly does so subsequently, his work inspired a new and different interest in cosmology. Data derived from many different cosmologies, together with mythologies, were being used to put forward general theories about the workings of the human mind. Whether the focus of anthropological studies is on kinship, ritual, house construction, or even social change, most find it impossible to discuss cultural and social practices without relating them in some way to indigenous, often ancient, cosmologies.

Vafpruðnismál is the *Codex regius* manuscript dated to around 1280, often known simply as the Poetic Edda, but it is one of the few Eddic poems also found elsewhere. All texts commonly date from the 13th century in their present form, but the Poetic Edda is usually regarded as old, even originating from before the Christianization of Iceland in 1000. It is one of several gnomic mythological poems composed in the meter of wisdom poetry: All verses but one are spoken by the protagonists, making it dramatic in form, regardless of whether it was ever performed. The Eddic poem depicts a contest of wisdom between Odin and a wise giant. It reenacts the conflict between gods and giants, which seems to lie at the heart of the heathen worldview, as reflected in 13th-century sources. Paternity is a major theme, and Odin's quest for knowledge of the origins and the end of the world outline the poem's core.

The relationship of gods and giants in these classic works is complex. The giants are the ancestors of the gods (including Odin himself) and of the world. Their Otherness is entwined with proximity. The giant's foremost attribute is his extreme old age and wisdom, whereas his size may be secondary to his paternal role. When Odin has plied the giant for information about the past, he turns to the future, the impending last battle of gods and giants and how he himself will meet his end. He then wins the contest by asking a fraudulent last question about what he whispered into his own son's ear. The death of the giant is closely associated with the proclamation of Odin as the new father and his growing awareness of his own mortality.

The Mission

Most studies of this Nordic text concentrate on two aspects: (1) the wisdom contained in the poem, which concerns important parts of heathen cosmology, and

(2) the duel itself and its significance. J. Cohen (1999) has claimed that in the Poetic Edda "constructing an identity for the subject and composing a history for the world are two versions of the same process" (p. 94). Without this poem, the importance of giants in the Nordic cosmos would be far less clearly represented. The battle is a duel of words, which concerns knowledge and the cosmos. The first five verses are a prelude to the contest and yet contribute much to the poem's overall meaning, since they establish the contest as a symbolic journey.

Odin, the wandering high god of Old Norse heathenism, informs his wife Frigg that he wishes to engage in a battle of wits against a giant called Vafpruðnir. He wants to seek out the giant and claims he is curious about the ancient knowledge that this all-knowing giant may possess. Frigg warns that he is the mightiest of giants. She is, nevertheless, persuaded that this mission is fundamental for Odin. From his point of view, the journey is a test—a challenge and a rite of passage. Odin needs to face the giant, to conquer him and to acquire knowledge and power from him.

The rest of the poem takes place in Vafpruðnir's hall, where the giant first has to discover whether his dissembled guest is an honorable antagonist. Then god and giant engage in a contest of wisdom where the stake seems to be the loser's head. This tragedy with two main characters is relatively plain, as Eddic stories go, and there are no descriptions of scene. It is left to the audience to stage the duel in their own heads and, as is so often the case with the mythological narrations of the Poetic Edda, the scene seems to refer to a lost mythical world. The text is not obscure in itself, but perhaps it has been made so by a loss of context. It is not clear, for instance, why Odin needs to contend with the giant and wherein Vafpruðnir's significance to him lies, but the epic impresses upon us that Odin is interested in the contest: It is he who starts it and who needs it. Odin is the aggressor, whereas the giant merely accepts his guest as an adversary. However, the reason given for Odin's eagerness is the figure of the antagonist. To fathom the quest, it is important to understand who he is and what he means to Odin.

The answer is complex, and indeed the giant of the Eddic world is a complex figure. The word *giant* occurs many times, as if to establish that it is an important attribute as well as wisdom. This may seem unusual in light of later folktales, where trolls and other relatives of giants are presented as stupid, but stupidity is rarely a quality of Eddic giants. There is also an emphasis on the giant's strength, but it is not clear whether this is pure physical strength or the strength derived from magical wisdom; the word *powerful* is often conjoined with a sort of witchcraft in Old Norse texts. It remains to be seen what kind of wisdom the giant possesses and how it is important to our perception of him.

The Symbolic Role of the Father

When Odin comes to the giant's hall, it is said that Vafpruðnir is a father, but not, however, the only father in

the duel. In the prose of *Snorra-Edda*, Odin is frequently named the father of all the gods. In this Poetic Edda, Frigg also calls her husband “father of men.” The contest is established as a contest of fathers before it begins. This makes it an attractive possibility that paternity might be a major theme of this particular poem and perhaps lie at the heart of the giant’s significance in Old Norse mythology. The quest is for a showdown between the two fathers—a conflict that may be characterized as oedipal (not necessarily in the Freudian sense), with Odin acting out the role of the son, since in the *Snorra-Edda* Odin is, on his mother’s side, the grandson of a giant. Of the two fathers, one is depicted as a son as well, and the two represent two different worlds. But which two worlds? Considering the giant’s close relationship to nature, the first assumption might be that the god and the giant represent the opposing forces of nature and civilization. Odin’s first questions to his rival concern the elements of nature, and questions about giants and natural elements are interwoven in the poem. After Odin has asked Vafprudnir about the origin of the sun and the moon, day and night, and winter and summer, he turns suddenly to the origins of the oldest living being, Ymir. He asks about his origins and how he grew.

The answers sometimes involve giants as well, which is best exemplified when Odin asks about the origin of the wind and the giant reveals that its originator is a giant in the shape of an eagle, called *corpse-swallower*. In narratives such as romances and folktales, giants dwell on the periphery, in the wilderness. Whether Vafprudnir rules over a distant kingdom in a spectacular landscape is unclear, for it is merely established that the giant possesses knowledge about nature. He lives in a hall, which does not suggest the wilderness. While Odin has to travel to get there, it is not revealed how lengthy his journey is, or where the giant resides (the Norse tradition says East, in frozen lands). It may be precisely the status of the giant as a father that makes Vafprudnir knowledgeable about nature and the elements, as nature is often seen as preceding civilization.

The Struggle Between Gods and Giants

There is an ongoing conflict between the gods and the giants; however, the relationship is complicated by the fact that they are also ancestors. In Odin’s case, this ancestry is direct. Giants are also known as ancestors of royal families in other sources (for instance, Giant Dofri as a foster father of King Haraldr, the legendary founding father of Norway). The enemy of gods turns out to be their grandfather. Furthermore, the enemy of the cosmos (earth) is its own past self, the giant descending from Ymir, whose body now has been transformed into earth. The enormity of giants is easily explained as a secondary trait going with their ancestral role—in the eyes of small children, their parents are giants. This means that monstrous enormity may go hand in hand with proximity. It is important to emphasize that, in Norse ancient mythology, otherness

is entwined with proximity; the giant is not just an alien, he is a familiar character. The frequent use of the word *father* forces us to regard the contest as a generational conflict, a symbolic battle between the past and the present, the old and the new.

We might define this conflict as oedipal or refer to the myth of Kronos-Saturn, which was known in medieval Iceland. The choice of father-son conflict seems to be subject to the protagonist’s point of view: Odin is like Oedipus in seeking out and killing a paternal figure, and the giant is a Kronos-like figure who poses a threat to his descendant. In Greek mythology, Kronos was the father of Zeus, who swallowed his own children, only to be toppled, castrated, and exiled by Zeus. In Old Norse mythology, this deposed and exiled ancestor (represented by the descendants of Ymir) had not admitted defeat and is an exile only in that he seems mostly to live on the outskirts of the known world and persist in distressing the current rulers of the world. The relationship with the Kronos-Oedipus myths is further complicated by the fact that it does not at first seem right to regard Vafprudnir as the aggressor in the struggle; he is a father figure who is sought out and defeated.

It has often been argued that the giants represent chaos, which in the beginning was embodied in the progenitor Ymir whom the gods had to kill in order to make the present world (cosmos). However, since the giants were not all drowned, they have continued to be a destructive and chaotic force, opposing the natural order of the gods and waging war on them. The narration may be seen as a reenactment of this struggle between two wise fathers, order and chaos. At stake is the head of one of the competitors, but the death of both of them closes the circle. There is a symbiosis between the future and the past, perhaps inspired by the notion of fate, that the future of the world is predestinated and the decisions were made long ago, so that a very ancient being is more likely to know the future than ourselves.

The last few verses of the cosmogony indicate that Odin has succeeded in his quest for the father role. When he asks about his own death, the giant answers by using the term *father of men* (the wolf will swallow the father of men). In spite of all their cheating, the Old Norse gods, somewhat uniquely for gods, nevertheless face extinction in the end: as scholars have noted, the Old Norse end of the world differs from the Christian account in that evil triumphs over good. This is logical if the gods represent order and giants chaos. The perfect only needs one flaw or imperfection for the adversary to win; a tiny chink in the armor of order leads to chaos. While good must be whole, evil is allowed to be sundered, imperfect, and chaotic, and in the end that may prove to be advantageous. The world goes on but the individual’s end is final. Odin has learned that the world will survive his death. Like a giant, our death is a huge and horrific presence, intertwined with our creation and being, but negative in that it signifies its end. This may account for the paradoxical nature of the giant in Old Norse mythology: We observe a duel of two fathers to the death

but we also learn about death, where the giant father gets a rare chance to enunciate his own point of view. He also has the last word, triumphing over Odin while he admits his own defeat.

Nature and Culture in Amazonian Cosmology

An important aspect of Amerindian culture has been called *perspectival quality*: The conception, common to many peoples of the continent, is based upon the idea that the world is inhabited by different sorts of subjects or persons, human and nonhuman, which apprehend reality from different points of view. This idea cannot be reduced to our current concept of relativism, which it at first seems to call to mind. As many anthropologists have already concluded, the classic distinction between nature and culture cannot be used to describe domains internal to non-Western cosmologies without first undergoing a rigorous ethnographic critique. Such a critique, in the present case, implies the redistribution of the predicates subsumed within the two paradigmatic sets that traditionally oppose one another under the heading of nature and culture: universal and particular, objective and subjective, physical and social, fact and value, the given and the instituted, necessity and spontaneity, immanence and transcendence, body and mind, and animality and humanity, among many more.

Such an ethnographically based reshuffling of our conceptual schemes leads many scholars to suggest the expression *multinaturalism*, to designate one of the contrastive features of Amerindian thought in relation to Western *multiculturalist* cosmologies. Where the latter are founded on the mutual implication of the unity of nature and the plurality of cultures—the first guaranteed by the objective universality of the body and substance, the second generated by the subjective particularity of spirit and meaning—the Amerindian conception would suppose a spiritual unity and a corporeal diversity. Here, culture or the subject would be the form of the universal, while nature or the object would be the form of the particular. This inversion, perhaps too symmetrical to be more than speculative, must be developed by means of the plausible phenomenological interpretation of Amerindian cosmological categories, which determine the constitutive conditions of the relational contexts we can call *nature* and *culture*.

Humans and Animals: A Perspective View

There are numerous references in Amazonian ethnography to an indigenous theory showing how the way humans perceive animals and other subjectivities that inhabit the world—gods, spirits, the dead, inhabitants of other cosmic levels, meteorological phenomena, plants, and occasionally even objects—differs profoundly from the way in which these humans see themselves. Usually, in normal

conditions, humans see humans as humans, animals as animals, and spirits (if they see them) as spirits; however, spirits and animals see humans as animals, either as predators or prey. By the same token, animals and spirits see themselves as humans: They perceive themselves as (or become) anthropomorphic beings when they are in their own houses or villages, and they experience their own habits and characteristics in the form of the culture. They see their food as human food (e.g., jaguars see blood as manioc beer, vultures see the maggot in rotten meat as grilled fish); they see their bodily attributes (fur, feathers, claws, beaks) as body decorations or cultural instruments; they see their social system as organized in the same way as human institutions (with chiefs, shamans, ceremonies, and exogamous moieties).

The allocation *to see as* refers literally to percepts and not analogically to concepts, although in some cases the emphasis is placed more on the categorical than on a sensory aspect of the phenomenon. Generally, animals are people, or see themselves as persons. Such a notion is virtually always connected to the idea that the manifest form of each species is a mere envelope—a garment concealing an internal human form, usually only visible to the eyes of the particular species or to certain trans-specific beings such as shamans. This internal form is the soul or spirit of the animal: an intentionality or subjectivity formally identical to human consciousness, materializable, in a human, bodily schema concealed behind an animal mask.

The Essence and the Appearance: A Cosmological Transformation

At first sight then, there is a distinction between an anthropomorphic essence of a spiritual type, common to animate beings, and a variable bodily appearance, characteristic of each individual species but which, rather than being, is instead changeable and removable clothing. This notion of clothing is one of the privileged expressions of metamorphosis—spirits, the dead, and shamans, beasts that turn into other beasts, and humans that are inadvertently turned into animals. This is an omnipresent process in the highly transformational world proposed by Amazonian culture. This perspectivism and cosmological transformation can be seen in numerous South American ethnographies and it can also be found, and maybe with even greater generative value, in the far north of North America as well as in Asia and among hunter-gatherer populations of other parts of the world.

Perspectivism does not involve all animal species (besides covering other beings); the emphasis seems to be on those species that perform a key symbolic and practical role, such as the great predators and the principal species of prey for humans. In fact, one of the central dimensions, possibly the fundamental dimension, of perspectival inversions

refers to the relative and relational statuses of predator and prey. On the other hand, however, it is not always clear whether spirits or subjectivities are being attributed to each individual animal, and there are examples of cosmologies that deny any consciousness to postmythical animals. Nonetheless, as is well-known, the notion of animal-spirit masters (e.g., mothers of the game animals or masters of white-lipped peccaries) is widespread throughout the continent. These spirit masters, clearly endowed with intentionality analogous to that of humans, function as hypostases of the animal species with which they are associated, thereby creating an intersubjective field for human-animal relations even where empirical animals are not spiritualized.

We must remember, above all, that if there is a virtually universal Amerindian notion, it is that of an original state of undifferentiation between humans and animals, described in mythology. Myths are filled with beings whose form, name, and behavior inextricably mix human and animal attributes in a common context of intercommunicability, identical to that which defines the present-day intrahuman world. The differentiation between culture and nature, shown by Lévi-Strauss as the central theme of Amerindian mythology, is not a process of differentiating the human from the animal, as in our own evolutionist mythology. The original, common condition of both humans and animals is not animality, but rather humanity. The great mythical separation reveals not so much culture distinguishing itself from nature, but rather nature distancing itself from culture: The myth tells how animals lost the qualities inherited or retained by humans. Humans are those who continue as they have always been; animals are ex-humans, and humans are not ex-animals.

The common point of reference for all beings of nature, then, is not humans as a species but rather humanity as a condition. The distinction between the human species and the human condition has an evident connection with the idea of animal clothing hiding a common spiritual essence and the issue of the general meaning of perspectivism. It is important to note one of its many corollaries: The past humanity of animals is added to their present-day spirituality hidden by their visible form in order to produce that extended set of food restrictions or precautions. These restrictions or precautions either declare certain animals inedible that were mythically consubstantial with humans, or demand their desubjectivization by shamanistic means before they can be consumed (neutralizing the spirit, transubstantiating the meat into plant food, semantically reducing it to other animals less proximate to humans). This all comes under the threat of illness, conceived of as a cannibal counter-predation undertaken by the spirit of the prey turned predator, in a lethal inversion of perspectives that transform the human into an animal.

These views illustrate how Amerindian perspectivism has an essential relation with shamanism and the valorization of the hunt. The hunting ideology is also, and above all, an ideology of shamans, insofar as it is shamans who administer

the relations between humans and the spiritual component of the extra-humans, since they alone are capable of assuming the point of view of such beings and, in particular, are capable of returning to tell the tale. If Western multiculturalism is relativism as public policy, then Amerindian shamanism is multinaturalism as cosmic policy.

Nature and Relations With Humans: Animism in Amerindian Culture

In recent studies, Descola (1986) distinguishes three modes of objectifying nature: (1) totemism, where the differences between natural species are used as a model for social distinctions (i.e., where the relationship between nature and culture is metaphorical and marked by discontinuity); (2) animism, where the elementary categories structuring social life organize the relation between humans and natural species, thus defining a social continuity between nature and culture, and founded on the attribution of human dispositions and social characteristics to “natural beings”; and (3) naturalism, typical of Western cosmologies, which suppose an ontological duality between nature (the domain of necessity) and culture (the domain of spontaneity) as areas separated by metonymic discontinuity. Animism is characteristic of societies in which animals are the strategic focus of the objectification of nature and of its socialization, as is the case among the indigenous peoples of America, reigning supreme over social morphologies lacking in elaborate internal segmentations. But this mode can also be found coexisting or combined with totemism, wherein such segmentations exist.

The contrast between animism and naturalism is not only classificatory, but primarily cosmological. Animism could therefore be defined as an ontology postulating the social character of relations between humans and nonhumans: The space between nature and society is itself social. Naturalism is founded on the inverted axiom: Relations between society and nature are themselves natural. Indeed, if in the animistic mode the distinction nature/culture is internal to the social world, humans and animals being immersed in the same sociocosmic medium (and in this sense nature is a part of an encompassing sociality), then in naturalist ontology, the distinction nature/culture is internal to nature (and in this sense, human society is one natural phenomenon among others). In Western naturalist ontology, the nature/society interface is natural: Humans are organisms like the rest, body-objects in ecological interaction with other bodies and forces, all of them ruled by the necessary laws of biology and physics; productive forces harness, and thereby express, natural forces. Social relations, that is, contractual or instituted relations between subjects, can only exist internal to human society.

The problem with this view is that given the universality of nature, the status of the human and social world is unstable and, as the history of Western thought shows, it

perpetually oscillates between a naturalistic monism and an ontological dualism of nature/culture. Culture is the modern name of spirit, or at least it is the name of the compromise between nature and grace. Of animism we would be tempted to say that the instability is located in the opposite pole: There the problem is how to administer the mixture of humanity and animality constituting animals, and not, as is the case among ourselves, the combination of culture and nature which characterizes humans; the point is to differentiate a “nature” out of the universal sociality. Animism, interpreted as human sociality projected onto the nonhuman world, would be nothing but the metaphor of a metonymy. Among the questions remaining to be resolved, therefore, is that of knowing whether animism can be described as a figurative use of categories pertaining to the human-social domain to conceptualize the domain of nonhumans and their relations with the former.

Conclusion

Connecting spirit and body between myth and cosmic world remains a challenge. As we know, the status of humans in Western thought is essentially ambiguous: On one hand, humankind is an animal species among others, and animality is a domain that includes humans; on the other hand, humanity is a moral condition that excludes animals. These two statuses coexist in the problematic and disjunctive notion of “human nature.” Our cosmology postulates a physical continuity and a metaphysical discontinuity between humans and animals, the former making of man an object for the natural sciences, the latter an object for the “humanities.” Spirit or mind is our great differentiator: It raises us above animals and matter in general; it distinguishes cultures; it makes each person unique before his fellow beings. The body, in contrast, is the major integrator: It connects us to the rest of the living, united by a universal substrate (DNA) which, in turn, links up with the ultimate nature of all material bodies.

In contrast to this, Amerindians postulate a metaphysical continuity and a physical discontinuity between the beings of the cosmos, the former resulting in animism, and the latter in perspectivism: The spirit or soul (here not an immaterial substance but rather a reflexive form) integrates, while the body (not a material organism but a system of active affects) differentiates. The body appears to be the great differentiator in Amazonian cosmology. However, the Amerindian emphasis on the social construction of the body cannot be taken as the culturalization of a natural substrate, but rather as the production of a distinctly human body, meaning naturally human. Such a process seems to express not so much a wish to de-animalize the body through its cultural marking, but rather to particularize a body still too generic, differentiating it from the bodies of other human

collectivities as well as from those of other species. The body, as a site of differentiating perspective, must be differentiated to the highest degree in order completely to express it. As bundles of affects and sites of perspective, rather than material organisms, bodies “are” souls, just, incidentally, as souls and spirits “are” bodies. Indeed, body and soul, just like nature and culture, do not correspond to substantives, self-subsistent entities, but equally to types of bodies, endowed with properties—affects—*sui generis*.

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PEASANT SOCIETIES

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By the latter part of the 20th century, most scholars of the peasantry agreed that global capitalism had a disintegrating effect on traditional agricultural societies. What they were at odds over was the issue of how such economies were changed, and the consequences of these changes. *Formalists* were of the opinion that the capitalist market improved individual well-being by rewarding farmers who adopted new economic behaviors and farming techniques to maximize productive yields and profits (Popkin, 1979). *Substantivists* contended that the appearance of capitalism had an adverse effect on the traditional value structure and practices in these communities by instituting new classes and outside alliances that undermined the preexisting system at the expense of the common person (Scott, 1977). *Marxists* argued that capitalism led to the differentiation of formerly integrated peasant societies into fragmented societies composed of competing individual farmers who became either better-off entrepreneurs or poor-wage workers. Or, they argued, if this polarization between two predominant and opposing classes does not occur, then the peasantry as a class, in itself, becomes a stratified, divisive, and unstable class because peasant farmers shift between capitalist and precapitalist relations of production in a transitional economy (Kahn & Llobera, 1981; Stoler, 1985).

This chapter reviews the major debates on the nature and consequences of globalization and culture change in peasant societies, while speculating on the future of these

societies. It is arranged accordingly: First, the origins of this disagreement in the classical literature on Marxism are reviewed. This is followed by a discussion of the successive substantivist versus formalist controversy. Finally, the *modes of production* debates that overtook and went beyond this controversy are examined and some conclusions are drawn.

Classical Theory and Debates

In the classical literature, scholars investigated the question, first raised by Karl Marx, of whether or not the effects of capitalism would result in the proletarianization and fragmentation of formerly integrated and, largely, self-sufficient peasant societies. Followers of Lenin argued that capitalist penetration would end by destroying and expropriating the peasantry, while Chayanov and his followers contended that, although this may sometimes be the case, it is not necessarily so. Terry Cox (1986) explains that Lenin initially theorized that class differences occurred in peasant societies as a result of the penetration of capitalism. Lenin isolated the rise of capitalism as the root cause of inequality in the peasantries. According to his view, peasant involvement in commodity production led to the unequal distribution of the means of production between households. This began the process of class polarization and the proletarianization of those households with insufficient means of production.

Later, Lenin expounded a twofold explanation to account for varying forms of capitalist differentiations then occurring in the Russian countryside. He theorized that class differentiations occurred, first, through preexisting, internal divisions in the peasantry and, second, as a result of the process of changes already taking place on large-landed estates where peasants were acting collectively as a class on behalf of their own interests. Cox (1986) explains this as follows:

Agrarian Marxists' theoretical heritage was one which, despite hints to the contrary in Marx, tended to assume that inherent in the growth of commodity production in peasant agriculture was the necessary emergence of capitalist farming and, associated with it, the class differentiation of the peasants. (p. 19)

That is, unless farmers consciously resisted such tendencies, capitalism would develop as a result of the growth of commodity production in agriculture. Lenin drew on the existing statistical data on rural inequalities to argue that peasant societies represented a beginning stage in the development of the bourgeois and proletarian classes, but he did not yet mean that the peasantry was being divided into two separate and distinct classes.

Accordingly, differentiation in the peasantry, largely, came about as a result of differences in wealth between households who shared the same means of production or way of life, without regard to their position in the wider stratified social system. In contrast, Chayanov (1966) argued that differentiation seemed to occur among the peasantry in predictable cycles—that is, households were known to be relatively rich and relatively poor at different periods in their life history (pp. 249–250). Therefore, Chayanov minimized inequalities among peasants. He considered inequality to be intrinsic in peasant societies in a natural economy, and not necessarily a threat to the economy or a result of the introduction of capitalism. Yet, when Chayanov conducted his fieldwork, everywhere the peasantries were already involved in the capitalist market economy. Hence, Chayanov failed to recognize that if the peasantry becomes divided by capitalism, they face the danger of becoming a marginalized class of landless laborers or labor pool. With this, Lenin argued that peasants represented a preliminary stage in the development of agrarian bourgeois and proletarian classes. But Chayanov refused to accept this view. He proposed that it was important to distinguish demographic differentiation from capitalist divisions taking place in the countryside. He also thought that it was important to treat distinct types of differentiation with particular methods and theories, and not to confuse them, which, ironically, he did (see Chayanov, 1966, pp. 249–250, 255).

Hence, Chayanov's research came in for criticism and debate. Kritsman (as cited in Cox, 1986) found fault with Chayanovian theory for failing to place the peasants in the perspective of their wider economy. He argued that the general disintegration of the Russian countryside was a

result of the war and revolution that was forcing former proletarians into subsistence farming to survive. He suggests that Chayanov mistook these farmers for peasant households persisting in a natural economy. Kritsman argued that Chayanov did not recognize that the outcome of war was an intertwining of different social and ideological structures, and that the most important question to ask was about how these different structures interact and affect each other. Cox (1986) clarifies that the Russian peasantry represented the petty bourgeoisie mass and the point of research was to distinguish how far this mass retained its basic homogeneity, and how far it was differentiating into discrete classes with different class interests. Alavi and Shanin (1982) put it this way: "Peasantries are new creations and not simply survivals of a pre-capitalist past that are conserved as such, to subserve capitalism" (p. 188). Once peasants become involved in the capitalist market economy, they exist in relation to it because they have lost their precapitalist moorings. According to his adversaries, Chayanov failed to understand the nature of capitalist farming. Rather, he understood capitalist farming, largely, in the same way as he did peasant farming, involving individual family farms using the same social organization and technological machineries, except that capitalist farms employed wage labor. This basic misperception gave rise to other shortcomings in Chayanov's theory.

Chayanov, inadvertently, supported a view of peasant societies that ignored the forces and relations of production. He stressed the determinant role of natural factors on consumption and labor as opposed to the influence of technological changes that were tied to political, ideological, economic, and social forces of production. Chayanov developed a theory of how different farm machineries could be best used in different and particular sorts of farm communities or social organizations, without first analyzing the effect of the introduction of machinery on peasant farm organization itself (Godelier, 1986; Pfaffenberger, 1988). In other words, his theory was abstract and bore little reference to real social life. He assumed that the sources of change in peasant societies were derived from natural factors, rather than socially constructed factors. This assumption led him, and his followers, to view peasant farming as an independent type of social organization that could survive the onslaught of capitalism. However, Chayanov did not consider how the influence of petty commodity production could slowly transform the relations of peasant farming, giving rise to new forms of exploitation and class interests. Chayanov did not factor into consideration the historical contexts in which peasant societies were situated.

Cox (1986) explains that the development of capitalist class stratification occurs in peasant farm communities when the workers are separated from their means of production. On the one hand, it is the conversion of the peasant worker into the proletariat or the hired laborer. On the other hand, it is the conversion of the means of production into capital (p. 87). However, the democratization or liberalization of capitalism

has resulted in all kinds of nonconventional reactions in agrarian societies that do not immediately fit this model. According to Kritsman (as cited in Cox, 1986), for example, class stratification had already begun to develop in the Russian countryside where those carrying out capitalist exploitation were broadly not the strong, but also the smaller peasants possessing the means of production. Hence, the conventional categories of rich, middle, and poor were called into question. Clearly, the middle peasantry cannot be characterized as independent farmers who were neither exploiting nor being exploited in their daily work. Thus, the study of the peasantry is problematic as illustrated by the question of proletarian households with small vegetable gardens, or of determining the accuracy of class boundaries between households.

Cross-culturally, students of the peasantry still grapple with theoretical questions first raised by Karl Marx concerning the direction of social and economic change in precapitalist agricultural societies that have entered into relation with capitalism. The same arguments can be heard in new contexts. Dogmatic Marxists contend that under the capitalist system, the integrated natural economy of the peasantries becomes disrupted. Small-scale landowners either become capitalists or wagedworkers who lose their control over the means of production. This polarization process will eventually produce a revolutionary crisis. In contrast, nondogmatic and creative Marxists or Marxist-postmodernists (e.g., Godelier, 1986; Kahn, 1980; Stoler, 1985; Wolf, 1986) counter that there are already various peasant societies in contact with capitalism that do not necessarily fit such a dogmatic model. They declare that there is no singular and universal definition of the peasantry.

Peter Worsley (1984) explains that early Marxists interpreted mode of production theory mechanistically. They saw the economic base of society as giving rise to social relations or the superstructure of society in all of its political and cultural aspects. They did not realize that world capitalism becomes embedded and transformed through preexisting relations of power and dominance. In the third world, these relations were forged early on between the subdued peasantries and their colonial overlords. So, rather than replacing precapitalist modes of production, capitalism dominates and exists side-by-side with them. Early Marxists thought that the working classes, not peasants, were the chief agents of social and economic change in history. But the idea of some amorphous working class being a culture-free economic unit in social history is a myth. Which class will be the vanguard for socialism is a function of the history and resultant social structure of a particular society. What is needed for the study of peasant societies is a dialectical theory that encompasses all of the exploited classes in rural and urban areas, rather than one that rejects segments of them as being counter to the revolution. New revolutionary movements cut across boundaries of class,

gender, and culture by forming strategic alliances with other proactive groups who fight for greater equity and justice. They need to be examined and analyzed in the historical context of the actual societies in which they are situated.

According to Worsley (1984), "Exploited classes are not inherently revolutionary, nor reformist, or anything. What they become is a function of the values and institutions available to them" (p. 232). The concept of class becomes potentially meaningful through political and ideological processes that bring about the development of class consciousness and political mobilization. Marx theorized that peasants lacked revolutionary consciousness (were like a sack of potatoes) and, thus, had to be liberated by outside leaders. Lenin thought that class consciousness had to be brought into the peasantries by an outside revolutionary party. In contrast, Rosa Luxemburg (as cited in Bottomore, 1985) argued that "the experience of class struggle creates the conditions necessary for the development of class consciousness and that patronizing the [peasant] proletariat by intellectual elites leads only to weakening, and to passivity" (p. 81). Also, before capitalism entered, peasants already had the makings of class consciousness and were already organizing collectively on their own behalf as their bylaws and customary laws demonstrate.

Contrary to Marx's description of the poor as being a lumpen proletarian mass who hinder the revolution because they stand ready to take workers' jobs, the poor are part of the working classes, not marginal to them. Veblen (as cited in Mitchell, 1964) argues that the revolutionary consciousness needed for socialist revolution is often derailed by another working-class revolution of rising expectations and conspicuous consumption. Working classes are already stratified among themselves prior to their entrance into the labor forces, and their internal divisions are intensified in their relationship to capitalist production. The working upper class usually arrests the potential for political activism by luring some activists into its hierarchical ranks to help control the rest of the population by giving them job security and decent wages. From this perspective, the poor become vulnerable to a wide range of astute and powerful influences because they are responding to their poverty in an instrumental manner, not ideologically, because they want to escape their dire circumstances. They pursue their own best interests, as they see them, within the context of their society and culture.

Likewise, models that reduce peasantries to family farms worked by family members who provide for the needs and reproduction of the household, as a unit of production, are inadequate because they fail to account for the wider context in which these families are found. Bernstein (1979) explains that these models are without history. They cannot distinguish between medieval European peasants, whose surplus labor was extracted in the form of rent by feudal lords, and contemporary, third-world peasants who operate in a world that is dominated by global capitalism (p. 422). Models of the peasantry need to take into account

the relations between different units of production, between various classes, and of the process of social reproduction as a whole. One model equal to this task is found in articulation theory, which is the study of how different modes of production interact with each other. In Southeast Asia, some anthropologists have employed this theory to separate out the different modes of production and contingent aspects of class, ideology, and culture in modern-day peasant societies. These anthropologists, also, have used articulation theory to study migration patterns of individual family members, and the effects of migration on the local community. Such an approach is able to account for how family members and households use outside monetary and material goods to perpetuate, or transform, rural social relations. This approach will be discussed in greater detail in the next section.

Substantivist-Formalist Debate

By the latter part of the mid-20th century, most of the literature dealing with peasantries emerged out of the widely publicized dispute between the substantivists, represented by James Scott (1977), and formalists, exemplified by Samuel Popkin (1979). This moral economy versus rational peasant debate looked at the interpenetrating structures of capitalism, ideology, and peasants in terms of the relationship between subsistence strategies and peasant rebellions in Southeast Asia. Substantivists argued that peasants live in communitarian villages that work for the common good. Village bylaws and customary laws work against norms of individualism and personal achievement that are characteristic of “Western” capitalist societies. According to this view, landlords and peasants negotiate patron-client contracts that provide farmers with their basic needs for social security. These mutually interdependent relationships, though still unequal, are based on norms of reciprocity that guarantee peasants their subsistence needs. This safety-first maxim, explains Scott, is a logical consequence of peasant dependence on agriculture and embodies the relative preference for subsistence over high-earning wages. However, once this promise to provision the peasants’ basic needs is broken by landlords, the peasants will rebel.

Scott (1977) proposes that the penetration of capitalism into peasant villages will lead to family discord and breaks the traditional landlord-to-peasant bonds because earlier patterns of reciprocity no longer apply. For example, the Green Revolution, which promoted the use of artificial fertilizers, pesticides, and new hybrid varieties of rice and corn and mechanized farming in agriculture, disrupted traditional landlord-to-peasant exchanges and the associated subsistence ethic. Landlords and machine operators no longer needed the support of peasants to legitimate their authority because they could rely on the backing of powerful, outside-state authorities. They were able to take advantage of farmers who needed cash to live in the new economy. There was

no longer a need for local elites to establish a personal bond with those who worked their farms; rather, they could easily shift and choose between personal and impersonal ways of dealing with them. Mechanized farming effectively led to the loss of farmers’ traditional social security system as many became unemployed.

In Southeast Asia, many small farmers were hesitant to adopt the new farm technology and seed crops being promoted by the Green Revolution because they entailed high risk in the face of unreliable weather conditions and outside forces. In order to lessen these uncertainties, peasants help each other to maintain a given level of production, even if they may not be maximizing yields. Subsistence farmers prefer to produce crops for home consumption, rather than for sale on the market. They select traditional seeds that have proven successful, even if they produce less than the high-yield varieties. In like manner, they tend to diversify their risks by multi-cropping, rather than mono cropping (Scott, 1977, pp. 4, 23). However, Feeney (1983) points out that Scott employed Roumasset’s safety-first model for the study of the family farm. If the risks are too high, the family will take certain steps to ensure their income will not fall below a certain dangerous level. What Scott describes as risk aversion could be interpreted as maximizing behavior. Feeney suggests that a farmer might choose to diversify his crops and plots if there are different types of land on his farm, and such a strategy would end by maximizing his profits. Or the farmer may seek to optimize his profits by working considerations of available family labor into his calculation, in terms of time factors and seasonal variations. Furthermore, when peasants are faced with an unpredictable market where prices are variable and subject to sudden change, they may have more incentive to produce for home use, rather than for sale.

Another model that Scott (1977) uses is Chayanov’s (1966) model. Scott focuses on the provisioning of a secure existence as the stabilizing factor in peasant communities. He argues that so long as peasants’ basic-security needs are met, they will no longer strive for profit. Furthermore, states Scott, “Peasants are not interested in social mobility” (pp. 186–187). However, Chayanov developed his hypothesis that the degree of self-exploitation is determined by a peculiar equilibrium between family demand satisfaction and the drudgery of labor itself, in relation to family farms in a natural economy. He did not place them in their historical context. Chayanov viewed peasant households as a distinct type wherein social differentiation occurred demographically through the fusion and fissioning of families. Yet, he also considered social stratification occurring in peasant societies as a result of such factors as commodity production in relation to the development of capitalism. He stressed the distinction between demographic differentiation and the development of classes due to the penetration of capitalism and stipulated that it is important not to confuse the two kinds of social

classes because each type calls for a different theoretical framework (Chayanov, 1966, pp. 249–250).

However, Chayanov's model, for the study of family farms in a natural economy, begins from the perspective of use value, not exchange value. It is not applicable to the particular communities in Scott's study because these communities have long been dominated by capitalism. Southeast Asian peasants compete and desire to increase their economic well-being, but the system works against them. Chayanov's theory is inadequate to the task of explaining underlying motivations and behaviors of peasants living in relation to the wider capitalist economy. Southeast Asian peasant communities have a long history of involvement in production for export under the various earlier colonial regimes and, prior to colonialism, under earlier kingdoms in a wider, maritime-trade economy based on semifeudal, lineage, and tributary modes of production. Paternalistic features of landlord-to-peasant relations are intimately connected to patterns of dominance and exploitation evolved under such traditional settings. This brings Scott's hypothesis that peasant behavior and reproduction results from their having to meet basic needs into question.

In contrast to the substantivist viewpoint, the formalists, represented by Popkin (1979), hold that peasant society is made up of individuals who pursue their own personal interests. From this perspective, peasants are household-utility maximizers who are motivated by individual rationality in ways similar to individuals in highly developed capitalist societies. They will take risks, and even go against group norms, so long as it is profitable to do so. Traditional peasantries can be highly stratified, as were Confucian villages in Vietnam before the Vietnam-American war, and individual survival in such instances is not necessarily the concern of the whole community. Also, the articulation of capitalism with the peasantry does not always result from outside penetration; rather, in some cases, it is sought out by local elites who proactively cultivate powerful outside allies to strengthen their positions in power struggles already taking place at the village level. Thus, peasants may have been already disillusioned with their villages before the appearance of capital because traditional norms governing behavior may have been violated. Popkin argues that the Green Revolution or the introduction of capitalist farm inputs can improve the quality of life for many in these traditional villages.

Popkin (1979) examined villages in Vietnam before the fall of Saigon and the rise of communism, arguing that villagers act rationally as self-calculating individuals, not in communion, to avoid risks. If this were not the case, peasants would have worked the land together as a whole group to increase production, rather than as individual farm units. But, at the same time, he recognizes an ecological basis for individual holdings: "Land reallocation is adapted to the environment and decreases the chance of a family losing all of its land at once in event of inclement weather" (p. 105). Popkin finds that Scott's thesis of a village-wide social

security system does not apply in all cases. In traditional Vietnamese villages, land was divided by rank, and rarely was it awarded to orphans. Peasants actively competed as individuals to increase their personal popularity, which is tantamount to gaining more political sway and power in their villages so as to maintain and accumulate more property. *Fiestas* in the Philippines and *slamatans* in Java, Indonesia, are examples of this form of competitive individualism. Hence, traditional village rituals sponsored by local elites serve to protect wealth, not level it. Peasants seek out patrons to provide them with social security, not the reverse, just as patrons are clients, themselves, to more and more powerful patrons. That is, instrumental rationalism is the motive force behind patron-client ties. Another example is the tendency of farmers to have large families to help them tend the land and themselves in their old age. Popkin finds that it is the individuals who manipulate each other for selfish gains who are the instigators of social stratification at the village level. Traditional peasant societies are both open and plural, states Popkin: "More stratification within the village resulted in differential access to and control over the bureaucracy and other ancillary institutions of the market, rather than from the markets themselves" (p. 28).

Finally, Popkin (1979) argues that peasant uprisings do not flare up as a result of violations against a code of ethics that guarantees farmers their subsistence rights. Instead, farmers actively recruit political leaders who will lead them, successfully, in their rebellions. However, Feeney (1983) finds fault with Popkin's theory of peasant revolution because he fails to explain the underlying motivations of their leaders, who may or may not have ulterior motives (p. 781). Greenough (1983) suggests that both Popkin's and Scott's interpretations of peasant rebellion are based on European assumptions that do not apply cross-culturally. Conversely, Polachek (1983) combines both theories into a slightly different approach. He proposes that competitive frameworks are useful for the study of peasant political coalitions and maneuverings, but, at the same time, revolutionary mobilization plays on peasant cultural ideas of redistributive justice (p. 822). This approach is different than Scott's theory of unitary consciousness because it considers the notion of rival factions in peasant societies.

Both Scott and Popkin attempted to develop a framework for the study of the peasantry. Scott tried to construct a universal theory of peasant behavior based on a generalized peasant economy. Popkin sought to make institutional rationalism, developed for the study of economic behavior in industrial capitalist societies, fit peasant behavior. Neither theory provides a completely satisfying explanation for peasant behavior. Scott does not take into account that peasants live in different societies with unique cultures and moral economies. He separates out the peasantry as a category for study and falls back on functionalism to explain it. Popkin, in contrast, overemphasized individual rationalism to the exclusion of the moral world in which peasants live. His methodological individualism also

sidesteps the dialectical relationship humans have with their society. Nonetheless, both theories point to a more definitive approach because peasants do make rational choices in the context their cultures and moral economies.

By the 1980s, this point of convergence in their theories became well known in anthropological circles. Anthropologists involved in Southeast Asian studies began to take it for granted that peasant societies have their own unique worldviews and cultural traditions, which, in turn, are interconnected with the wider, world capitalist system (Keyes, 1983, p. 854). Views of peasants acting both communally and in terms of their own selfish interests apply, more broadly, to human behavior in general. There is no universal definition of peasant societies. Rather, as Bernstein (1979) explained, new theories were needed to account for the articulation between different units of production, the relationships between various classes, and the wider process of social reproduction.

Current Perspectives

By the 1990s, students of the peasantry had gone far beyond substantivist and formalist frameworks by placing their case studies in local, regional, and global contexts. They were concerned with issues of social and economic transformation in traditional, agrarian societies undergoing capitalization. Yet, even then, especially after the fall of the Soviet Union, which caused the demise of communism, some scholars began to question whether theories aimed at discerning the dominant type of production and class structure in peasant society were necessary. Aguilar (1989), for example, criticized writings involved in the articulation of mode of production debates for being guilty of holding a teleological assumption about the end result of capitalism (pp. 41, 47). According to his argument, poststructuralist and neo-Marxist scholars studying peasant societies in Southeast Asia were using a dogmatic and ethnocentric model. Similarly, Hart (1989) found fault with them for “having been far more concerned with what is, and is not capitalist (and/or functional to it) than with understanding the dynamic processes at work in particular settings” (p. 31). Both Hart and Aguilar call for more flexible theories that can be used to study peasants in specific nation-states that have their own unique histories and structures of economic and political power.

However, Aguilar (1989) and Hart (1989) failed to recognize that new structural and neo-Marxist studies were open to the possibility of different cultural economies and societies being based on premises other than capitalist ones. For example, Scott’s (1985) *Weapons of the Weak* and Ann Laura Stoler’s (1985) *Capitalism and Confrontation in Sumatra’s Plantation Belt, 1870–1979* demonstrate the significance of first determining the capitalist nature of the peasantry under consideration, because it is through the particular peasantry that traditional peasant

communities are reproduced and transformed. Scott, looking at the controversial issue of class in a Malaysian farm community, built upon his earlier thesis of a moral peasant economy. He investigated the question of how small farmers organize openly, or covertly, to express their class interests. Scott contends that the moral economy becomes eroded by the infiltration of capitalism. He describes the objective effects of mechanized farming, double cropping, changes in demography, land tenure, and rents by looking at how large-scale cultivators, small-scale cultivators, and landless and tenant farmers interpret them. Scott argues that the Green Revolution, or the post–World War II introduction of new hybrid varieties of rice and artificial inputs together with mechanized farming, had created a situation of increased inequalities between peasants (p. 147). That is, the introduction of capitalist farming destroyed traditional patron-client ties.

On the one hand, poor peasants no longer had a legitimate patron-protector through whom to voice their protests, so they expressed their complaints indirectly. On the other hand, wealthy farmers adopted behaviors derived from the logic of the global market economy, while their authority continued to be based on traditional leadership styles. In other words, the relationship between large-scale cultivators, small-scale cultivators, and landless laborers had become an impersonal one based on capital. While wealthy farmers could still revert to using their traditional power of authority to call upon peasants to do extra work for free, the peasants, being waged workers, could no longer depend on landlords to provide emergency assistance. Although Scott’s thesis was that the Green Revolution transformed peasant societies into capitalist societies, he was opposed to theories of hegemony that depicted them as being dominated by capitalism because they were mystified. Rather, peasants continue to believe in their earlier moral economy and they express this alternative worldview in subtle and covert ways.

Evans Grant (1986) argues that this aspect of Scott’s thesis is his most controversial contribution. Scott argues that the concept of hegemony is institutionalized and embodied in elite values and myths found in bureaucracies, schools, churches, and the media. It does not work its way down, uniformly, to the villages in the countryside. An exception to this is religion, but Scott (1977) explains that religion is selectively reinterpreted from the core to the periphery, and religious interpretations and meanings vary in accordance with the organization of the religious intermediaries (p. 281). Grant states, though, that “Scott has been searching all along for a social basis of a radical subject other than the proletariat who is fatally compromised because he is organically linked to the capitalist class” (p. 20).

Hence, Scott argues that peasants are not reformists sharing the same ideology as the working classes in urban areas, but rather they share the make-up of ideal-typical revolutionaries because they are fundamentally opposed to the values of capitalism.

However, to use Worsley's (1984) expression, "There are factories without roofs" (p. 14), and capitalism can cover the gap between rural and urban sectors. It could be equally argued that the specific forms of peasant resistance Scott depicts are further evidence of their having been mystified by their new capitalist relations of production. Scott argues that peasants perceive the local owners of capital to be the cause of their circumstances, and for this reason, they are not mystified. But, if they were truly demystified, would not they recognize the unequal and oppressive conditions of the capitalist mode of production? Also, Scott's peasants are not necessarily made up of two opposing classes; rather, instead, they may be stratified in competition among themselves, although they may simultaneously converge in a wider context as a class in relation to other classes within a national, or international, class system (Ossowski, 1973, p. 89). Scott seems to shuffle his concept of class around as needed. Sometimes he speaks of only two predominant and opposing classes, while at other times he talks of classes stratified into a hierarchy. This makes the question of who is struggling for whom unclear. He cites the destruction of property, tampering with machinery, acts of theft, and killing of livestock as examples of covert peasant resistance (1985, pp. 271, 289–290). Scott questions whether these actions can be considered a collective form of resistance. His conclusion is that they are collective movements because they pave the way for other struggles that can catapult peasants into rebellion (p. 273). However, when an individual peasant maces a cow, is he really doing it against well-to-do households as Scott claims? Or is he only trying to protect his own land from overgrazing by his neighbor? Are such secret acts of sabotage done by hired thugs, working for local warlords or patron bosses to control peasants in their domain? Also, are peasants themselves, in relation to capitalism, perhaps already involved in manipulative and stratified subclasses at the local levels? If peasants are driven to such extreme acts of violence, not resorted to in the past, is this not indicative that peasants are being mystified by capitalism? The clandestine acts of peasant resistance Scott cites in making his case that they are demystified may also be shown to be similar to passive forms of resistance committed by urban workers.

Scott's (1977) work raises an old yet relevant question derived from the classical literature on the peasantry: Do peasants form a class "for themselves" as he claims, or are they merely a class "in themselves" as suggested by Karl Marx (1987):

In so far as there is only a local connection between small holding peasants, and the identity of their interests begets no community, no national unity, and no political organization, they do not form a class. They are consequently incapable of enforcing their class interests in their own name, whether through a parliament or through convention. They cannot represent themselves, so they must be represented. Their representatives must, at the same time, appear as their masters, as an authority over them. (p. 332)

Georg Lukacs (1971) defined class consciousness as being introduced to the peasantry by an outside revolutionary party. In contrast, Rosa Luxemburg (as cited in Bottomore, 1983) argued that leaders evolved out of the class struggle, itself, and that it is through such struggle that class consciousness is raised (p. 81). However, the argument also can be made that insofar as peasants exist in a relationship that is subordinate to dominant elites who extract surplus from them, the peasants form a class "in themselves," but, to the degree that they accept their status, without struggling to change the systemic causes of their grossly inequitable position, they are not a "class for themselves."

Turning to Indonesia, Stoler (1985) investigated the conditions that promote the formation of a *class-for-itself* and supra-class movements that unite peasant groups. She critically examines the historical documents dealing with Sumatra's plantation belt from a bottom-up perspective. Before global capitalism, Indonesia came under the influence of the tributary mode of production in partnership with India, then China, and later the Middle Eastern Islamic empire, the latter of which overrode India and China as a tutelary power. Muslim traders sought to win the allegiance of Indonesian princes who ruled the peasantry that supplied them with surplus wealth. Stoler suggests that it was through this background that the Dutch colonizers moved. They worked, directly, under the auspices of local princes to extract the islands' rich natural resources for export to Europe. However, she stipulates, the Dutch empowerment of preexisting hierarchical figures and structures of authority was a process that was shaped not so much by colonial design as in reaction to local movements coming up from below (p. 6). Issues of contestation and change, not institutional stability and cohesion as the hegemonic colonial discourse would have it, instigated the development of capitalism in Indonesia.

Take Java, for example, where peasants—due to their economic situation—had no other recourse than to produce crops for export, while they remained in their villages living in relation to a larger state apparatus held in place by a layer of indigenous civil servants. In other words, Java's culture was subtly subverted. In contrast, Deli was made up of labor settlements owned by the companies who ran them. In these settlements, masters and workers left most of their cultural baggage behind, as new relationships of hegemony were formed. Java and Deli illustrate two divergent conditions in the relations of production, which gave rise to two distinctly different types of labor movements. In Java, collective resistance movements were organized under the umbrella of religious organizations. In Deli, to the contrary, largely, individual acts of labor protests evolved out of the context of a plantation economy that enforced gender-specific policies of recruitment, wage payment, and job allocations that, effectively, worked against the formation of traditional collective action. On company-owned plantations, opportunities for mass organization and protest were negated because workers were

frequently moved from place to place, intentionally set apart from one another. It is no wonder, states Stoler (1985), that “ties between workers were short-lived and not conducive to collectively planned and sustained action. Assaults, on the other hand, by individual or a handful of workers usually required little planning or long term cooperation” (p. 85). Hence, labor protests on plantations did not emerge as a struggle between clearly defined classes but, rather, as fragmented acts of resistance. Daily confrontations between laborers and their bosses represent the different ways in which sublimated class interests were expressed along gender, ethnic, and racial lines.

The Japanese colonization of islands, however, brought in new conditions and possibilities for these peasants to address felt wrongs. For example, the Japanese, largely due to the miserable circumstances of plantation workers, decided to allow the workers to cultivate small plots of land to feed themselves and reproduce, in order to work for the occupational forces. This started a new “squatter movement” where peasant families began to settle down on small farms around the peripheries of large plantations. Stoler (1985) argues that this movement actually was a form of mass protest, but it had its own repercussions (p. 97). The Japanese took advantage of peasants by taking their produce and forcing them to produce more than they would otherwise. After colonialism, the conditions on the plantations did not really change. For example, there was no real change in the working conditions or productive relations on the Deli estates (p. 45). There was not much difference between the quality of life of an indentured worker and a wage worker. In other words, there was no transition from a precapitalist system to a capitalist system. Stoler explains that it is through the loopholes in recruitment policies that precapitalist, unpaid forms of labor exaction are continued and maintained (p. 209). Unlike in the past, however, when the plantation estates had to ensure the reproduction of their laborers’ subsistence needs, contemporarily, the availability of a large, landless labor pool of temporary workers, beyond the skeleton crew, has freed companies from providing them with social security. That is, farming communities at the margins of large plantations are not operating in terms of a production mode that is contrary to that of the plantation economy. These farmers are not part-time peasants and part-time proletariats; rather, they are an intricate part of the plantation estates. They are a preexisting part of a preexisting economic and social system that has already been subsumed into the logic of the capitalist reproduction of the plantation economy.

Similarly, in the Philippines, students of the peasantry have been involved in a long debate over the direction of agrarian change. Benjamin Kerkvliet (1977, 1990) takes us back to the beginnings of the early American colonial regime in the Philippines, at the turn of the 20th century. At that time, peasantries were steeped in patron-client relations that were uniquely negotiated out of local colonial conditions. The relationship between landlords and peasants was

an unequal one, but because it was flexible and enabled peasants in time of urgent need to obtain aid from their landlords, it was acceptable. Peasants needed their landlords and landlords depended on them to legitimate their power and authority over local resources, by working the soil. Peasants could opt for alternative courses of action if their landlords treated them unfairly. They could collectively negotiate better working conditions or move on to new places where other landlords promised to protect them. In short, there was a system of checks and balances. But this traditional feudal mode of production changed with the coming of the Americans, and the imposition of the capitalist mode of production. The once symbiotic relationship between landlords and peasants was transformed into an impersonal relationship. Kerkvliet (1977) argues that this change caused peasants to rebel to regain earlier patron-client ties (p. 25).

The American colonizers brought capitalism. They utilized landed and official elites to promote their American business interests. This empowering of local elites provided additional legitimization of their authority. Hence, landlords could change the terms of agreement between themselves and their peasants, and they could relinquish their pledge to provide social security to those who worked the land. In time, peasants became transformed into tenants and waged workers, sharing similar work conditions, and began to organize to protect their own interests. Kerkvliet (1977) suggests that peasant unions were formed to reestablish traditional patron-client bonds (p. 25). However, Nadeau (1999) argues that peasants sought not so much to return to the past as to proceed forward in the context of capitalist relations of production by unionizing, much like workers in the early-20th-century United States had done. They tried to promote their own interests in the face of their newly formed competition, property owners, who also were the local political officials. Their efforts can be seen not so much as an attempt to realign patron-client ties as to contract better conditions of employment.

In the United States, union workers struggled for better working conditions from owners of property, the latter of whom resorted to tactics within the strictures and confines of their culture to retaliate against or negotiate with them. In Cagayan Valley, organized peasantries faced landed officials who were further solidified into power by outside colonial powers. For example, the American colonizers sent military and paramilitary forces to suppress peasant rebellions at the local levels. They armed landed elite warlords with monetary and military might that was superior to that of the peasantries who were struggling to create a structure of support for themselves. Kerkvliet (1977) argues that the working class in Manila opposed joining forces with the peasants because they thought themselves to be the vanguard of the revolution, rather than the peasants (p. 265). Another possible explanation, however, is that labor divisions taking place within the ranks of the working classes in the cities and the countryside came

about as a result of their fiercely competing against each other for immediate, short-term gains, rather than their long-term interests as a class in and for itself.

Going a step further, Willem Wolters (1983) questioned whether Ferdinand Marcos's 1972 declaration of martial law was able to change the pattern of Philippine rural politics into class-based parties, as it claimed to do (p. xi). One of the government's justifications for instituting martial law was to replace the personalized system of politics by a well-organized authoritarian system. Wolters, alternatively, suggests that the Philippine state is not structured along traditional patron-client lines; rather, traditional relations have been changed into new types that do not correspond to the traditional model. There continues to be patron-client ties between the president and upper-class politicians, and between these politicians and local brokers who bring in the votes, but the relationship between local elites and peasants is no longer one of mutual reciprocity. Wolters explains that these new relations between the political bosses and peasant voters are grounded on specific short-term, instrumental, impersonal transactions (p. 228). They are completely different from the multifaceted and dyadic relations that bonded landlords and tenant farmers in the past. Rather, into the 21st century, capitalist-oriented landlords try only to outwit tenant farmers, and make a profit from them, while tenants, without any viable means of income, are still thinking in terms of a subsistence economy.

Wolters (1983) explains that patron-client relations do not form a unifying state structure in the Philippines; rather, they are a structure tied in to wider processes of state development. He argues that in the Philippines and, by extension, Southeast Asia, relatively unified countryside classes, complete with a degree of class consciousness and organization, have not yet appeared. However, this question of whether or not peasants are self-consciously aware of their own class interests remains contentious. Philippine peasants have organized themselves on their own behalf. This has been demonstrated in our previous discussion on peasant rebellion in Luzon (Kerkvliet, 1977, 1990). Other examples include, but are not limited to, the 1986 people-power movement that overthrew the Marcos regime (Bonner, 1987; Poole & Vanzi, 1984) and the progressive, basic Christian community movement (McCoy, 1984; Nadeau, 2002).

Conclusion

Articulation of modes of production theory for the study of peasant societies came under widespread attack after the fall of the Soviet Union, in the early 1990s. Mode of production theory was faulted for being irrelevant and overly deterministic in terms of the end result of capitalism being socialism, and then communism. Also, critics claimed that this general theory lacked a concept of individual agency. However, late 20th-century theorists, using a mode of

production approach, addressed newly emerging issues of agrarian and social change. They conducted fieldwork and examined pertinent changes occurring in actual communities with unique configurations of culture, resulting from local interactions that existed in relation to global capitalism. It is not that their critics were incorrect in calling for more progressive theories to account for questions of individual agency and contingent issues of gender, ethnicity, culture, and class. Rather, they failed to also recognize the importance of looking at rural communities, historically and contextually, in relation to the changing modes of production around which they are oriented.

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FOOD

Plants and Animals

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Today the world population is 6.7 billion people, according to the U.S. Census Bureau (2009). In 1900, there were “only” 1.65 billion people on earth, 2.5 billion by 1950, with a projected 9 billion by 2050. While a number of factors have affected this exponential increase, not the least of which is reallocation of resources and labor (Boone, 2002), the abundance and distribution of food has played a major role, spurring technology to increase production and distribution. The result is the food crisis emerging in this early part of the 21st century.

Leading to this crisis, there are four major “events” in the history of food use. The first is cooking—the act of using heat to transform a substance from one state to another. This is an *emergent* behavior, as no other primate does anything like it. The second event, equally as dramatic, is the domestication of plants and animals; the outcome has been increasing control of resources (plants, animals) to the point of manufacture. This manufacture has included husbandry procedures, breeding, sterilization, and the like—and most recently, genetic engineering. The third event, directly related to manufacture, is the dispersion of foods throughout the world, which is a continuous process beginning at the time of domestication and continuing today, albeit now in the form of globalization. The “typical” diets of China, Italy, France, or anywhere are the result of diffusion and dispersion of these domesticated plants or animals, known as *domesticates*

(Sokolov, 1991). The fourth event is the industrialization of food. This is an ongoing event beginning in the latter part of the 18th century with the invention of canning (Graham, 1981) and continuing today in the form of frozen meals, new packaging materials, ways of reconstituting foods, and, in the near future, creating animal “meat” by tissue engineering (Edelman, McFarland, Mironov, & Matheny, 2005). The purpose of this chapter is to describe the events concerning the human use of food in the past (prehistory to the 1700s) and present, and speculate on the trends for the future.

The Past

We are primates, descended from a long line that began around 80 million years ago (Ackermann & Cheverud, 2004). As a group, primates are *omnivores* and consume nuts, seeds, leaves, stalks, pith, underground roots and storage organs, flowers, insects, lizards, birds, eggs, and mammals. The source of nutrients, or its emphasis, varies from group to group so that it is possible to classify primates by food intake. Table 25.1 illustrates these groups.

Prosimians, or lower primates, tend to be insect eaters while certain types of these primates prefer lizards or small invertebrates; monkeys—both Old and New World—rely on fruits with a significant input from insects or small vertebrates. Apes eat from a variety of ladders (food supplies)

Table 25.1 Primates by Food Intake

Category of Eater	Principle Food
Faunivore	Vertebrates
Insectivore	Insects
Gummivore (also gumnivore)	Gums, resins
Herbivore	Leaves
Frugivore	Fruits
Graminivores	Grains
Omnivore	All of the above and more

depending on type: orangutans eat fruit, gorillas eat stalks and pith, and chimps eat fruit and hunt for mammals—but none eat one type to the exclusion of all else. Physical specializations to extract nutrients from the source vary greatly. Some primates ferment their food; others reingest it.

The shape of teeth and jaws, and the length of gut and digestive tract, also affect different emphases of diet. Fruit eaters, for example, are equipped with molars that are not shaped for crushing or grinding, but are small in relation to their body size (Kay, 2005). Some leaf eaters, like colobines or howler monkeys, have sacculated stomachs containing bacteria that aid in digestion. One type of lemur is probably coprophagous; that is, like rabbits, it ingests its own waste pellets to extract semidigested nutrients. The length of the gut in primates that eat any kind of animal is 4 to 6 times its body length, while that of a leaf eater is 10 to 30 times its body length (Milton, 1993).

Primates, unlike some other mammals, require certain vitamins. The most important substances, vitamins B₁₂ and C, must be obtained from outside sources. In the case of B₁₂, it must be extracted from animals including insects (Wakayama, Dillwith, Howard, & Blomquist, 1984), and for vitamin C, from fruits and a little from muscle meat. Genes controlling the manufacture of these substances were reassigned (*exapted*), as it were, to other functions when the anthropoid group of monkeys, apes, and humans split from prosimians. The genetic information is affirmed by the fact that some prosimian relatives of the earliest primates are still able to synthesize these substances (Milton, 1993).

The model for human evolution derives from the behavior and physiology of African apes, particularly the two kinds of chimpanzees: the bonobo and the common chimpanzee. These primates are more active than either gorillas or orangutans and a good deal more sociable than the orangutan, also known as the red giant of Asia. Their choice of diet is considered an important factor in their activity, as larger primates tend to rely on leaves and foliage, as do gorillas, who have a range of only around 300 meters per day. Fruit eaters are not only more active than foliage eaters, they are more eclectic in their diet, including nuts, seeds, berries, and especially insects of some sort because fruits are an inadequate source of protein (Rothman, Van Soest, &

Pell, 2006). They are also considered to be more “intelligent,” as witnessed by recent studies of New World capuchin monkeys, and Old World macaques and chimpanzees. Chimps can take in as much as 500 grams of animal protein a week (Goodall, 1986; Milton, 1993).

Animal protein is considered high-quality food, and the importance of high-quality protein to the evolution of the human brain cannot be underestimated (Leonard, 2002). From only 85 grams (3.5 ounces) of animal protein, 200 kilocalories are obtained. In comparison, this amount of fruit would provide about 100 kilocalories, and leaves would provide considerably less—about 20 kilocalories. The daily range of chimpanzees can extend to about 4 kilometers per day, and their societies are highly complex social groups. It is this complexity that enables them to conduct their hunts, coordinating members as they approach their prey using glances, piloerection, and pointing. Since primates evolved from insectivores at a time when fruits and flowers were also evolving, their ability to exploit this new resource demonstrates the most important characteristic of primates: flexibility.

Primates can readily adapt to extreme conditions like drought. Under harsh conditions, primates will seek (as indeed, humans do) what are called *fallback foods*. These are foods like bark, or even figs, that are less desirable because they lack ingredients such as fats or sweet carbohydrates (Knott, 2005). Primates have a remarkable repertoire of methods to deal with changes in food availability: They can change their diets; they can change their location; they change their behavior according to the energy they take in (Brockman, 2005).

This flexibility in adapting behavior to changing circumstances was a decisive advantage for the primates, as they implemented the underlying knowledge about resources with the ability to remember locations of specific foods. Equally as important is the ability to evaluate the probability of encountering predators in these locations. The ability to adapt to environmental and social changes depends not only on genetic evolution but, as Hans Kummer (1971) noted, on cultural processes arrived at through group living. The behavioral mode responds more quickly to dynamic situations than does physical evolution.

Gathering, Hunting, and the Beginnings of Food Control

The ancestors of humans continued the food-gathering techniques of their primate predecessors, gathering invertebrates and small vertebrates, as well as plant materials, in the trees, on the ground, and below ground. As prey gets larger, the techniques shift from one individual working to a concerted, group effort. The former is seen in the behavior of capuchin monkeys and baboons, and the more sophisticated planning and coordination is well documented

among chimpanzees. With greater reliance on meat, there are more changes in the primate body—the more reliance on protein, the more prevalence of the hormone ghrelin. Ghrelin is active in promoting the organism to eat, and therefore causes an increase in body mass and the conservation of body fat (Cummings, Foster-Schubert, & Overduin, 2005).

The secretion of ghrelin stimulates the growth hormone as it increases body mass. Human brains require huge amounts of energy—as much as 25% of our total energy needs. Most mammals, in contrast, require up to about 5%, and our close relatives, the other nonhuman primates, need about 10% at the most (Leonard, 2002; Leonard & Robertson, 1992, 1994; Paabo, 2003). The brains of our other close relatives, the australopiths, were apelike, measuring about 400 cubic centimeters (cc) at 4 mya. Our ancestor, *Homo*, experienced rapid brain expansion from 600 cc in *Homo habilis* at 2.5 mya, to 900 cc in *Homo erectus* in only a half-million years. This value is just below the lowest human value of 950 cc.

Somewhere near this period of time, *Homo erectus* began using fire to cook. While the association with fire may have been long-standing (Burton, 2009), its use in transforming plants and animals from one form to a more digestible one appears to have begun after 2 mya, and according to some, the date of reckoning is 1.9 mya (Platek, Gallup, & Fryer, 2002).

Tubers are underground storage organs (USOs) of plants. They became more abundant after about 8.2 mya, when the impact of an asteroid cooled the earth creating an environment favoring the evolution of C4 plants over C3 ones (trees and some grasses). The USOs are often so hard or so large that they cannot easily be eaten, and contain toxic substances. Heat from a fire softens the USO, making cell contents accessible, and it also renders the toxic compounds harmless.

For some years, Richard Wrangham and coworkers (Wrangham & Conklin-Brittain, 2003; Wrangham, 2001; Wrangham, McGrew, de Waal, & Heltne, 1994) have been proposing that cooking was the major influence in human evolution. As explained, the application of heat made USOs more nutritively accessible. Recently, in an experiment to test this hypothesis, captive chimpanzees, gorillas, bonobos, and orangutans were offered cooked and uncooked carrots, and sweet and white potatoes. Apparently there was a strong tendency for the great apes to prefer softer items (Wobber, Hare, & Wrangham, 2008). While monkeys dig for corms and the like (Burton, 1972), the finding that chimpanzees use tools to dig up USOs (Hernandez-Aguilar, Moore, & Pickering, 2007) underscores the appeal of this hypothesis. In addition, there is evidence that *Homo* had already been using tools for over a half-million years when cooking probably began. The inclusion of “meat” in cooking had to have begun by 1.8 mya because there is substantial evidence of big-game hunting by this date. Equally important to Wrangham and colleagues is the consideration that the jaws and teeth of these members of *Homo* could not

have dealt with the fibrousness and toughness of mammalian meat (Wrangham & Conklin-Brittain, 2003). This is despite the fact that apes and monkeys regularly partake of raw flesh; all primates eat insects, and many eat small vertebrates like lizards.

Insects are not termed meat, although their nutritive value is comparable. Certainly the early *Homo* was eating mammals. Recent evidence from *Homo ergaster* shows that this hominin was infested with tapeworms by 1.7 mya and that these parasites came from mammals (Hoberg, Alkire, de Queiroz, & Jones, 2001). The remains suggest that either the cooking time at this site was too short, or the temperature was not high enough to kill the parasitic larvae, but also that these hominins were utilizing fire as an instrument of control in their environment. The knowledge base of our ancestors was extensive: It had to be for them to prosper, and it included knowledge of medicinal qualities of plants in their habitat.

Food as Medicine

It is now well attested that animals self-medicate (Engel, 2002; Huffman, 1997). Plants are used externally as, for example, insect repellent or poultices on wounds, and internally against parasites and gastrointestinal upsets. They may also regulate fertility, as recent evidence suggests that the higher the fats versus protein or carbohydrate, the more males are born (Rosenfeld et al., 2003), and the higher the omega-6 versus omega-3, the more females are born (Fountain et al., 2007; Green et al., 2008). The fact that the animals seem to know the toxic limits of the substances they use and consume is also significant (Engel, 2002).

Domestication of Plants and Animals

As knowledge is passed from generation to generation, it crosses lines of species. *Homo erectus* became *Homo sapiens*, and their knowledge base was a compendium of all that had gone before that could be remembered. Hence, the knowledge base included the breeding habits of plants and animals, their annual cycles, and where and when to find them, as well as what dangers were associated with them.

Somewhere between the advent of *Homo sapiens*, at the earliest around 250,000 years ago, and first evidence around 15 kya, this knowledge became translated into domestication. The process of domestication was first delineated by Zeuner (1963). Foreshortening of the muzzle, lightening of the fur, and crowding of the teeth are characteristic of this condition. There are even changes in the part of the brain relating to fear, as there is a relaxation toward the fearful stimulus—in this case with humans—under domestication (Hare & Tomasello, 2005). Because human care is extended to the domesticate, a relaxation of natural selection occurs as nonadaptive traits are supported. This process is seen in sheep, and laboratory and

pet mice, as well as dogs, and whatever other animal has been domesticated.

Evidence of diets having components of domestication is attested to by microwear patterns, detected with an electron microscope. These can be found on teeth; isotope analysis of the ratio of C3 to C4 plants, since the latter include more domesticated plants; biomechanics; and anatomical characteristics, such as tooth size or length of shearing crests on molars. Researchers also experiment with various kinds of abrasion and compare these to the “unknown”—the fossil. Biomechanics, an engineering type of study, analyzes forces and examines tooth and bone under the conditions of different diets.

While earlier in our history, only about 30% of the dietary intake would have come from eating organisms that ate C4 plants, under domestication, the number of animals as well as C4 plants increased. This is known from isotope analysis, which evaluates how CO₂ is taken up by plants, and which can estimate the proportion of C3 to C4 plants in the diet. What’s more, the nature of the diet itself can be understood.

How Domestication Occurred

Descriptions of domestication follow different theoretical models. Terms like *center*, *zone*, or even *homeland* relate to a view of process and dispersion. How many separate areas of independent domestication there were relative to subareas that received the domesticate or knowledge on how to domesticate also depends on the scholar. A general consensus is that there were seven separate areas where domestication took place: the Middle East, sub-Saharan Africa, Asia, Mesoamerica, South America, eastern North America, and from the Near East to Europe, with firm evidence dating from between 12,000 and 10,000 BCE in the Fertile Crescent of west Asia. The time of transition between hunting and gathering and cultivation of plants and animals is well documented at a number of sites. One, in the Levant, at Ohalo II near Haifa, has evidence for the earliest brush dwellings (Nadel, 2003) and is fairly typical of this transition period. It is dated radiometrically to 19,500 BP (or radiocarbon years before present, RCYBP), which gives a calibrated date of between 22,500 and 23,500 BP (Nadel, 2003). In this Upper Paleolithic, or Epipaleolithic site, evidence from dentition suggests an abrasive diet emphasizing food based on cereals, fish, and a variety of local animals, especially gazelle. In addition to wild barley, wheat, and fruits, small-grained grasses were well represented in the remains (Weiss, Wetterstrom, Nadel, & Bar-Yosef, 2004). The Ohalo II people occupied the site for at least two seasons, likely spring and autumn (Kislev, Nadel, & Carmic, 1992) and perhaps throughout the year (Bar-Yosef, 1998) in brush huts along the lakeshore. These sites at the end of the Upper Paleolithic along the Mediterranean, and in Europe during the Mesolithic, indicate that plants were relied on as

dietary objects and may well have been cared for around campsites to ensure their growth.

The specifics of how domestication occurred in each region differ (Bar-Yosef, 1998). Classical theories seeking to analyze the how and why of domestication focus on the environment, population growth, the organization and management of small-scale societies, trade, and changes in the daily schedule (Sutton & Anderson, 2004). Extending in time from the 18th century, the discussion of these is too complex and lengthy to be included here. More recently, Boone (2002) invoked an energy-budget model, consonant with contemporary notions of evolutionary demography and ecology. A scenario then emerged based on archaeological evidence that the climate was becoming increasingly unpredictable. These dramatic changes in climate, some of them a result of asteroids (Firestone et al., 2007), caused big game to decrease. The subsistence base changed to accommodate the lessened availability, requiring the diet to become more diverse. Fishing became important as groups moved to rich coastal areas, especially along the Mediterranean (e.g., the Levant and Turkey). Activities changed as a consequence, since traditional jobs were now replaced and the need to “follow the herds” was replaced with sedentism, itself a complex phenomenon defined by activities at a given locale as well as infrastructure developed there (Bar-Yosef, 1998).

While populations over most of prehistory had overall zero growth, the cultural processes that emerged with hominines affected mortality and population increase (Boone, 2002), culturally “buffering” local climatic and environmental changes. Brush huts and other shelters are emblematic of this. Larger groups encouraged specializations to emerge. A concomitant to climate change was the decrease in big game. These had provided substantial amounts of protein, and some, because of their size, had little or no predator response, making them particularly easy for small people with limited technology to overcome (Surovell, Waguespack, & Brantingham, 2005). So proficient had the hominines become that these efforts apparently caused massive extinctions of megafauna worldwide, in particular, proboscideans (Alroy, 2001; Surovell et al., 2005).

The actual effect humans have had on megafauna elsewhere, however, remains controversial (Brook & Bowman, 2002), and the demise of big game may indeed owe more to an extraterrestrial impact around 12 kya and its concomitant effect on climate (Firestone et al., 2007). At the same time, humans were obliged to include in their larder a wide variety of foods that either were not as palatable or required a great deal more effort for the caloric return—rather like the choices of fallback foods that nonhuman primates make under poor environmental conditions. The heads of cereals (wheat or barley, for example) need to be gathered, dried, ground, and boiled to make satisfactory “bread.” They can be, and are, eaten whole, with the consequence of heavy dental abrasion (Mahoney, 2007). The circular process of exploiting new or different resources

required techniques and technology to extract nutrients, and in turn, the new methods provided access to new food sources (Boone, 2002): Between the 7th and the 5th millennia, for example, milk was being consumed by farmers in southeastern Europe, Anatolia, and the Levant. The evidence comes from comparing the residue left on pottery sherds—that of fat from fatty acid from milk to carcass fats (Evershed et al., 2008).

In his discussions of the San, Richard Lee (1979) noted that the cultural practice of reciprocal food sharing, as complex as it was, functioned as storage in a climate where there was no other means: As perishable meat was given away, it ensured the giver a return portion some days later. Had the giver kept the entire kill, undoubtedly most of it would have spoiled. Stiner (2001) references Binford's suggestion that the development of storage systems was one of the technological "inventions" that must have accompanied the broadening of the diet so that the new variety of seeds and grain could be kept for some days. While hunter-gatherers, even until the end of the old ways (until 1965), would gather grain heads as they walked from one camping site to another—an observation documented in the Australian government's films on the Arunta—the development of implements to break open the grain heads, removing the chaff and pulverizing the germ, perhaps preceded domestication. As grains and grasses became more important in the diet, the gathering of those that failed to explode and release their seed grain became the staple domesticates. The advent of domestication has been dated at the various areas illustrated in Table 25.2.

Table 25.2 Areas of Domestication

Area	Date
Mesoamerica	8000 BCE to 6000 BCE
Middle East = Turkey; Iraq/Iran; Levant (Syria, Jordan, Israel)	10,000 BCE to 8000 BCE
East Asia = China, Thailand	6000 BCE
West Africa	6000 BCE

Domestication of Plants

Early domestication developed in different ways in different areas, as local people responded to local exigencies in different conditions and with different cultural standards (Evershed et al., 2008). Gathering and colonization were how plants and animals came to be domesticated, with some evidence that people practiced cultivation in naturally growing areas of desirable plants. By removing competitors, distributing water, or protecting from predators, the people were able to enhance the growth of the desired plant. Because plants were gathered and brought back to home base, some

seeds took root nearby. Awareness of the relationship of these seeds to the burgeoning plant spurred the next stage. Those plants that were gathered often had less efficient dispersal mechanisms. Their seed heads did not break off, and their seeds did not blow away. This was the case for flax, peas, beans, and many others, facilitating their cultivation. It seems a natural progression to the next step, outright sowing.

Gathering of seeds, and keeping them for the next season, was the final and significant step in the process of domestication, but it requires surplus as well as foresight and storage facilities. The seeds that would become the next season's crop were selected for some attribute they possessed: The plant had produced more, the seeds were less volatile, less able to disperse, or predators had been kept from taking them. Forms of plants that were more suitable were selected, probably initially unconsciously, and later intentionally—skewing the genetic mix in favor of domestication.

Domestication of Animals

The supposition about animal domestication includes various ideas: Perhaps the cubs of hunted mothers were brought home and raised; some kinds of animals "followed" people home where making a living was easier; animals were kept in corrals or tethered to allow captive ones to mate with the wild until the population grew substantially so that taking them was easier; or animals showing traits such as aggression not favorable to people were eliminated from the gene pool. The "big five" of domesticated animals—pigs, cows, sheep, chickens, and goats—were domesticated in different regions, independently from one another (Diamond, 2002), whereas domestication of plants seems to have diffused through areas. The animals that became domesticated were those that had behavioral traits that permitted it: They were gregarious and lived in herds where following the leader was part of the repertoire. Diamond (2002) suggests that it is the geographic range in which domesticates were found that influenced whether there were single or multiple areas of origin. The range of the big five is so great in each case that they were independently domesticated throughout, whereas the plants had a more limited range and so both domesticates and process diffused.

A population boom is clearly recorded at the centers of domestication (e.g., the city of Jericho in the Near East had up to 3,000 people living in it by 8500 BCE, according to the original researcher, Kathleen Kenyon, although that number has been revised downward [as cited in Bar-Yosef, 1986]). In these centers, there were an impressive number of people supporting themselves on a variety of domesticated plants such as einkorn, emmer wheat, and barley. The city of Teotihuacan in what is now Mexico had a population of 200,000 just before the Spaniards arrived (Hendon & Joyce, 2003). The abundance of food has its repercussions in population size with a concomitant development of trade specializations.

Over time, however, the benefits of agriculture become somewhat overshadowed. Zoonoses from association with farm animals increased. Tapeworms were known from 1.7 mya along with hookworm and forms of dysentery. Because settlements were often near bodies of still water such as marshes or streams, malaria became endemic. The development of agriculture and its concomitant population increase encouraged a variety of contagious diseases in the human population. In addition, noninfectious diseases became increasingly apparent: arthritis; repetitive strain injury; caries; osteoporosis; rickets; bacterial infections; birthing problems; and crowded teeth, anemia, and other forms of nutritional stress, especially in weanlings who were weaned from mother's milk to grain mush. Caries and periodontal disease accompanied softer food and increased dependence on carbohydrates (Swedlund & Armelagos, 1990). Lung diseases caused by association with campfires, often maintained within a dwelling without proper ventilation, plagued humanity as well (Huttner, Beyer, & Bargon, 2007). Warfare also makes its appearance as state societies fight over irrigation, territory, and resources, and have and have-not groups vie for their privileges (Gat, 2006). Hunter-gatherers were generally not only healthier, but taller. The decrease in height is probably a result of less calcium or vitamin D, and insufficient essential amino acids, because meat became more prized and was only distributed to the wealthy. Women suffered differentially, as males typically received the best cuts and more, especially when meat was not abundant (Cohen & Armelagos, 1984).

The more mouths to feed, the greater the incentive to develop farming techniques to increase supporting output. Implements changed, human labor gave way to animal labor, metal replaced wood, carts and their wheels became more sophisticated, but above all, selection of seed and breed animals became more trait specific as knowledge grew. The associated decrement in variety began early and has continued to the present.

The Present

The changes that have taken place in the use of plants and animals are momentous. The idea of change promoted the advances that mark the 18th century. As has too often been the case, warfare encouraged new technology. Napoleon's dictum that armies run on their stomachs inspired competition to find a way to preserve food for his campaigns. Metal, rather than glass, was soon introduced to preserve food in a vacuum (Graham, 1981). It did not always work: Botulism and lead poisoning from solder used to seal the tin played havoc with health. (Currently, the bisphenol in the solder is also a concern.) Nevertheless, the technique was not abandoned, especially as it meant that food could be eaten out of season. "Exotic" foods from elsewhere could now be introduced from one country to another. The ingredients of Italian spaghetti are an obvious case in point:

noodles from China, tomatoes from Mesoamerica, and beef originally from the Fertile Crescent combined in one place at different dates. For very different historical reasons, the Conquistadors brought much of it back to Europe after Columbus's momentous voyage. Diffusion of crops and techniques had occurred since they were first developed, evident in the "Muslim agricultural revolution" at the height of Islam from 700 CE to the 12th century (DeYoung, 1984; Kaba, 1984; Watson, 1983). During this period, China received soybeans, which arrived in c. 1000 CE, and peanut oil—both staples in the modern Chinese diet. Millet had been more important in China than rice (just as in contemporary west Africa, corn is replacing the more proteinaceous millet), and tea was a novelty until the Tang dynasty.

In "the present," the kind of foodstuffs that could be dispersed elaborated the inventory. The Industrial Revolution, with its harnessing of fossil fuel (coal) to produce energy (steam), further encouraged the process as travel time diminished. Food could be eaten—fresh—out of season and brought from thousands of miles away. The refrigerator truck could take food from its source, usually unripe, and deliver it thousands of miles away. With this new mechanism, the food *value* in the produce is diminished, but the extravagance of eating produce out of season remains.

Rivaling the distribution of foodstuffs in its impact on human history is the continued control of breeding. Indeed, Darwin's great work proposed "natural" selection in contrast to husbandry, or "artificial" selection. Before the *gene* was known and named—properly a 20th-century achievement—"inheritance" in humans was sufficiently understood in the form of *eugenics* (with its dubious history) as put forth by Galton in the late 1880s. When Mendel's findings were recovered in 1900, Bateson named the gene (1905–1906), and Morgan discovered the chromosome (1910), genetics got seriously under way, and culminated, in the context of this chapter, in the Green Revolution.

By the 1960s, famine had become a major world issue, with increasing frequency and severity: the Bengal famine of 1942 to 1945; the famine in China between 1958 and 1961, which killed 30 million people; and the famines in Africa, especially Ethiopia and the west African Sahel in the early 1970s (Sen, 1981) rivaled the famines recorded in ancient history and throughout modern history, especially in the late 19th century. Although the causes of famine are usually environmental, for example drought or pests, the underlying causes are often economic and political (Sen, 1981). In the United States, the President's Science Advisory Committee (1967) issued a report noting that the problem of famine, worldwide, was severe, and could be predicted to continue unless and until an unprecedented effort to bring about new policies was inaugurated (Hazell, n.d.).

In an attempt to bypass the underlying issues by producing more food for starving millions, the Rockefeller and Ford Foundations initiated what was named the Green Revolution. This was a dramatic change in farming techniques introduced to have-not countries of the time: India,

China, and nations throughout Asia and Central America. Mexico had initiated this decades earlier, in the early 1940s, when Norman Borlaug (1997) developed high-yielding, dwarf varieties of plants. Production increased exponentially, and seed and technology from the “experiment” in Mexico was soon exported to India and Pakistan. At the occasion of his Nobel Prize being awarded in 1970, Borlaug noted that wheat production had risen substantially in India and Pakistan: From 1964 to 1965, a record harvest of 4.6 million tons of wheat was produced in Pakistan. The harvest increased to 6.7 million tons in 1968, by which time West Pakistan had become self-sufficient. Similarly, India became self-sufficient by the late 1960s, producing record harvests of 12.3 million tons, which increased to 20 million tons in the 1970s (Borlaug, 1997).

To sustain these harvests, however, petrochemicals had to be employed, and land had to be acquired. The new genetic seeds were bred for traits requiring fertilizers, pesticides, and water. Since the mid-1990s, the enthusiasm for the Green Revolution has waned as the numbers of the hungry have increased worldwide, and production has decreased. According to the International Rice Research Institute (IRRI) (2008), the global rice yields have risen by less than 1% per year in the past several decades.

The explanations for the decrease vary, but among the most important is the fact that soil degradation results from intensity of farming, and petrochemicals that do not “feed” the soil itself. Depletion in soil nutrients requires stronger fertilizers; pesticides select for resistant pests and diseases, which in turn require stronger pesticides. Poorly trained farmers overuse the petrochemicals, exacerbating the situation. Irrigation itself causes a serious problem: The evaporation of water leaves a salt residue that accumulates in the soil. There is a concomitant loss of fertility estimated as 25 million acres per year, that is, nearly 40% of irrigated land worldwide (Rauch, 2003). In addition, new genetic breeds have not addressed social factors: Water supplies are regional, and irrigation requires financial resources; and farmers with greater income buy up smaller holdings and can afford to purchase industrial equipment. Access to food was not enhanced by the Green Revolution, especially in Africa (Dyson, 1999), where imports are approximately one third of the world’s rice (IRRI, 2008). It is access to food, more than abundance or pest resistance, that mitigates famine, dramatically demonstrated by Sen (1981). Determining access falls into the hands of government—implementing social security programs, maintaining political stability, and legislating property rights. The small farmers then move to cities, which become overcrowded, and lack employment.

While access has improved in some areas, the increase in population—often occurring exponentially—requires yet greater production. The response has been what, at the end of the 1990s, some have termed *frankenfood* (Thelwall & Price, 2006), or genetically engineered seed. This combines traits from very different species to enhance the

plant. Thus, cold-water genes from fish are put into wheat to enable it to grow in regions not hospitable to the plant, or plants are engineered to resist a herbicide that would otherwise kill it as it destroys competitors. Transgenic genes might allow insemination for a variety of plants into soil that has become infertile due to salinization, and thereby extend productivity to regions where production has long ago ceased (Rauch, 2003).

Genetically modified (GM) plants are spreading throughout the world, even as some countries refuse them entry. The powerful corporations and governments that endorse their use see them as a panacea: New varieties for new climate issues, which themselves, like global warming, have arisen as a result of human activity, not the least of which is the industrialization of food. In addition, farmers are restricted from using seed from engineered plants, even if they blow into their fields, as the seeds are, in effect, copyrighted and the use of them has caused expensive legal challenges (“In Depth,” 2004). While GM crops are less damaging to the environment than typical introduced species, as the numbers and distribution of these increase, the probabilities of them spreading, evolving, and mixing with local varieties increases (Peterson et al., 2000). Early “evidence” at the beginning of the century that transgenes had entered the genomes of local plants in Oaxaca, Mexico, was based on two distinctive gene markers. The studies were corroborated by government agencies but further controlled, and a peer-reviewed study of a huge sample of farms and corn plants did not find transgenes in this region (Ortiz-García et al., 2005). The question therefore remains moot, at least in Mexico, but the issue gave rise to the Cartagena Protocol on Biosafety (1999–2000), which regulates the movement of living modified organisms—plant and animal—whether for direct release or for food (Clapp, 2006). A number of countries in Europe and Africa have refused modified seed, although pressure on them to accept the seed continues. The Food and Agriculture Association’s (FAO) Swaminathan (2003) has urged India not to permit a “genetic divide” to exclude it from equality with other developing nations. Anxious that there not be a genetic divide between those countries that pursue transgenic organisms and those that do not, the United Nations World Health Organization (WHO) has echoed this concern (WHO/EURO, 2000).

Future Directions

Over time, selection for certain desired traits and hybridization of stock to develop specific traits (resistance to disease, etc.) has meant the loss of biodiversity in agriculture. Conservation of seed, by agencies like the Global Crop Diversity Trust, and seed banks, like IRRI in the Philippines, and the Svalbard Global Seed Vault in Norway, have been established in order to retain plant biodiversity. Their purpose is to have available strains that can reinvigorate domesticated species with genes from the

“wild type.” Because domestication reduces variation, these “banks” become increasingly important (Acosta-Gallegos, Kelly, & Gepts, 2007).

Certainly there will be more technological advances as the pressure for food continues and the area available for cultivation diminishes. The growth of genetic modification over the past decade has been exponential and is a harbinger of the future. The food crisis in the mid-1970s caused by oil prices, and the world summit on finding solutions, both had little permanent effect. The food crisis in the first decade of the 21st century has multiple causes, not the least of which is climate change. But that is not the cause: It is a concomitant, as Sen (1981) has argued. Newspapers and magazines detail the economic and political actions that seem paramount, and then a climate disaster hits and the crisis becomes full-blown. Australia, for example, has been suffering drought for over a decade, especially in its wheat-growing areas, but its economy can support basic food imports; Canada’s prairies were overwhelmed by a heat wave due to climate change, which reduced its 5-year production of wheat by over 3 million tons. Ironically, one of the major factors is that due to the Green Revolution, the health and diet of billions of people, in China and India in particular, has improved, but this has led to obesity (Popkin, 2008). Their demand for meat, which traditionally was an ingredient in a vegetable-based gravy over a staple, has escalated, and with it a shift from land producing for people to land producing for, especially, cattle. And, world over, the amount of arable land left has decreased from 0.42 hectares per person in 1961 to just about half this figure by the beginning of this century (as cited in Swaminathan, 2003).

Over the past two decades, the rise in the price of oil has caused an escalation of food prices, since transportation by ship, plane, or truck requires energy and global food markets require foodstuffs that once were kept local. Clearly another form of energy needed to be found, and the answer lay in the conversion of biomass to energy. The demand for biofuel, initially created from corn, kept acres out of food production and relegated them to energy manufacture. Currently the move is to find other sources of biomass—like algae, for example—to relieve the pressure on foodstuffs, and ultimately to use waste to create fuel. Then too, agglomeration of land into huge holdings has helped to make farming a business enterprise, subsidized by government and reflected in the market fluctuations in the prices of commodities, where 60% of the wheat trade, for example, is controlled by large investment corporations. The consequence has been that small farmers cannot compete with imports that are cheaper than what they can produce; production cannot compete with demand (IRRI, 2008). An even further result is scarcity in precisely those countries where the crops are grown, resulting in hoarding not only by individuals, but also by governments, for example, the ban on rice in India and Vietnam (IRRI, 2008).

Global organizations such as the G8 and the World Trade Organization (WTO), together with nongovernmental

agencies, individual governments, think tanks, and institutes, are “closing the barn door after the horse has escaped” with a variety of stop-gap measures. At the same time, there are clear and significant countertrends occurring. Not the least of these, and perhaps the best established, is the organic movement, whose origins followed the introduction of vast petrochemical use in the 1940s. Since then, the movement has grown out of the “fringe” to become “established.” In the mid-1980s, supermarkets’ recognition of a substantial market for certified-organic produce and meat broadcast the knowledge of the health implications of additives (from MSG to nitrates).

Of course, advances in technology and science focus on ensuring that there will be sufficient food for future populations. Livestock require vast amounts of land to produce the food they eat. By the early 1970s, the calculation was that conversion of cow feed to meat produced amounts to only 15% (Whittaker, 1972), and cows eat prodigious amounts of food. The agriculture department of Colorado State University, for example, reckons a cow eats up to 25 pounds of grain, 30 pounds of hay, and 40 to 60 pounds of silage—per *day*. One way around this is the virtual “creation” of meat. The future will see the industrial manufacture of meat through tissue engineering (Edelman et al., 2005). Using principles currently devised for medical purposes, cultured meat may actually reduce environmental degradation (less livestock, less soil pollution) and ensure human health through control of kinds and amounts of fat, as well as bacteria. Given the growth of the world’s population, in order to maintain health levels, the current trend of creating, nurturing, and breeding *neutraceuticals* will be expanded. The Consultative Group on Agriculture Research’s (CGIAR) Harvest Plus Challenge Program is breeding vitamin and mineral dense staples: wheat, rice, maize, and cassava for the developing world (HarvestPlus, 2009). Similarly, the inclusion of zinc, iron, and vitamin A into plant foods is under way in breeding and GM projects. The Canadian International Development Agency (CIDA) terms its efforts *Agrosalud* as it seeks to increase the food value of beans, especially with regard to iron and calcium content (Acosta-Gallegos et al., 2007).

There is a distinct interest in returning to *victory gardens*—those small, even tiny plots of land in urban environments that produced huge quantities of food in the United States, the United Kingdom, and Canada during World War II. By 1943, there were 20 million gardens using every available space: roofs of apartment buildings, vacant lots, and of course backyards. Together they produced 8 million tons of food (Levenstein, 2003). The beginnings of this movement are seen in the community gardens hosted in many cities, and in blogs and Web sites all over the Internet. Cities will also see the development of *vertical farms*—towering buildings growing all sorts of produce and even livestock. This idea, first promulgated by Dickson Despommier, a professor of microbiology at Columbia University, has quickly found adherents (Venkataraman, 2008). One project,

proposed for completion by 2010, is a 30-story building in Las Vegas that will use hydroponic technology to grow a variety of produce. The idea of small plots, some buildings, and some arable land—in effect, a distribution of spaces to grow in—is consonant with the return to “small” and local: the hallmarks of the *slow movement*.

The future may see a return to local produce grown by small farmers, independent of the industrialized super-farms, utilizing nonhybridized crops from which seed can be stored. The small and local is part of the slow movement, which originated in Italy in the mid-1980s as a protest against fast food and what is associated with it. Its credo is to preserve a local ecoregion: its seeds, animals, and food plants, and thereby its cuisine (Petrini, 2003). It has grown into hundreds of chapters worldwide with a membership approaching 100,000 and has achieved this in only two decades. In concert with this movement is a new respect for, and cultivation of, traditional knowledge. The World Bank, for example, hosts a Web site on indigenous knowledge (Indigenous Knowledge Program, 2009) providing information ranging from traditional medicine, to farming techniques (e.g., composting, terracing, irrigating), to information technology and rural development.

The best example of small, local, and slow, along with exemplary restoration of indigenous knowledge, comes from Cuba. When the United States closed its doors to Cuba in the late 1950s, the Soviet Union became the chief supporter of Cuba, providing trade, material, and financial support. With the fall of communism, and the collapse of the Soviet Union in the 1990s, Cuba could no longer rely on the imports of petrochemicals that had been traded for citrus and sugar and upon which agribusiness depended. Large-scale state farms therefore were broken into local cooperatives; industrial employees were encouraged to work on farms, or to produce gardens in the cities much like victory gardens. A change in the economic system, permitting small-scale farmers to sell their surplus, encouraged market gardening and financial independence. Oxen replaced tractors, and new “old” techniques of interplanting, crop rotation, and composting replaced petrochemicals. Universities found practitioners and taught traditional medicine and farming techniques. It may not be feasible for small and local to exist everywhere, yet the future will see some of each as expedience requires.

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PART IV

LINGUISTICS

LINGUISTICS

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Of the many areas of anthropology that entice researchers to study, language is one that draws significant and sustained attention. As far back as 1500 BCE, individuals in India speculated about language development, derivations, and use. Similar speculation was done in Europe among Greek philosophers at the time of Socrates and his followers. Evidence from over 30,000 preserved cuneiform writings has consistently raised curiosity regarding the spoken language of the ancient Sumerians prior to 2000 BCE, as have discoveries regarding original language types from other indigenous peoples, such as the aborigines of Australia and New Guinea.

The reasons and methods for trying to understand language have changed from one historic era to the next, making scholarly activity in the field known as *linguistics* as vibrant as each era. Knowledge of the changes in perspective about language development provides one key to unlocking the door to characterize the nature of human beings as well as unlocking the door to the evolution and growth of societies. For example, Franz Boas (1858–1942) used what became known as *descriptive-structural* linguistics in his studies of culture and anthropology in the early 20th century. His interpretation of *language* was, in the words of Michael Agar (1994), “just a ‘part’ of anthropological fieldwork, and the point of fieldwork was to get to culture” (p. 49). This sense of linguistics as a vehicle was shared by the students of Boas and became a primary interpretation for many years, especially through the influence of Leonard Bloomfield. One

can only imagine the kinds and degrees of meaning that are lost to us about peoples of the world due to the formal methods used in the study of language in the early 20th century and the relegation of language, as a research tool, as it was by Boas and Bloomfield. However, for the time, descriptive-structural linguistics was a significant advancement, albeit more of a part of anthropology rather than a separate field in itself. That changed dramatically in the latter half of the 20th century, particularly with the dynamic referred to by Noam Chomsky (2005) as the *second cognitive revolution* when the number of new research fields increased (e.g., cognitive psychology, computer science, artificial intelligence). The *first cognitive revolution* is a cognomen for the period between the 17th and early 19th centuries when classical thoughts and theories about language were proposed, especially by philosophers such as René Descartes, Gottfried Leibnitz, and Immanuel Kant.

In the 21st century, the methods of language study and characterizations of linguistics hardly resemble those of Boas and anthropologists in his era. Current scholars cannot capture all the characteristics of *language* in just one definition or modality to designate linguistics as one singular field of study. Multiple views of language and linguistics support a richer perspective about the study of language and people than one that identifies linguistic methods only as tools to find out about culture.

Philology in the 1800s was the ancestor to general linguistics. Those who identified themselves as philologists

were oftentimes recruits from the field of philosophy. Their studies provided historical perspectives about languages—classifying and categorizing them by phonology, morphology, and syntax (but not so much by semantics and pragmatics).

Much of the early linguistic research (i.e., up to the first half of the 20th century) was undertaken to find out about the speech of ancient peoples. Thus, there was a reliance on writings—as well as on the spoken word—as these survived and changed into modern eras. *Comparative linguistics* enabled scientists to look for patterns in spoken languages in order to find connections among them that might give some indication of evolution. Those involved in comparative linguistics were close cousins to researchers in the current subfield of *sociolinguistics*, which attempts to understand language use and its social implications as well as the consequences of language and literacy development and education among citizens of world nations and societies within them.

In the latter half of the 20th century, the pursuit of language understanding enhanced the identity of linguistics as a field constituted of several subfields, with each involving the study of specific human dimensions evidenced in language use. For example, *forensic linguistics* provides insights into language, law, and crime; *neurolinguistics* includes the relationships between language and the human nervous system. This latter field holds much promise for understanding individuals afflicted with aphasia and other communication disorders. It also provides answers regarding second-language learning and multilingualism. Another linguistic subfield, *computational linguistics*, is one that has supported the developments of the computer age. This field involves scholars from a wide range of related disciplines (e.g., logicians, computer scientists, anthropologists, cognitive scientists) in the study of natural language understanding to create models for incorporation in technological devices and instrumentation for crosslinguistic communication and translation. For example, the quality of voice recognition on the telephone, as well as the complexities of voice recognition responses, was unimaginable even in the early 1980s. Likewise, translations of written languages in computer search engines, such as *Google*, require sensitivity to meaning as well as to the interpretations of words and grammar between any two languages.

The branching off of language studies into a range of related linguistic disciplines demonstrates that there is no limit to the number and variety of questions that can be approached. Answers are constrained only by one's choice of definition, purpose, and characterization of language. Even so, the richness of language research, both past and present, shows that an answer to one question many times leads to new and more interesting ones. And, for the most part, language questions are now perceived to pose dynamic challenges in and among subfields of linguistics. For example, why should we be concerned about the extinction of languages? How did spoken languages evolve?

The Nature of Language

Studies of language by researchers who are designated as members of one of the several subfields of linguistics is limited by the particular theory or theories held by the particular researcher(s). Each theory is derived from the definitions of elements or characteristics of language that are of interest to the individual. Definitions of language chosen by linguists will influence the direction in which research will proceed; however, among the linguists, there is much cross-disciplinary understanding that continuously reshapes arguments and individual theories.

Definitions

There are a great variety of scholarly definitions for language as well as for *languages*. Each reflects the theoretical perspectives and areas of study of the specific group (i.e., subfield) of linguists. If one were to ask for a definition from those who are not considered academics, however, they more often than not would associate language with spoken communication. Joel Davis, in his discussions about the *mother tongue*, explains that there is somewhat of a dilemma for linguists to pose a singular definition to language because of the multiplicity of characteristics and the use of one's own language to describe language in general. To capture the nature of language and define it, linguists attempt to study language structure (form) as well as language use (*function*). Studies may reveal things in single languages or singular situations or may uncover things by comparison of one language to another language or other languages.

20th-Century Delineations

Those who look at the structure of languages do so to establish a foundation for exploring distinct parts and compositions of specific languages in order to see what might be common among them. Van Valin explains that from the beginning of the 20th century, those who were curious about “linguistic science,” such as Boas and his contemporary Ferdinand de Saussure (1857–1913), were especially focused on identifying language systems to support the further study of language use. This positioned the definitions of language within a construct that came to be known as *structural linguistics*. In the 1930s, Leonard Bloomfield reinforced the idea of structuralism, claiming that the main object of linguistic study should involve grammatical principles that have little or nothing to do with observations of what individuals know or think about their language.

In the second half of the 20th century, as researchers from fields such as psychology, cognitive science, and sociology began to take interest in language studies, definitions of language could be distinguished as representative of one of two major linguistic areas, *formalism* or *functionalism*. The former area involves linguistic study of

the systematic, organized ways that language is structured. The latter area is more concerned with language use and the reasons why individuals choose to speak in certain ways and not in others.

Formal Linguistics

Franz Boas, Ferdinand de Saussure, and Leonard Bloomfield are among those who are acknowledged as formal linguistic researchers in the first half of the 20th century. Their theories and the field of structural linguistics led the way to expanded ideas about language study. Boas is considered to be the father of American anthropology, and as stated above, his use of linguistic analyses was only as a tool to get to culture. Although Saussure did not write down his ideas in articles or books, his lecture notes distributed among his students became a text after his death titled *Course in General Linguistics*. Language researchers give recognition to Saussure for the growth of linguistics as a science, and his work has been a central one for the development of the subfield of sociolinguistics. Bloomfield is best known as a linguist, although some classify him as an anthropologist. Of his many writings, his book *Language* was revered for its discussions of structural linguistics and comparative work to characterize languages.

The work of these three scholars—Boas, Saussure, and Bloomfield—left an indelible imprint on the field of linguistics. In their wake, there began a strong desire among young language researchers to pursue studies in formal linguistics. However, none was to compare to Noam Chomsky who moved formal linguistics into a new home, that of generative transformational grammar.

Noam Chomsky

A political activist and formal linguist, Chomsky designated two particular foci for characterizing and, thus, added to the definitions of language. In his book *Aspects of a Theory of Syntax*, he distinguishes between language *competence* and language *performance*. Previously, those researchers who were identified with structural linguistics ignored or paid little attention to language competence which, as stated by Van Valin (2001), “refers to a native speaker’s knowledge of his or her native language” (p. 326). Structuralists were more concerned about language performance, or how speakers used the language forms to communicate. In Chomsky’s work and that of others who ascribe to the newer area of formalism, there is more of an involvement with explorations of cognition, and this situates language competence as the main focus for striving to define language. Those who study *generative transformational grammar* in the tradition of Chomsky look for linguistic characteristics that are universal to all languages (e.g., all natural languages have nouns and verbs). Language is approached by exploring its generative capacity using a logical system of transformations to manipulate syntax.

Chomsky’s work drew attention to distinctions between the *surface* and *deep* structures of sentences. For example, he notes that the difference between the following two sentences is at the level of deep structure; both are composed of the same syntactic elements in the same order at the surface but differ at the deep level:

John is easy to please.

John is eager to please.

A critical part of the linguistic theories of Chomsky concerns how humans are “wired” for language. Having critiqued the work presented in B. F. Skinner’s *Verbal Behavior*, Chomsky reinforced his own belief that humans have innate knowledge of grammar as evidenced in the ways that individuals can generate new, never before uttered sentences.

This particular view of universal grammar and linguistic nativism contradicted the work of Edward Sapir and his student Benjamin Whorf; both had proposed a theory of linguistic relativity. The Sapir-Whorf hypothesis states that the cognition of individuals is influenced by their linguistic experiences within their given cultures. In other words, people in different cultures have different worldviews that have been tempered by the ways that their languages are structured and used.

Language Competence and the Sentence

In the 1960s, Thomas G. Bever and D. Terence Langendoen characterized language competence in this way, “A person knows how to carry out three kinds of activities with his language: He can produce sentences, he can understand sentences, and he can make judgments about potential sentences” (Stockwell & Macaulay, 1972, p. 32). In the previous comment, there is the singular concentration on the role of the sentence. In formal linguistic research, the sentence has been the central grammatical vehicle through which characteristics of language are identified. Although all languages are the subject of study, it is particularly in English and many other SVO languages (i.e., subject-verb-object sentence ordered) that the sentence has provided a foundation for analyses.

Formal linguists who are designated as *psycholinguists* have long held that designing research at levels of discourse beyond the sentence is especially unwieldy, and it may be difficult to resolve a hypothesis with absolute certainty. One psychologist, who demonstrated this point in his work regarding the interpretation of written texts in the 1980s through the 21st century, is Karl Haberlandt, a scholar in the field of memory and cognition.

The previous discussion requires a clarification about the definition of *sentence*. Formal linguistics looks at the syntax of sentences and the rules by which the grammar of a language allows for the order of words in sentences. For example, English transitive sentences commonly follow

the order [s]ubject, [v]erb, [o]bject, but there may be variations of this order that are acceptable in English conversation. French follows a SVO pattern but is SOV when personal pronouns are used (e.g., *Je t'aime*, "I you love"). Consider also the ordering of adjectives in English, for example, *three enormous green avocados* versus *green enormous three avocados*.

Although not a member of any of the subfields of linguistics yet mentioned here, Richard Montague is a linguist known for his attempts to quantify language by matching the logic of set theory to characterizing the semantics of sentences. Although his life was a short one, his legacy of Montague grammar remains to challenge those who respect formal linguistics and considerations of the ordering of language.

Functional Linguistics

The second area of focus from which we might posit definitions of language is that of *functionalism*. Individuals who are involved in this particular area propose theories of language use that may or may not allow for grammatical connections. Van Valin classifies the functional linguists as extreme, moderate, or conservative. Those who are in the first category do not admit to any use for grammatical (i.e., syntactic) analysis in their studies. To them, all language study is necessarily at the level of discourse, and observations of language grammar are restricted to the discourse. Those who are conservative functional linguists study language by adding on language use components to formal linguistic grammars. They keep the syntactic structures as the main part of the design of their research and amend them with discourse rules. Susumu Kuno is a well-known functional linguist who proposed a *functional sentence perspective* that guided a part of his research at Harvard University.

Moderate functional linguistics is especially represented by the work of M. A. K. Halliday. This subfield of linguistics is particularly appealing to anthropologists since it encourages comparative studies of communication and discourse without completely discounting the need for reference to grammatical theories. Moderate formal linguistics includes the consideration of semantics and pragmatics within the analysis of spoken human discourse. Dell Hymes (1996), credited with naming the linguistic subfield of *anthropological linguistics*, commented on the nature of language and provided a functionalist perspective of grammar in which he criticized Chomskian theories of formal generative grammar. This perspective demonstrates the thinking of the moderate functional linguist:

The heart of the matter is this. A dominant conception of the goals of "linguistic theory" encourages one to think of language exclusively in terms of the vast potentiality of formal grammar, and to think of that potentiality exclusively in terms of universality. But a perspective which treats language only as an attribute is unintelligible. In actuality language is in large part what users have made of it. (Hymes, 1996, p. 26)

One important functional linguist and anthropologist who had studied under Boas, and whose work was particularly vital in the latter half of the 20th century, is Joseph Greenberg (1915–2001). He is credited with providing the first thorough classification of African languages. Greenberg looked for language universals through language performance, rather than through formalistic analyses such as those of Chomsky. Since his work resulted in characterizing languages in this way, Greenberg is also mentioned in discussions of *typological universal grammar*.

Classification of Human Languages

The classification and categorization of human languages is particularly complex. First, there is the complexity derived from the theories and definitions of the linguists who are influenced by their own subfields of linguistics. Second, there is the complex weave among the topics of language evolution, language modification and change, and language death that in some respects is an uncompleted textile, metaphorically speaking. Each of these areas is connected to the other in simple and intricate ways, and they continue to enkindle disagreements among researchers who want to classify languages. When, why, and how does/did language evolution occur? What are the causes and correlates of language change? Are there any simple reasons why languages die? How do languages differ regarding interpretation and communication both between and among cultures?

In the last quarter of the 20th century, it became somewhat clear that no one subfield of linguistics could provide full answers to those questions that concern the classification of languages. Thus, some linguists have joined forces with individuals who have opposing views from their own or who are experts in allied fields. For example, anthropological linguists do well to partner with formal linguists, neurolinguists, and archaeologists to search for the origins of spoken language. Researchers such as Marc Hauser, Noam Chomsky, Morten Christensen, and Simon Kirby have commented on the need for cross-collaborative efforts to study the evolution of language and languages, and they have been collaborative themselves.

Structural and Comparative Linguistics

Philologists who, for the most part, were later to be known as *comparative philologists* and, subsequently, *comparative linguists*, started out with questions concerning spoken languages and their origins. One of their main areas of inquiry was guided by material gleaned from artifacts that survived from ancient civilizations; most of these included writings and monuments from the Sumerian civilization dating between 5000 and 2000 BCE. Researchers hypothesized about modes of spoken language by evaluating ancient patterns of writing, that is, by separating out

demarcations from other elements of what might be a grammar. They also strove to classify spoken languages by documenting those that occurred in various parts of the world, creating models of word structures and grammars as well as looking for consistency and similarities from one geographical area to another. This kind of work, of the philologists and comparative linguists, was, however, once limited by the Société de Linguistique de Paris in 1866 as a response to the proliferation of ill-conceived explorations into the evolution of language prompted by the publication of Darwin's *On the Origin of Species*. It was not until the last decade of the 20th century that research on the origins and evolution of languages had a resurgence among a new breed of anthropological linguists, who were not at all like their comparative linguist predecessors, as well as among teams of researchers from fields such as computer science, neurology, biology, and formal linguistics. Though still using theories derived from formal linguists, new paradigms for research included language competence and communication theories.

In 1997, Philip Parker produced a statistical analysis of over 460 language groups in 234 countries, showing the connections between linguist cultures and life issues in their societies (e.g., economics, resources that defined cultures, and demography). He used variables such as the availability of water, transportation, and means for communication to see patterns regarding the development of nations, especially in third world countries. Parker's work can be studied to understand the difficulties involved in trying to classify languages as well as in identifying new languages or finding those that are going extinct.

Sociolinguistic Perspectives

Those who identify themselves as sociolinguists are concerned with the study of how individuals use language to be understood within particular communication contexts. This includes research about sports, courts of law, teen talk, conversations between individuals of the same or different genders, and even ITM (instant text messaging). Sociolinguists primarily concentrate on spoken languages or on gestural languages, such as American Sign Language. However, several scholars have become curious about written languages, especially about literacy. Rather than using formal linguistics, as did the structural linguists, sociolinguists use observations about the human condition, human situations, and ethnographic data to understand language. When their research includes formal linguistic analyses, it is to demonstrate language interpretations and comparisons of language use within particular social contexts.

Sociolinguists are well acquainted with the theories of Saussure. Although Saussure was only 2 years old when Darwin wrote *On the Origin of the Species* (1859), linguists in the early 20th century have remarked that Saussure showed an awareness of Darwin's ideas in his lectures on language change and evolution. At that time, those

linguists who were concerned with anthropology or language growth and language interactions within societies more than with the formal characterization of languages attended to linguistic performance rather than to linguistic competence. This was the period of structural and comparative linguistics. Until the early 1950s, the term *sociolinguist* was not used. In the following two decades, researchers were involved in what now is commonly identified as sociolinguistic studies, but these individuals were not fully recognized within the subfield of linguistics called sociolinguistics until well into the 1970s.

Sociolinguists are especially concerned with the processes involved in language use in societies. Their research designs are commonly ethnographic. Dell Hymes has been identified as the father of the *ethnography of communication* approach used in sociolinguistic research. As an anthropologist, Hymes observed that those in his field and those in linguistics needed to combine theoretical dispositions to fill in the gaps in each other's research. He saw that the legacy of Boas resulted in many anthropologists thinking about the use of linguistics in their work only at the level of a tool as Agar has interpreted it. Hymes also saw that linguists were focusing on what he thought was too much formalism. An ethnography of speaking would enable those in each field to get a fuller picture of the language processes used by individuals, as well as reasons for their use, processes that are associated with one of a variety of social constructs—politeness behaviors, courts of law, and the deference to the elderly.

Deborah Tannen's research, concerning gender differences in conversations in the United States in the 1980s, involved the use of video to compare the conversational behaviors of children, teens, and adults who were paired by gender and put into a room for a short time with only their partners. Her work has added much to understanding the effects of communication behaviors, by environment and human nature, along the continuum to adulthood. Although Tannen could have dissected her subjects' conversations using formal grammatical methods, she was much better able to answer her research questions by analyzing the processes, both verbal and nonverbal, that they used. In fact, the nonverbal behaviors were especially revealing.

Tannen's previous research had prepared her for her gender comparison study. In one early piece of research, she participated as a collaborator with several other linguists to observe and subsequently characterize differences in verbal interpretations of a film by individuals from several nations around the world. This led to the publication in 1980 of *The Pear Stories*, edited by Wallace Chafe. Tannen compared the narratives of Athenian Greeks to those of American English speakers and concluded that the style and form of interpretations vary according to how people of a given culture adopt the conventionalization of rhetorical forms used in their culture. She supports her claims with research from sociolinguists John Gumperz and Dell Hymes. Her comments about cultural stereotypes in this

early study are one reason that this work should be reread in the 21st century, especially by political scientists and those concerned about cultural misunderstandings derived from translations between the languages of two nations, particularly when the conversations have consequences for peace between these nations:

The cultural differences which have emerged in the present study constitute real differences in habitual ways of talking which operate in actual interaction and create impressions on listeners—the intended impression, very likely, on listeners from the same culture, but possibly confused or misguided impressions on listeners from other cultures. It is easy to see how stereotypes may be created and reinforced. Considering the differences in oral narrative strategies found in the pear narratives, it is not surprising that Americans might develop the impression that Greeks are romantic and irrational, and Greeks might conclude that Americans are cold and lacking in human feelings. (Tannen, 1980, p. 88)

Language Mixtures

The concept of language mixtures is one that has been identified through sociolinguistic research. It includes areas of oral communication accommodation between people who speak different native languages as well as the use of new “half-languages,” as McWhorter calls them—that is, pidgins and creoles. As people migrate, voluntarily or as a consequence of a historical situation (e.g., the great potato famine, the slave trade), they have a need, to a greater or lesser extent, to communicate with those who do not speak their language. For example, the United States experienced large waves of immigration from the mid-1800s to the 1920s. As these new Americans populated cities on the East Coast and continued to settle throughout the United States, they maintained their original cultures in ethnic neighborhoods and were comfortable speaking their native languages. Schools accommodated these immigrants, providing instruction in English as well as in dominant European languages. Across the neighborhoods, individuals tried to communicate for economic reasons and for socialization. Sometimes, the elderly preferred to speak only their mother tongue, even insisting that their children or grandchildren do so whenever in their presence. Regardless, these new citizens created what linguists call an *interlanguage*, which includes words and expressions from both the new language and their mother tongues.

Interlanguage is defined in one of two ways. It may be that an individual creates or mixes terms between the native language and the target language. A Polish immigrant might use an expression such as “Ja będę iś do marku” (“I will go to the market”), substituting the first syllable of the English word, *market*, in the Polish word, *rynku*, and retaining the final syllable of the Polish word. (*Rynku* is the Polish word for market.)

A second way that interlanguage occurs is in situations where each individual in a conversation uses clever verbal

manipulations. It may be that the speaker imposes the syntax of the native language on the order of words in the new language. For example, Larry Selinker, an expert in interlanguage, gives an example where an Israeli says, “I bought downtown the postcard.”

As individuals become bilingual, they will switch between the two languages in their attempts to be understood or to clarify for the listener what they mean. This behavior is called *code-switching*, and over time, individuals who are in constant communication may create new words and expressions that possess characteristics of each or both languages.

Studies of interlanguage and code-switching provide information regarding the development of new languages but especially new words. Researchers such as Joshua Fishman have observed a special form of language mixture that evolves slowly within speech communities—that is, groups or societies that use one variety of their native language. An example of this situation, called *diglossia*, is a language vernacular. Some languages have one formal language variety and one or more informal ones. Vernaculars are often called the “common language” of the people. What is very interesting about diglossia is that in some places in the world, as in some parts of Africa, two speech communities may live side by side and never mix. Speakers of one language will continue to use their mother tongue when addressing individuals who speak another language. Yet the latter will understand the former but never adopt any of the morphology, phonology, or grammar of those speakers.

Pidgins and Creoles

Pidgins are formed when speakers of one language interact with those of a second language for particular purposes. As with language mixtures, they are called *contact languages*, and for the most part, they developed during the colonial periods when European traders sailed to countries in Africa, as well as to South America, and to islands in one of the great oceans. However, pidgins may arise anytime speakers of two languages have a particular need to communicate. They are characterized by a mixture of words from each language (e.g., French and Ėwé, an official language of Togo) in a somewhat “abbreviated” kind of grammar. Frequently, pidgin languages die out as individuals become bilingual or if there is no longer a need for communication between speakers of each natural language. Many pidgin languages that prevail become regularized from one generation to the subsequent one, and they take on well-defined morphological and syntactic rules. When this happens, they are then called *creole* languages. McWhorter observes that, just as natural languages may occur in one of several varieties, creoles, too, may have more than one variety. Creoles often have the same generative properties as natural languages. One very well studied creole language is *Tok Pisin* of Papua, New Guinea. It is estimated that between 4 and 6 million people speak it.

Linguistic studies regarding language mixtures, including pidgins and creoles, have been a source of valuable information to historians and geographers as well as to anthropologists and sociologists. Besides gaining an understanding about more recent history, especially the colonial eras and migrations in modern times, researchers have been able to hypothesize about the structures of and changes in societies where there has been contact with groups from countries and nations distant from themselves. Those linguists who promote theories of linguistic relativism are able to better understand the effects of language change brought on by social interactions among peoples from different parts of the world. As moderate functionalists, they are also able to evaluate language use by integrating generative functional linguistics into their evaluations.

Linguistics and Politics

An edited text by Joseph, DeStephano, Jacobs, and Lehiste (2003) draws on research that is particularly important to sociolinguistic studies—that is, the nature and relationship of languages that may or may not share the same cultural space. In *When Languages Collide: Perspectives on Language Conflict, Language Competition, and Language Coexistence*, linguists from diverse subfields share essays regarding, as the editors say, “a variety of language-related problems that affect real people in real situations.” Although each one represents the views and perspectives of particular researchers, taken together, they give a powerful message showing that the complexities of language and languages are entities that are indicative of the complexities of human behavior and the structure of societies.

As is the case with so many texts in the subfield of sociolinguistics, *When Languages Collide* permits much reflection on the multiple roles of language through the paradigms of both formalism and functionalism. It especially provides thought regarding language endangerment and societal change. Among the topics discussed are language ideologies (i.e., the role of governments in determining language use), language resurgence (e.g., increased speakers in the Navajo nation), and language endangerment. Joshua Fishman, an eminent sociolinguist, expounds on the growth of literacy and the political structures of society. His chapter is especially intriguing since most of his other research involves studies of spoken language. Julie Auger describes the growth of literacy among people in the border areas of Belgium and northwestern France. In this area, a fragile language, Picard, has a growing literary tradition in spite of the fact that few individuals speak it.

Language Extinction

Just as there has been a resurgence in studies about the classification of existing languages and cultures, there have also been linguists and anthropologists who have tried to understand the reasons for language endangerment and the extinction of languages. They have attempted to keep

records about endangered languages, looking at linguistic structures and geographic areas where endangerment predominates. David Crystal, considered one of the world’s foremost experts on language, has compiled research about the language survival situation and reasons for language extinction. In *Language Death*, Crystal (2000) gave calculations that show that in 100 years between 25% and 80% of the world’s languages will be extinct. As of 2005, the actual number count of known languages (spoken and signed) was estimated as 6,912. Thus, approximately 1,728 languages, as a lower estimate, could be extinct by the year 2105. He states that currently 96% of the world’s population speaks only 4% of existing languages.

Research about language death is a relatively new pursuit. Just as societies have become concerned with ecology, global warming, and survival, they are becoming more aware of the case of linguistic ecology. There currently exists an International Clearing House for Endangered Languages at the University of Tokyo and an Endangered Language Fund in the United States. A new subfield of linguistics, *ecolinguistics*, has been designated for concentration on issues of language diversity and language death.

Reasons for extinction include the lessening of the numbers of peoples who speak the language, as in Northern (Tundra) Yukaghir, Russia, as well as language assimilation into a language that predominates in a geographic area. Only around 120 individuals in Northern Yukaghir speak the indigenous language of the villages. It is believed that this language is at least 8,000 years old. All of the community of 1,100 people can speak a second language, Yakut, which is the name of the Russian republic in which they live. The two indigenous languages are spoken by the elderly at home. In *Ethnologue: Languages of the World*, Gordon (2005) noted that these people have no ethnic identity due to their assimilation with other groups in the area, such as the Yakuts and the Evens. Yet the Northern Yukaghirs do share cultural bonds as explained in the research of Elena Maslova, a formal linguist.

Salikoko Mufwene has summarized the work of linguists, such as David Crystal and Jean Aitchison, regarding language death, decay, murder, and suicide. He also has conjectured about the possibilities for language persistence and language ecology. To do so, Mufwene looks to the social dimensions of language characterization as he has researched it within the subfield of sociolinguistics. He, like other linguists who are concerned about societies and cultures, takes a historical perspective and includes questions and answers from work on migration and colonization in particular areas of the world (e.g., Sub-Saharan Africa). His research adds a special dimension to the subfield of sociolinguistics, which he calls *sociohistorical linguistics*.

Psycholinguistics

Psycholinguistics is a subfield of linguistics in which researchers study psychological processes involved in language development and use. The primary focus for the

psycholinguist is language behavior, and this may include studies of memory, cognition, speech processing, auditory processing, and reading. This subfield, just as sociolinguistics, is a relatively young one. From the late 20th century to the early 21st century, there has been an exponential growth in the number of psycholinguistic studies concerned with cognition and language processing. What is particularly interesting about this field is its focus on the individual as a speaker, writer, and thinker.

Members of the subfield of psycholinguistics are typically identified within the field of psychology and to some extent in educational psychology. Since a primary goal is to understand connections between the mind and language, there appears to be much more collaboration of psycholinguists with others in allied fields than there is among other subfields of linguistics. Perhaps this collaborative nature exists because a large body of psycholinguistic research has to do with language acquisition. Those involved in developmental psycholinguistics have provided a wealth of research regarding language learning in infants and children, cross-linguistic issues in language development, and correlates of brain development and language maturation.

Although most psycholinguists follow the theories of formalism, many may be identified as functionalists. This is especially true among developmental psycholinguists who study child discourse, bilingualism, and language education. Since psycholinguists have a proclivity for collaboration, researchers who are in fields of applied linguistics (i.e., fields that study language use in a variety of situations) tend to be collaborators with psycholinguists and educational psychologists. For example, Evelyn Hatch, a researcher in second-language learning and discourse, uses a variety of research theories that relate to the theory of knowledge known as constructivism. Annette Karmiloff-Smith, who did much early work on children's narrative interpretations, focuses on the fields of developmental psychology and neuroscience. It has been stated elsewhere that Daniel Slobin's contributions in developmental psycholinguistics have enabled the field of linguistics in general to understand language acquisition among children in nations that represent a range of spoken language families.

Other concerns of psycholinguists have to do with language perception and language processing. A correlate of these areas is that of *forensic linguistics*, a growing subfield that has, as one of its areas of focus, the study of language interpretation and expression in matters of the law and crime. Knowledge of the use of memory and language perception is important to forensic linguists, and they are able to draw from the larger subfield of psycholinguistics for their own research.

Language Identification and Tools of Linguistic Studies

The large family of linguists includes those who are driven to research using formal theories and those who are

motivated by paradigms of functionalism. At one end of the spectrum are the conservative formal linguists, whose interests are in how the mind uses language and the identification and description of universal principles of grammar, as well as those that are unique to every language group. At the other end of the spectrum are the extreme functionalists, whose work is to uncover meaning in the conversations (verbal discourse) of individuals and to see deductively what is similar and what is different in the language use of peoples. Some linguists look at their research through the lens of the historian or anthropologist; others look through the lens of computational models, as these models are able to mimic natural language. And others take a route of applied linguistics to bring research down to a utilitarian level, as in forensic psychology and in psycholinguistics as a component of educational psychology.

Researchers may be especially concerned about the actual language or languages for study, or they may be more concerned with the individuals in societies and the conditions of their lives that are determined by their language or languages. Whether a sociolinguist or a computational linguist, the resources used in linguistics include words, sentences, conversations, gestures, body language, writings, and a range of nonverbal signals. Linguists separate and manipulate these resources in the main categories of *phonology*, *morphology*, *syntax*, *semantics*, and *pragmatics*. These categories apply to analyses of spoken language as well as signed languages, of which there are 119 known throughout the world. Of these, American Sign Language (ASL) is most studied by formal linguists, as well as sociolinguists and other functional linguists.

Languages are also delineated as *natural* or *contrived*. Simply put, a natural language is any human language that has developed naturally over time. Invented languages are not a significant area of study by linguists, although this area can be of value regarding computer paradigms. Computational linguists and those involved in the field of artificial intelligence study natural languages and try to figure out how to simulate these in computer technology.

There are many linguists who believe that a research paper of Steven Pinker and Paul Bloom (1990), "Natural Language and Natural Language Selection," was the main driving force for the spread of legitimate studies about language evolution into the 21st century. As stated previously, there had been a moratorium on this area of research imposed by the Société de Linguistique de Paris in 1866 due to an unwieldy number of studies of questionable integrity that arose after the 1859 publication of Darwin's *On the Origin of Species*.

Phonology

Phonology refers to the sound system of a language. Descriptive linguistics, during the time of the structural linguists, provided a large body of information regarding the articulation of speech, the classification of speech sounds in natural languages around the world, and the

characterization of the brain areas in which receptive and expressive language originate and function. Regarding ASL, linguists only began to characterize phonology (which involves facial expression and physical involvement other than the hands) in the latter half of the 1900s, especially after ASL was acknowledged as a real language.

Through linguistic studies in the early 20th century to the present, there has been much research in developmental linguistics regarding language acquisition and the growth of language as it occurs contrastively in the speech development of infants and children throughout the world. Slobin's research, comparing the expressive language of children in countries where languages belong to different language families (e.g., Turkish, Korean, Estonian, English), has proven invaluable for further studies of language acquisition. For example, he observed that initially all infants babble similar sounds, but those that are not common in the speech of a particular language drop off and are "forgotten" as the infant says his or her first words generally around the age of 12 months.

Research on the history of the phonology of languages, such as that of John McWhorter, provides a window into the possible ways that languages have changed as well as the development of new languages. McWhorter gives an example of the movement from Latin to French. In the Latin word for woman, *femina* (FEH-mee-nah), the accented syllable remains and the two weaker syllables are dropped as this word becomes *femme* (FAHM) in French. McWhorter comments that new words and languages develop with the "erosion" of sounds from the parent language to the new one.

Change in the phonology of languages is believed to be a very slow process, as is the modification of vocabulary forms. These precede changes in grammar. However, research by Atkinson, Meade, Vendetti, Greenhill, and Pagel (2008) indicates that there may be rapid bursts, which they call *punctuational bursts*, that occur at the beginning of the development of "fledgling languages" that may be derivatives of older languages. These characteristics are then followed by a period of slower development. The authors observed this in their studies of the languages of three language families and hypothesized that it holds for phonology, morphology, and syntax.

Anthropological linguists are especially curious about the studies of phonology to find out when humans first began to speak. Biologists as well have proposed theories based on the findings of archaeologists and paleontologists regarding the evolution of humans. Although there is evidence from fossils that the anatomical parts for speech were in place 150,000 years ago, scientists question when vocalization was cultivated for the use of communication. Even though the physical structures were available in the middle Paleolithic era, archaeological evidence of social organization suggests that the liberal use of speech and verbal language might have more reasonably started around 40,000 years ago during the Upper Paleolithic explosion.

One of the reasons that linguists from several sub-fields might find it worthwhile to collaborate with other researchers—particularly those in speech perception, audiology, neuroscience, and computational linguistics—is that each has expertise regarding different aspects of phonology. One possible goal of the collaboration might be to enable applications of new knowledge about phonology to support the development of instrumentation or technology to fulfill a medical or engineering purpose. For example, the development of the cochlear implant by individuals such as Graeme Clark involved a team of experts from 10 fields, including electronic and communication engineering, speech processing, speech science, and psychophysics.

Morphology

Morphology is a branch of grammar that describes the combination of sounds into words, the development of the lexicon of a language. As with phonology, morphology is rule driven. Crystal (1985) explained that there are two divisions of morphology, *inflectional* morphology and *derivational* morphology. The study of the structure of words is especially interesting since they are representations of actual entities in a language that involve meaning. Early structural linguists were able to look at the use of words and the growth of language lexicons in order to situate them within the grammar of a language. For example, Boas, in his *Handbook of American Indian Languages* (1911), called attention to the way that Eskimos (Aleuts) take a single root word and combine it with other morphological components to designate different words for *snow* according to their unique experience of it in Alaska. This point has frequently been discussed by others, including Benjamin Whorf, who used it to support his theory of linguistic relativism.

In generative linguistics, morphology and syntax are considered central foci for grammar. Crystal explains that the same syntactic rules apply to the structure of words, as well as they do to phrases and sentences.

Sometimes, one may hear the comment, "I don't have a word for that in my language." And sometimes, it may take more than a single word to describe a concept captured in another language by a single word. As with the example above regarding *snow*, linguists may argue for linguistic relativism using similar comments. What intrigues linguists is the way that words may represent degrees of meaning for an entity. For example, alternative verbs for *walk* give different impressions of movement in a conversation or text (e.g., *strut*, *saunter*, *shuffle*). Linguistic studies about conversations and word use provide information regarding the growth of languages and language change, even at the level of morphological analysis.

Wierzbicka explains that polysemous words (i.e., words that have many meanings) are a special case for the study of languages. It is not that there may not be an equivalent word in one language available in another but that a particular usage of the word is not permitted. She gives the

example of the word *freedom*, comparing it in five languages. In English, *freedom* can be used in the context of freedom *from* (interruption), freedom *to* (speak), and freedom *of* (choice). In Polish, the word *wolność* is used to represent moral and political issues, matters of life and death. Unlike English, it cannot be used in a context such as *freedom of access*, *freedom of movement*. It can, however, be used as *freedom of conscience*.

Syntax

Syntax refers to the grammar of a language. The study of syntax involves knowledge of the rules that govern the ways that words combine to achieve meaning in a given language. It is at the level of syntax that so much of the work of linguistics has been especially important. Whether in formal or functional paradigms, linguists have concentrated on the sentence and on syntax as primary characteristics that separate humans from the rest of the animal world. The work of Chomsky has contributed not only to the formal understanding of language structure but also to the enabling of researchers to understand something that makes humans special. Belletti and Rizzi (2002) stated it this way:

The critical formal contribution of early generative grammar was to show that the regularity and unboundedness of natural language syntax were expressible by precise grammatical models endowed with recursive procedures. Knowing a language amounts to tacitly possessing a recursive generative procedure. (p. 3)

Formal linguistics, as well as psycholinguistics, makes heavy use of syntactic and morphological structures in its research. There are several methodologies for syntactic, grammatical analysis. Besides those that are based on Chomsky's generative transformational grammar, there are mathematical methods, such as that of Montague, and methods that probe universal grammar, such as that of *optimality-theoretic syntax*.

In the case of discourse analyses, those who might be considered conservative functionalists, using the definitions of Van Valin, sometimes combine methods—more of a formal approach to observations of syntax in conversational discourse.

Semantics and Pragmatics

Semantics refers to the study of meaning. Pragmatics refers to the connections between specific contexts and meaning. Although these two are specific areas of linguistics, together they have provided for theories of understanding and human cognition.

The field of semantics has been especially important to modern language philosophy and logic. Philosophers such as Rudolf Carnap (1891–1970) and W. V. O. Quine (1908–2000) delved into language philosophy with consequences for those studying artificial intelligence. Quine, in

particular, explored the works of Chomsky and formalism in an attempt to verify his own direction regarding logic and language. Semantics also includes studies of speech acts and conversational implicature. John Searle, a prominent language philosopher who is identified with the free speech movement at Berkeley, has contributed greatly to speech act theory. This theory involves the search for meaning in what individuals say, and that requires further understanding of language contexts as well as linguistic culture. Conversational implicature is one component in speech act theory and has to do with particular conventions of speech in which there may be complicated underlying meanings. For example, a request at dinner, “Can you pass the salt?” does not require a yes/no answer but rather an acknowledgment in action by the guest. An understanding of speech act theory enables anthropological linguists to draw connections regarding the development of cultures as they observe commonalities in the use of language within particular cultural environments (e.g., traditions of rights of passage to adulthood and interactions in the marketplace).

Applications of meaning to grammar have practical consequences for computational linguists as well as for understanding political and other spoken and written discourse. Thus, those in the subfields of psycholinguistics and sociolinguistics have provided much evidence, regarding the role of semantics in a wide range of grammatical and conversational contexts, among a wide number of diverse cultures around the world.

Concerns that have arisen due to linguistic and philosophical theories regarding semantics have to do with variations in both speaking and writing. Two of these areas are ambiguity and referencing. In many spoken languages, such as English, listeners accommodate much ambiguity in conversation. For example, sentences such as “Bill told John that he loved Mary” are well tolerated. Spatial relationships and nonverbal cues help listeners disambiguate referents in statements such as “Here it comes,” when contextualized within a situation such as a baseball flying into the spectator section of a ballpark.

Pragmatics plays an important role regarding semantic interpretation. Subfields in both formal linguistics and functional linguistics concentrate on identifying and interpreting the meaning of statements as they are applied to the real world. Areas of speech acts, conversational implicature, ambiguity, and referencing all involve consideration of real-world contexts. For example, a sentence such as the following is usually understood because of an individual's prior knowledge of how the world works: “Sarah pulled the rug next to the chair and then sat on it.” In this sentence, a psychological principle known as parallel processing influences the listener's determination of the referent for the pronoun *it*. One wants to match the rug as the referent; however, pragmatically speaking, it appears more sensible to choose the chair.

Studies of meaning in linguistics, whether at the philosophical level or that of human culture and society, involve

each of the areas of phonology, morphology, and syntax to greater and lesser extents. Although these areas are often dealt with separately in research, they also may be used in one of several combinations or pairings.

Conclusion

It is particularly important for those in the field of anthropology to recognize and understand a wide range of linguistic theories in order to support their investigations and the works of cultures and societies. Rather than considering linguistics as an ancillary tool for research, as was the case with Boas, the new anthropologists of the 21st century need to consider the constitutive nature of language to humanity. The range of characteristics that constitute the matter of linguistics is so broad, however, that researchers of necessity need to collaborate in order to address their particular questions. Further study of the involvement of linguistics in the field of anthropology will require of the individual much reading in subfields, such as those described in this chapter.

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COMMUNICATION AND SYMBOLISM

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Communication and symbolism are the two cornerstones of cultural anthropology. Their analyses will continue to occupy a major portion of the field throughout the 21st century and, in fact, as long as there are humans and anthropologists. Humanity exists in continual processes of inter- and intracommunication as for all life forms, but for humans these processes are crucially important. The essential nature of our existence is created and maintained through the special means by which we communicate—language. Language enables humans to exist in a complex and seemingly limitless symbolic world that, while related in many interesting ways with the world of other life forms (growth and mortality, diurnal and seasonal cycling), is distinctively separate and unique to humans. Cultural anthropology is the attempt to study and describe human symbolic forms and their patterns, as well as the manner in which these function to facilitate human life. Symbols exist in shared usage, and so the study of symbols and the study of communication are but two sides of the same coin. A “symbol” that is not included (with some frequency) in the communicative activity of a community is not operable as part of its symbolic world and thus does not exist for that community. Communication itself has symbolic status; none of its many forms can be neutral—outside the world it creates. The communicative nature of symbols and the symbolism of communicative activity will continue to be robust areas of research and discovery.

Within the last decade of the 20th century and rapidly growing through the beginnings of the 21st, however, enhanced electronic media and advanced intelligent systems have introduced a significantly new dimension into human communicative abilities, which will be referred to here as cyberspace and the Internet. From continuous audio and video linkages with a limitless number of others around the globe to “entering” into virtual realms that enable persons to take part in another life in “cyberspace,” communicative exchanges and the symbolic systems these entail will likely be subjected to considerable modification.

20th-Century Studies of Communication

The past century has been an enormously productive one in regard to the analysis and description of human communication. Building on the ideas of Ferdinand de Saussure, early structuralists delineated the phonological and morphological building blocks of speech by refining and applying the concepts of the phoneme and the morpheme. In addition to the rigorous description of hundreds of indigenous languages, anthropological linguists using this body of data worked on the problem of language histories and the division of current languages into families of related languages with the concomitant contribution to cultural history. Another achievement was the demonstration that not only was language separate from physical

type, but also it was of equivalent complexity regardless of cultural complexity; in Edward Sapir's (1921) phrasing, "The lowliest South African Bushman speaks in the forms of a rich symbolic system that is in essence perfectly comparable to the speech of the cultivated Frenchman" (p. 22).

The second half of the 20th century was dominated by those who followed Noam Chomsky (1957) toward looking at the processes by which sentences are generated from an underlying assemblage of semantic, syntactic, and phrasal elements and their (re)arrangements through transformational cognitive processes. For both of these approaches—structural and generative—the symbolic role of communicative forms played little role. There was a concern with meaning, but it was really limited to its employment (1) as part of a method to uncover linguistic units (such as the use of the semantic difference necessary for identifying phonemic minimal pairs) or (2) as a lexical tagging element to prevent the generation (however correct in regard to the sequence of general syntactic classes) of semantically inappropriate sentences. A sentence such as "He ain't heavy, he's my sister" should not be generated due to the lack of semantic fit between the male pronouns and the term for a female sibling. But the interesting issue was not considered: how this expression could be used appropriately in regard to humor or sarcasm, for which the sentence might carry a distinctive symbolic weight in a particular discourse occurrence or strategy, or why it was in English if a possible choice of using, for example, Spanish, existed. This interest often was characterized under the name of pragmatics to distinguish it from the "true" or internal language systems of phonology, semantics, and grammar. Internal structure of language code, however absorbing as a research problem, is not by itself the salient element in human communication; it is the manner in which these code features are employed in human interaction within a cultural context.

The question of how speech was used in social expression and how it was evaluated by its users was raised in the last several decades of the 20th century under the banner of the sociology of language, or sociolinguistics, and the ethnography of language, or ethnolinguistics, and thus rapidly became the dominant orientation of linguistic anthropology. The research question was not so much how speech forms were constructed but what they signified as choices or alternatives in a complex field with several varieties of codes ranging from dialects, registers, and jargons within one "language" to different languages.

Joshua Fishman's (1968) work on minority language maintenance in the United States formed the field of sociolinguistics: language choice as a social issue and the interplay between national politics and ethnic identity. This was certainly not a new issue in the 20th century, but this work applied a more sophisticated understanding of language structure and employed a greater methodological rigor in determining the social and cultural place of a language in the communicative life of a community. The linguistic

implications of social behavior (and vice versa) were engaged as a valid research agenda. Numbers of speakers of each speech variety were tallied for different communities, language questionnaires were administered to identify how varieties were used across social space, frequencies of linguistic usage were measured, and diachronic studies were planned to determine how the allocation of speech forms was being maintained or shifted. In other words, speech behavior was considered to be a necessary concomitant to social behavior and their covariation a serious research objective.

Complementing the sociological approach was the more anthropological approach of Dell Hymes (1962) called the "ethnography of speaking." Here, the focus was on the cultural models that guided the speech behavior of the members of a community. What was it that a speaker (and hearer) needed to know about (and know how to carry out) in order to behave in an acceptable manner as a speaker? Essentially, what was required to be a human member of a community of communicators? Knowledge was required about different genres of speech acts, beliefs about kinds of speech and their speakers, when to talk in turn or interrupt and when to remain silent, using profane or sacred utterances, whom to speak with or about, what places are associated with which kinds of topics, and how to allocate the different available speech varieties in order to be polite or dominating. The ethnography of speaking was an ambitious undertaking that dealt with a very large and complex array of communicative knowledge and was committed to doing it across cultures. A crucial element in much of these studies was the determination of the symbolic value of the different codes and speech varieties that humans employed in their daily social communions. As much as language consisted of an intricate system of the arrangements of sound, meaning, and syntactic elements, it was not simply an elaborate tool to be used or not based on the vagaries or whim of the moment. It was a part of human identity and heritage, our past and what we stood for; as a first language, it was all that the phrase "mother tongue" connoted in terms of a powerful personal and ethnic identity.

Consequently, a large and continuing number of studies deal with language as a symbolic marker of ethnicity. Using a language is a social condition of being a particular kind of human, not only in the Whorfian sense of affecting how the world is perceived but also in the social sense of valid communicative membership in a community of other users. Language becomes a symbol of a state that transcends the act of speaking, one that defines one's place in the world and essential identity. In this vein, we shall examine three selected studies that may provide a base for looking into the 21st century: Jack Goody on writing, Ruth Finnegan on the nature of communicating, and Sol Worth on the growth and personal availability of visual representations of self.

Goody (1987), in *The Interface Between the Written and the Oral*, examined the potential changes that the advent of literacy had on humanity. Contesting the common assumption that the impact of literacy was one of

improvement, in the sense of a progressive change toward much greater rationality and enhanced thought, Goody's discussion deals with a much more complex intertwining of the effects of literacy (one should say "literacies") on human cultures. Certainly, the ability to physically store the products of human communication, whether or not these are phonetic or lexical, has the result of permitting the retrieval of certain kinds of communication without relying on the presence (and willingness) of the person(s) who produced the original communicative event. It also enables more time for reflective consideration of the contents of the communication, as well as analytic operations that are based in having access to a large number of written materials. It also opens a new realm of symbolic discourse whose topics are specific to written materials: pagination, fonts, first editions, citation, and bibliographies. It also adds to the symbolic notion of precedence and truth; Commentary A may not be accepted as "true" in contrast to Commentary B if B is written while A is oral.

It would be a mistake, according to Goody (1987), if oral communication were thus relegated to an inferior or less capable rank. Orality can support rationality and logic, and literate productions can certainly be false, or judged as less binding than oral communication. Yet, as we shall see below, this idea that the new medium of writing radically transformed human thought and brought into existence an enhanced human capability is pertinent to the consideration of communication in cyberspace, in particular communicative participation in Web-based domains.

Ruth Finnegan (2002), in *Communicating: The Multiple Modes of Human Communication*, wrote of the holistic dimensions of human communication, especially the aspects beyond speech and writing. We (other than those with sensory impairments) are enculturated to communicate in a field of visual, scent, and touch signals as much as sound. Furthermore, each of these categories of signaling is itself an array of different kinds of signals. Sound, for example, is not only simply what is produced by the vocal tract (however complex) but also what is produced by part of the human environment of speech communication—the rustling of a brocade garment, a babbling infant, the crackle of a hearth and the bubbling of a kettle, as well as the large variety of metalinguistic claps, coughs, whistles, and sighs. All of these signals overlap and are mutually reinforcing. Human communication is thus a global activity, and while one or another of the multiple channels for communicative signaling may be selected, with the others excluded or ignored, whatever might be gained with the narrow focus on one signal type must be lost through the attenuation of others. Cyberspace communication at the beginning of the 21st century necessarily possesses the symbolic limitation of sounds without touch, visual graphs, or images without scent, and the proxemic dimensions of a (small) two-dimensional screen (although three-dimensional simulation is often available). This dilemma will undoubtedly result in a number of avenues for further study, possibly the

technical development of packaging together multiple signaling capabilities or even a nostalgic return to the symbolic value of face-to-face communication.

Finally, Sol Worth (1999), in "Toward an Anthropological Politics of Symbolic Forms," has written a prescient article on the implications of a world in which individuals have open access to, and creative ownership of, visual productions (at a time when this capability was vested in videotape and hand-held photographic cameras, not the Web). The potential of individuals from all over the earth being able to produce and distribute their own symbolic representations of their world was predicted to be transformational, not only for anthropology in particular but also and essentially for humanity in general. This transformation would be vested in the creative, even idiosyncratic, elaboration of visual symbols. It would liberate humanity from a slavish reliance on what powerful publishers feel we should see to what everyone wants to show us. In its orientation, Worth's piece is remarkably similar to Michael Wesch's recent 2007 account of the inevitable tidal surge of Web-based productions on such sites as YouTube, which lists over 1 million hours of short visual programs every 6 months! That this capability will usher in a new era of human interconnection, information accessibility and transfer, and associated cultural forms is presented as a given. The issue is what will anthropology be able to do to incorporate this kind of world in its research agenda?

20th-Century Studies of Symbolism

Symbolism is coextensive with human life; we are "symboling" beings, and we exist in a symbolically constructed world. There are innumerable topical areas within cultural anthropology, but all of them, in one way or another, deal with our use of symbols in constructing meaning, in maintaining a sense of common bond with others, and in conceptualizing the structure of our world and how it operates. Rather than be limited to examining the content, or referential aspect, of symbols, linguistic anthropology has focused on relationships between this communicative content and the social forms with which they exist (praxis). Symbolic content is open-ended and productive, which provides symbols the power to be broadly adaptive and specifically useful in new contexts. Symbols are public in the sense that they are shared and continuously communicated, and they have emotional salience for those who employ them. Studies in the role of symbols, once the challenges of delineating their semantic and system properties are met, have looked at the contributions these have for human life. Victor Turner's (1967) *The Forest of Symbols: Aspects of Ndembu Ritual*, an examination of the use of symbols in the ritual process and how these are employed to resolve social conflict, is one example of this approach. Symbolic meaning that is able to unite disparate factions (at least temporarily) can be seen

as a common human use of the emotional efficacy of symbols. However, this function depends on the presence of symbolic commonality among the members of a community, and this cannot be taken for granted. Many studies of how symbols are used have shown that there may be considerable variation within a single community about the interpretation of symbolic content and an ongoing negotiation of this interpretation. Throughout the past century, American anthropology considered the effect of culture change, especially acculturation, on the shared value of symbols. The openness of symbol content also means that their content is subject to change and, in the acculturative process, different segments of a community—perhaps generational—will likely change their understanding of, even adherence to, certain symbols. This process is tied to the introduction of different channels of communication during culture change. As discussed above, writing may come packaged with new and different symbols. Written texts may be symbolically associated with “truth” or “importance.” In a similar vein, many assume that the new communicative technology of the Web will introduce new symbolic content. Following Worth (discussed above), one might have a sense of “freedom” from the constraints of social context or political authority.

Another dimension to the study of symbolism is the question of whether or not it has certain immutable properties that are assumed to be tied to the cognitive structure of the human brain. Claude Lévi-Strauss (1967), in *Structural Anthropology*, proposed that symbolic systems were composed of an essential duality—manifested, for example, as cooked-raw, wild-domesticated. Whether or not these structures are genetic, in the brain as opposed to in the mind, a considerable amount of research has gone into studying symbolic systems. One result has been the objection that descriptions of these systems may represent a more coherent array of meanings than are present or used by the members of a community. This difference is not based on culture change but rather on the idea that symbolic activity by humans incorporates a constant amount of ambiguity and uncertainty, especially in the presence of mutually incompatible symbolic meanings. This property gives rise to the orientation that symbols can, and should, be employed creatively and that it is a human privilege to expand symbolic reference and manipulation to their fullest limits. The presence of computer-assisted advanced communication technologies, such as virtual reality MOOs (multi-user object oriented domains), clearly is consistent with this orientation.

Some Current Studies of Communication and the Web

It is clear that anthropology will necessarily incorporate electronic forms of communication as part of its research agenda into human behavior and cognition. This should not be surprising, as it has already dealt with the presence of

literacy, radio and mass media, and e-mail. In fact, this kind of study is already in place and is growing, although now without certain methodological obstacles. Here we will examine three selected studies of Web-based activity and what their objectives and methods have been.

David Hakken (1999), in *Cyborgs@Cyberspace? An Ethnographer Looks to the Future*, presented the approach that advanced information technology (AIT), of which the Web is a prime example, should be examined as a (new) part of the human technological tool kit. His approach is based on the conclusion that humans have been “cyborgs”—part natural human, part technology-based device—for much of our species’ evolutionary development. Although there exist polar approaches that view AIT as either a benefit to our cyborgic nature or as a detriment to our natural need for socially vested information, Hakken steers between these in order to examine how various human groups actually make use of the Web and electronic communication (EC) systems. This practical, ethnographic approach is grounded in the anthropological axiom of firsthand observation. He starts with descriptions of particular groupings (e.g., a local government agency in Sheffield, England) and what their purposes are in embarking on the deliberate use of AIT. His analysis details what platforms are purchased, how access to these are set up, and who uses them and with what objectives. Planning strategies by user groups are observed as are the disputes that arise over such matters as costs, allocation of budget resources, and planning time lines.

One interesting conclusion that Hakken (1999) reached is that “computers” have often been assigned a symbolic efficacy beyond their capabilities. An economic challenge for a region should be solved by *having* “computers.” He sees many of the attempts to use AIT as “mixed” to the degree that some benefits were achieved while others were missed. A question of control was also raised. The symbolic promise of AIT is the freedom to access an unlimited amount of relevant information. However, in some cases, governments imposed strictures on this access. Software restrictions resulted in some kinds of access being more difficult than others, while in others, access to potentially useful databases were not open. In other words, computer-assisted practice was vested in the same kinds of social matrix as other kinds of social development projects with some due to technical issues and some even due to personal pettiness. The conclusion is that AIT does not significantly depart from existing human cultural and symbolic parameters. Hakken uses the term *culture-centered computing* to emphasize this point. Ethnographic methodology is quite suitable for this kind of study since the researcher is participating in the activities of a social group and can observe what they are doing in regard to this technological development. People can be asked about their activities, especially about the meanings they place on aspects of their activities and the devices they are using. The ethnographer is able to make useful inferences

concerning the operable symbolic system and check these against further behavior. New symbolic forms and rearrangements of the symbolic system will appear, especially in regard to “information” and “occupation,” but this is not a radical departure from the kinds of symbolic adaptation to new technology that has occurred throughout the human past.

Daniel Miller and Don Slater (2000), in *The Internet: An Ethnographic Approach*, contributed a somewhat different but related view of the impact of EC technology. Focusing on one locality, Trinidad, they investigate the particular manner in which Trinidadians have taken to the Internet. In this case, there is a celebration of the perceived capabilities of the Internet as an eminently appropriate vehicle for the symbolically valued character of being Trinidadian, or possessing “Trini-ness.” On one level, the Internet simply provides an effective and inexpensive means of staying in contact with friends and relatives who are scattered over the world; but on another level, this particular channel is symbolized as being designed for Trinis since it permits a varyingly creative, even consciously flamboyant, means of expression. It is certainly not symbolized as a threat or as impersonal technology but rather as a satisfying stylistic choice. This perception may well develop in other cultures; in the United States, for example, an e-mail note of appreciation for a gift or favor probably is displacing a handwritten letter although likely not for the same symbolic justification. Here, it is probably perceived as convenient and maybe efficient but not necessarily satisfyingly “American.” In Trinidad, businesses, schools, and even churches have eagerly adopted Internet and Web presences.

Miller and Slater (2000) described the involvement with the Internet as transformational, an “expansive potential” to create and expand a successful Trini identity. However, the question that must be raised is, What will be the efficacy of this attempt to create a vibrant Trini identity using the Internet? It is not a matter of whether or not the effort is possible but rather if it is feasible. As Hakken (1999) has shown, not all development projects using Web technology may be successful. Moreover, creations that are in cyberspace may only be “there,” satisfying, no doubt, but with little other impact. However attractive and exciting these creations may be, unless they have a salient impact on the real world, they have the quality of chimera. This is not to suggest that Trinidad’s ongoing fascination with the Internet is in the category of a symbolic illusion similar to a millenarian cult but rather to point out that other than for the human activity of play, cyberspace or Internet creations should yield practical outcomes.

The final study illustrates this last point above—the “reality” of Web-based activities. Tom Boellstorff (2008) in *Coming of Age in Second Life: An Anthropologist Explores the Virtually Human* took the position that the “unreality” or “virtuality” of Web-based domains is precisely their great and transformational contribution to

human experience. Second Life is a private, fee-based server that provides the software platform to enable people, once they are logged in, to create a persona (avatar) that is displayed on a computer screen along with other environmental features within the limits of the server. Other avatars with (or without) clothing and accessories, structures, furniture, hills, lakes, trees, and animal life are presented in an active mode that depicts a model of a human setting. As the name of this interactive system implies, what is depicted is akin to “life.” It is decidedly not a human simulation since what can take place online includes such unhuman capabilities as flying or being immediately transported from one site to another, appearing and disappearing from an online event (i.e., going on- or off-line), and appearing as a nonhuman avatar. Furthermore, avatars do not have to eat, eliminate, sweat, grow old, reproduce, or die. Still, Boellstorff presents this realm as an appropriate, even advantageous, manner of human existence. His ethnographic study is fully online within the confines of Second Life. The avatars he interacts with, observes, and talks with (even administers questionnaires to) are presented in the same manner as if he were studying a community. There are clearly methodological questions when identity is not known and the strictures of life are absent, but it is the symbolic dimension that is of interest here. The symbolic values of creativity, spontaneity, freedom, and play are dominant. These symbolic attributes are present in real human interaction, but in a virtual realm there are no limits other than those of nondisclosure and abusiveness for which a member might be censured and even banned. The virtual realm is valued as an improved human condition. The technological ability to construct and maintain this kind of activity creates a new set of symbols or at least a new dimension to the symbols of human life. Presenting oneself as an animal avatar may be no different from performing as a mummer in an animal costume, yet according to Boellstorff, in Second Life there is a seriousness and commitment to the guises that appears to be a potential rejection of one’s real visage.

Internet Creations and New Symbols

The existence and rapid development of Web devices, along with their extensive communicative power, has certainly created the need for new symbolic forms. However, the challenging issue is not really the new lexicon and meanings of devices and operating systems (such as cell phone and blog) but the rapidity by which these appear and are cast aside for new ones (such as Blackberry and Wiki).

Of greater significance is the lack of boundedness of the social groups involved in change. Millions of users from around the globe interact and are potentially involved (as creators or judges) in the creation of new terms, new meanings, and new programs. Anthropologists accepted that “rapid” culture change had to be accepted as an essential

part of the reality of contemporary cultures, and therefore has been studied beginning in the early 20th century under the umbrella term of *acculturation*. But *rapid* then meant within a generation; what can anthropology do when it occurs in hours and is instigated out of an amorphous, unknowable assemblage of users? This very speed has become symbolic of a new age of human interaction, one in which Zipf's law (that speech becomes more efficient over time by shortening words) is somewhat prophetic. David Crystal's 2001 work, *Language and the Internet*, illustrates the many abbreviated graphical forms that appear in text messaging from acronym-like forms using the first letters of a phrase (lol for "laughing out loud") to inventive pictorial forms using sundry letters and punctuation marks, such as ":-)" for a wink or a joking reference and "emoicons."

Anonymity

The absence of apparent or definite personal identification is not new with EC. Printed material could be the writings of anyone either listed as anonymous or with a pseudonym, the product of a group such as a government agency, or simply not given any specific authorship. There is also the production of print materials that are purported to possess definite authorship but that are, in fact, the products of other authors. In other words, print materials contain an opportunity for lying, an opportunity less available in speech. Of course, spoken lies occur (as well as modifications of an objective truth, such as exaggeration, satire, rationalization, etc.), but some person must utter the lie, and there is some connection to the identity and social membership of that person along with the ramifications of having produced the false message. Print removes any direct or face-to-face connection between sender and receiver. Yet even print has some restrictions. The very mechanism of preparing, producing, and distributing the materials provides some identification—but only after the fact, not during the communicative process. The sender is writing in the absence of the receiver or receivers, and the receiver is reading in the absence of the sender.

Indeed, this separation has been offered as one of the important advantages of print and one of the reasons why it occupied a significant role as authoritative messaging. The sender, not distracted by the vagaries of interpersonal interaction, could construct (and importantly, refine) a message focused on the requirements of reason and order, and the receiver, again not having to consider the sender's personal characteristics, could carefully consider those elements of reason and order discerned in a reading (and importantly, rereading) of the printed material. As Goody has shown, printing revolutionized the communication of meaning. Reason, logic, proof, and analysis, although certainly not absent from oral discourse, were especially enabled by writing. The symbolic value of a superordinate authority, especially science, dogma, and scripture, could be achieved. In particular, this was the case when printed materials were

laboriously constructed by intensive personal labor, but even going into this century, a printed version carries greater weight than what has been only spoken.

Still, the characteristic of anonymity is not inherent in writing, simply a possibility. Whether directly, through explicitly and authentic authorship, or indirectly, by a discovery process that determines authorship, print materials are typically considered to be authored in the sense of there being a person responsible. This identification becomes much more problematic in Web-based communication.

On the Web, there is no necessary condition of a real, or authentic, social identity. Other than the specification of the Internet address (e.g., Yahoo, Aol, or Hotmail) the identification that is prefixed to the sender's production is usually a matter of personal creativity. Or at least, even if the list of alphanumeric characters in the prefix may have some one-to-one connection with identity, such as first initials and birth date (*abc778@—*), this does not provide specific or usable social information.

Even educational addresses may only give a first initial and part of a surname. Even this is not done in a standard sequence (e.g., it may be obvious that *smithk@—* represents a person whose first name starts with K and whose last name is Smith, but this allocation breaks down with *bardon@—* or with *woidat@—*). More to the point, while some e-mail addresses are explicit (*Mary_Smith@—*), this is not a requirement for the vast number of senders. Moreover, the personal identification is not readily, or ever, available, if the Internet service provider maintains secrecy as to its users (other than perhaps through a court order). Anonymity is, thus, easily ensured.

To what extent will this condition affect the nature of messages and their symbolic characteristics? This will be a challenge that a 21st-century ethnography of Web communication will necessarily have to confront. One might suggest that anonymity has created a sort of liminal arena of discourse. Aside from the possibility that a sender's actual identity may, in fact, be able to be disclosed, while online and in electronic discourse, the sender is not John Smith, residing at 123 Fourth Street, whose parents are Mary and James Smith, but *toosmart23@aol.com*. As *toosmart23*, he can submit messages that may be socially unacceptable were John Smith to say these in a conversation. And this very freedom from the norms of social discourse is celebrated as a particular advantage of EC. Unlike the contribution that reason and logic gave to written materials, which can be considered an added responsibility for writers, anonymity strips away social repercussion other than what may issue forth from other senders, equally anonymous. This can be proffered as liberating and creative, since one can submit whatever one wishes (within the limits that some EC providers may establish as guidelines) without any concern with an evaluation by one's community of kin, friends, business associates, and others.

Symbolism is inherently a social construct, as discussed above. Symbolic forms derive their significance not only from their relative positioning within a semantic system but

also, and more important, from their usage within the praxis of a social group or community. One of the achievements of 20th-century symbolic anthropology is that symbols do not have inherent or universal meanings or significance. Rather, their referent properties/attributes are vested, or negotiated, in their continuing application in the life of a community. And in cyberspace, there does not seem to be a community.

The absence of a real community does not make studying this form of communicative behavior unimportant. An electronic realm of discourse and interaction is derived from real persons, operating from real settings, and performing real behavior (on keyboard and/or mouse) but in a not-real realm. Certainly, there are absorbing research questions about what humans do in this kind of realm, and especially, the linkages between their real and nonreal worlds. However, a more intriguing question is what the symbolic characteristics of this nonreal realm will develop to be—even whether there will be a “development” in the sense of a progression toward some sort of cultural/symbolic charter generally accepted by those in the virtual realm (or their avatars), or whether there will be continually changing symbolic representations according to which persons (and their avatars) are present and likely tied to the apparently limitless permutations of creative virtual activities and relationships. It may very well be that people use their avatars to take their real-world symbols in limited and predictable directions. Many descriptions describe the virtual worlds they enter as not being too different, in essential attributes, from their real world. One enters, meets others, selects those who are interesting, jointly engages in interactive activities (such as playing a game or conversing or going to a party), and then departs. This is very much like an active party scene in a hip urban neighborhood—regardless of what the virtual form and behavioral capabilities may exhibit (animals, giants, or dwarves and flying, teleporting, or shape changing). Social symbols, such as prestige, sophistication, admiration, exclusion, cooperation, commitment, et cetera, are transferred and remain operable in the nonreal realm. In somewhat the same way as examining what humans do when they believe themselves to be alone and not observed, virtual worlds may provide an opportunity for persons to behave in ways derived from their anonymity. Yet there may be some inability for human operators to shed their real-life social personage and treat the nonreal interactions as free of any repercussions to their social selves. In other words, we may not be able to be completely virtual, independent of any derivative orientations from our real social condition. Web communication may thus only provide another environment in which to extend our already culturally delineated selves rather than becoming the transformational portal into a new order of being.

Virtuality

The ability to fly, to become any form of your choosing, and to construct objects literally by simply thinking about

them—these are attributes of a virtual realm. This is not, of course, new or new because of the Web. Storytellers have taken their listeners into similar realms, with concomitant morphing abilities undoubtedly from the first appearance of our capacity to symbolize. Dramatically compelling accounts of beings that could fly, change their shape, and bring worlds into creation by willing them to exist are widespread among human cultures. Indeed, it may be the case that the creative achievements of a gifted storyteller have yet to be equaled (if they ever will be) by the platform capabilities of a virtual realm, including the variegated input design products by its inhabitant avatars. Such is the power of human symbolic generation with our open and productive language system that an oral (or even written) performance of a creation myth cycle is able to create mental images of realms and actions perhaps not yet present in any virtual realm.

Yet descriptive accounts of cyberspace realms, such as *Second Life* or *World of Warcraft*, demonstrate that being an “inworlder” (player) provides a dizzying array of choices absent from the real world. Moreover, within some limits, these choices are individually realized, or idiosyncratic (other than those avatars that are run by more than one person in real life). In fact, this is supposedly the lure of virtuality—one can be truly free of real-life social controls and instead express one’s creative individuality.

This opportunity to operate as a virtual individual (even if the virtual platform offers, or even encourages, access to group or community interaction) raises some interesting questions regarding the function of symbols in the virtual world. While symbols can be studied in isolation from human social reality as systems of relationships among universal motifs or qualities (theft of fire from gods, nature versus culture, and so on.), during the 20th century, anthropology has preferred to examine how symbols served the societies who employed them. This functional approach (e.g., that of Victor Turner) would base a symbolic anthropology on ethnography. Even the semiotic approach of earlier linguistic anthropology (as with Sapir) would base the study of symbols on the language structure and the use of language by a community. Symbols were not “free-floating” essences whose significance derived from a primordial or panhuman meaning. Symbols had work to do in the operation of meaningful human life.

This pragmatic approach to the meaning of symbols will have to undergo considerable reworking in order to be applied in a virtual realm. Certainly, many areas of human life will necessarily be absent in a virtual world. Certain life cycle landmarks could not occur, such as reproduction, birth, puberty, senescence, and death, and therefore could have no (or only attenuated) symbolic form. Perhaps reproduction might be argued to have a similar symbolic nature in a virtual world since sexual activity is certainly present in the interactions among avatars. Consequently, avatars can be guided through a variety of sexual encounters, and these may be viewed as resulting in pleasurable (or not) outcomes. However, the symbolic content of reproduction

is much more extensive than sex (however much the act itself may constitute a powerful component of reproductive symbolization) and intertwined throughout much of a society's cultural system due to the physical concomitants of community existence. Awareness of connections to each partner's past, even the sensation of descent and the transmission of a life force; a place, not just for the sex act, but as a home with the presence of kin, children, in-laws, and neighbors whose activity can be sensed as well as the sounds and smells of sexual activity; the carnality of perspiration and effluvia; and especially, the likely biological result of pregnancy—all of these and more are necessarily absent. And shorn of its physical senses, this would not be the same kind of human world (e.g., Finnegan's emphasis on the importance of taking into consideration the other dimensions of communication).

Conclusion

Cyberspace is not likely to disappear from human experience. Anthropology will necessarily have to take an active interest in this experience and attempt to achieve a useful analytic understanding of its parameters. Studying it as an adjunct to human affairs, as a device and set of skills, and as what communities do with it (such as in Hakken, 1999) should not pose too many challenges to a rigorous ethnography of communication activity. Even the creation of new symbols and symbolic arrangements based on the probable development of new uses and applications should be achievable through participant observation.

The real challenges will come with having to deal with activity in a not-real realm of interaction with an involvement of very large numbers of anonymous users existing in a mode that encourages deception of artifice (if only for playful purposes). Boellstorff (2008) claimed to have begun and even partially achieved this kind of ethnography of this new world and its symbols. It will remain to be seen if there is even a possibility of replication and restudy, as there should be (whether or not actually done), in real-life ethnography. If symbols can be created and discarded literally at will and this is largely an idiosyncratic act of personal play, it should be extremely challenging to study cyberspace symbolic systems as exhibiting outcomes. Turner's work on liminality located the conditions of this realm within a symbolic system that provided parameters for the separateness of a particular liminal space and time. But when the realm itself—a virtual reality—is itself essentially liminal, it will be difficult to work out its symbolic properties. However, as growing numbers of people engage in this kind of activity, anthropology will have

little choice but to follow the kind of work done by cyberspace ethnographers, such as Boellstorff, and attempt to be observant participants in Web worlds.

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STORYTELLING

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Once upon a time, before words were written, before cultures and societies were observed and analyzed, there was storytelling. Storytelling has been a part of humanity since people were able to communicate and respond to the basic biological urge to explain, educate, and enlighten. Cave drawings, traditional dances, poems, songs, and chants are all examples of early storytelling. Stories pass on historical, cultural, and moral information, and they provide escape and relief from the everyday struggle to survive. Storytelling takes place in all cultures in a variety of different forms. Studying these forms requires an interdisciplinary approach involving anthropology, psychology, linguistics, history, library science, theater, media studies, and other related disciplines. New technologies and new approaches have brought about a renewed interest in the varied aspects and elements of storytelling, broadening our understanding of, and appreciation for, its complexity.

What Is Storytelling?

Defining *storytelling* is not a simple matter. Scholars from a variety of disciplines, professional and amateur storytellers, and members of the communities where the stories dwell have not come to a consensus on what defines storytelling. Scholars tend to place storytelling within the broader topic of folklore, a term also surrounded by

debate, but generally agreed to be the beliefs, practices, and tales of a people that are passed on primarily through oral tradition. The complexity of defining storytelling continues with debates regarding the meanings of the words *story* and *teller*. There is agreement that storytelling, in its simplest form, is the act of communicating an event (or sequence of events) to an audience, using words and/or physical movement.

This simplified explanation of storytelling does not capture the interactive, cultural, and living essence of storytelling. It is necessary to look at more details that include the origin of the story (oral or written); the *who*, *what*, *where*, *when*, and *why* of the performance; the type of story; and the emotional and cultural implications of the storytelling event. The finer points of these details are debated and discussed among those attempting to provide a definition of storytelling.

Traditional Versus Nontraditional

Much of the debate in the definition of storytelling stems from the acceptance or denial of the different types of storytelling. Some scholars accept only the traditional forms of storytelling, the strictly oral, that is, nonwritten communication of a story that has always been passed down orally, never written. The traditional forms of storytelling are considered to be the unadulterated forms of oral tradition, stories shared within a group passed down

through the generations by people regarded as experts in the telling of an event. The stories from this tradition are culturally significant, often religious or spiritual, and deeply tied to the traditions of the community. In traditional storytelling, there is usually a trained, experienced narrator or professional storyteller. Examples of traditional storytelling are myths and legends. Nontraditional forms of storytelling can be told by nonprofessionals, embrace different methods of delivery, and present stories that are not necessarily only oral traditions. Contemporary examples of nontraditional storytelling are urban legends, personal narratives or vernacular storytelling, and original stories crafted by a storyteller.

Oral Versus Written

The conflict between oral and written is often at the heart of the struggle to define storytelling. Purists will claim that storytelling is the continuance of an oral tradition only, excluding any texts that have been written. However, this exclusion is difficult, considering that many ancient oral traditions have been written down in order to be preserved and were never studied in their actual oral form. The only way that modern culture has access to such oral traditions, such as the epic poem *The Odyssey*, is through its written version. Walter Ong (1982) explored the relationships between the oral and the written in his book *Orality and Literacy*, which is often cited by current scholars who seek to present distinctions between oral and written storytelling. These scholars have explored and presented terms such as *oral literature*, *narrative literature*, and *literary tradition* to distinguish the oral from the written. Folklorist Jack Zipes (1994) pointed out that the oral tradition was not replaced by the literary tradition but rather there is evidence that the literary traditions are influenced by the oral traditions. Stith Thompson (1951) also spoke about the difficulty of separating written and oral traditions in his book. A purely oral tradition in storytelling not only excludes written traditions, but also overlooks new technologies. It is generally agreed that simply reading a text is not storytelling. However, taking that text and breathing life into it during a performance is considered by some to be as valid a storytelling event as recounting an oral legend.

Formal Versus Informal

Descriptions of storytelling are usually of formal events, such as a bard singing an epic poem or an elder teaching children their creation story. Early scholars and some professional storytellers will emphasize such formal events in their discussions of storytelling. However, there also exists the no less important act of informal storytelling. A formal storytelling event takes place when there is an audience that has gathered for the specific purpose of listening to a story. The storyteller has selected specific stories to share with the expected audience. Examples of formal storytelling include

epic poems performed in theater, elders in a community sharing experience with the younger members, teachers telling stories in the classroom, ghost stories at campfire gatherings, and storytelling at festivals. Informal storytelling is the kind of storytelling that takes place everyday with everyone. Everyone is a storyteller in informal storytelling. Recounting the day's events at the dinner table, passing an urban legend on to a friend, and sharing a family memory are examples of informal storytelling.

Historically, the descriptive details of storytelling fell to the folklorists and anthropologists, who were the greatest contributors to the earliest scholarly studies on storytelling. German folklorists Jacob and Wilhelm Grimm, British folklorist Andrew Lang, and American folklorist Stith Thompson were some of the first to look at folklore and storytelling academically. It is important, however, that the definitions provided by individuals from other disciplines (art, library science, history, psychology, and religious studies) and the storytellers themselves are not ignored. Such definitions emphasize the emotional, artistic, and professional element of storytelling. It is best to consider all of the details when working toward a definition of storytelling.

The National Storytelling Network broadly describes storytelling as "an ancient art form and a valuable form of human expression." This general description acknowledges the diversity and broad scope of storytelling. Its Web site (www.storynet.org) describes storytelling as containing the following five elements: interactive, uses words, uses actions, presents a story, and encourages the active imagination of the listeners.

While previous definitions of storytelling tend to be narrow and biased toward the discipline conducting the research, current attempts, such as from the National Storytelling Network, are more inclusive. Today's definitions are careful to acknowledge that all definitions of storytelling are relevant. Recent scholarship on storytelling does not attempt to dispute previous definitions but, instead, embraces the different theories for a complete interdisciplinary understanding of the term. Storytellers Carol Birch and Melissa Heckler (1996) attempted to bridge the "philosophical, professional, academic, regional and cultural divides" (p. 9) that take place when defining storytelling. According to them, one of the most challenging aspects of the study of storytelling is in its respecting all of the different models that are presented by the various groups who study and analyze storytelling.

One of the ways this challenge is met is by approaching the definition of storytelling by focusing on its function and history, emphasizing less of the aesthetic elements and focusing more on the role within society. These functions of storytelling include education (of children and adults), socialization, validation, explanation, passing on of historical and societal information, and entertainment. Understanding why people tell stories and what purpose the act of storytelling serves are important parts of

defining the term. The most widely read and accepted functional study is William Bascom's (1965b) "Four Functions of Folklore." These four functions are summarized in Leeming and Sader (1997) as providing escape from reality, validating one's culture, educating, and maintaining conformity. Other functional approaches include Margaret Read MacDonald's (1999) "Fifty Functions of Storytelling" and Robert Georges's (1969) "Toward an Understanding of Storytelling Events."

To accommodate the different types of storytelling presented in this chapter, the term *storytelling* will be broadly defined as the culturally important act of presenting an event or a series of events, true or fictional, through some form of communication (oral, written, or visual) to an audience that is or is not present at the time of the presentation. Storytelling is a vital part of all cultures past, present, and future. The details as to how and why it got that way continues to be debated and discussed.

Origins of Storytelling

Discussions regarding the history of storytelling frequently present the statement that storytelling has been called the oldest and the newest of the arts. Individual authors' interpretations of this vary, but it is apparent that storytelling has been around since humans have been able to communicate. In preliterate societies, the oral and visual traditions were the only way to pass on important historical and cultural information. The act of passing this information on to the next generation in songs, chants, pictures, dances, and stories is storytelling. As with the definition of storytelling, the theories on the origins of storytelling vary according to scholars of different disciplines. Each discipline focuses on specific theories and provides evidence to support them. Storyteller Ann Pellowski (1990) provided a nice summation of the many theories addressing the cultural, historical, and psychological significance of storytelling. These theories include the emergence of the storytelling form as a basic human need for sharing their experiences with others, a need to provide entertainment, a need for beauty and form, and a need to record history and social norms.

This need for beauty and form was met by talented and skilled individuals who could provide an aesthetic performance of the events. In the early days of storytelling, everyone was a storyteller, for example, individuals chanting, singing, and telling stories within family units and within their communities. It is theorized that as time went on, some people became better at telling stories and honed their skills in order to become professionals. These talented professionals are the earliest examples of traditional storytellers, known by different names worldwide. Parkinson (2009) presented descriptions of some, including bard (Europe), seanachie (Ireland), ashik (Turkey), and griot (West Africa). These individuals were charged with preserving history and culture while also entertaining through

formal storytelling events. A vital element of society, storytellers were held in high regard by their communities. The function of traditional storytellers has changed with the advent of written history, but these individuals continue to be necessary in order to educate and entertain.

"Tell Me a Story"

When discussing storytelling, the word *story* is generically used to describe the event being communicated. These events have also been called folk narratives, oral literature, or more specifically by their individual classifications, such as myth, legend, or folktale. In general, use of the term story is inclusive, though perhaps not altogether accurate. The *Oxford English Dictionary (OED)* defines story as, "a narrative, true or presumed to be true, relating to important events and celebrated persons of a more or less remote past; a historical relation or anecdote." This definition describes legends and myths, but it is at odds with the description of fairy tales and other tales that are not always presumed to be true and do not always relate important events or celebrated persons.

The term *narrative* is often used when discussing storytelling, so exploring the word narrative may lead to a better understanding of the meaning of story. The *OED* definition for narrative is "an account of a series of events, facts, etc., given in order and with the establishing of connections between them." This statement appears to describe the events. However, more flexibility is necessary in order to allow for modifications in the order of events and connections. The definitions provided by the *OED* do not sufficiently capture the essence of the word story in storytelling. The "story" in storytelling is alive, changing each time it is told, depending on the teller, the audience, the context, and the intent. This modification through time and culture is a significant aspect of the definition of story. The adaptability of a story to the needs and intents of a storyteller and an audience is vital to the nature of storytelling.

The dictionary definitions do not capture all of the meaning of the word story within the context of storytelling. In some cases, the word *folktale* is used in lieu of story. Used in this context, the term folktale is used to describe any type of story. This, however, leads to some confusion as the term folktale is also often used to describe a specific type of narrative. American folklorist and anthropologist William Bascom (1973) proposed the term *verbal art* to refer to a subcategory in folklore that included myths, legends, fables, riddles, and tales. This term, however, was never widely adopted. The word story remains the most accepted way to describe the traditional and nontraditional narratives performed by a storyteller.

Traditional: Märchen and Sagen

One of the first documented attempts at cataloging and classification of stories was by Jacob and Wilhelm Grimm

of Germany. The Brothers Grimm, or Grimm Brothers, have become synonymous with children's fairy tales, with much credit given to them for their compilation and presentation of traditional stories. In their publication, *Kinder und Hausmärchen (Children's and Household Tales)*, the brothers divide their collected stories into two categories, Märchen and Sagen. Märchen can best be described as enchanted tales, or fairy tales. While not all Märchen include actual fairies, the characters and events in these stories are magical, involving the supernatural and taking place in mysterious realms. Sagen is the term used to define stories that are historical, taking place in the actual past, with mostly human characters. The closest English translation for this term is "legend" and should not be confused with the word *saga*, which is used to specifically refer to the legends of Scandinavian cultures. Märchen is still widely used today to refer to any sort of tale that involves the supernatural and is used interchangeably with fairy tale, folktale, magic tale, and fable. Legend has generally replaced the use of the term Sagen to refer to the traditional, historical stories of a culture.

As others followed in the footsteps of the Grimm Brothers, more categories and subcategories were developed to classify the different types of stories that were encountered in the field. Some stories did not fit neatly into the Grimm Brother's categories and needed their own place. One such type of story is myth, which can be thought of as a combination of Märchen and Sagen as it is a historical, heroic story with magical creatures and a supernatural element.

The challenge of assigning stories to specific classifications was taken on by those who sought to collect, classify, and analyze them. These individuals were the earliest known folklorists. In the early 1900s, Antti Aarne, a Finnish folklorist, wrote, *The Types of the Folktale; A Classification and Bibliography*. She assigned a type number to the tales, attempting to classify the known stories of the time. In 1932, her work was updated by American folklorist Stith Thompson, and published as *Motif-Index of Folk-Literature: A Classification of Narrative Elements in Folk-Tales, Ballads, Myths, Fables, Medieval Romances, Exempla, Fabliaux, Jest-Books, and Local Legends*. The update to Aarne's classic work included further clarification of the type by looking at the individual elements of the story (location, characters, and lessons), along with the story as a whole. Each recurring narrative theme or motif of a tale was classified and assigned a motif number. It was in this classification of stories that the earliest scholars began to see similarities in the oral traditions around the world, prompting further scholarly study of the stories within a culture's folklore.

The classification of stories continues to challenge scholars today, especially with the emergence and discovery of new, nontraditional stories. William Bascom (1965a) proposed the use of the term *prose narrative* to describe a category within verbal art that included three

traditional types of stories: legend (Sagen), folktale (Märchen), and myth. Terms such as *fairy tale*, *fable*, *saga*, *tall tale*, *animal tale*, *hero tale*, and *epic* can generally be assigned to one of these three categories, though not all will agree with these distinctions. Some nontraditional stories, such as urban legends, are also found within these headings, but other nontraditional stories, such as personal narratives, require their own category.

Legend

While there is no direct translation of the Grimm Brother's classification *Sagen*, the English word that best describes the meaning is legend. The word *legend* has its roots in the Greek and Latin words for "to gather, to read." The direct translation of the German word Sagen is "to say." The combination of these concepts results in the basic idea of storytelling itself: gathering, reading, and saying. Earliest use of the word legend was in reference to the lives of Christian saints, which were written down but shared orally and considered to be true. Through time, however, use of the term legend began to mean the unbelievable or impossible, which is not an accurate description. In describing the events of individuals in present space and past time, legends are considered to be the most historical and believable type of story.

Legends may be considered the most historical type of story, but it is important to note that they are not history. They are historical in nature because they are assumed to be true, even if they are not verifiable. Legends take place in a specific time and location in the present world, unlike the supernatural worlds of other story types. The characters in legends are real people and true historical figures, but the events are not always true to history. The characters in legends can be common folk and unnamed individuals or specifically named kings and heroes. The events, while not historically accurate, are considered to be real events in the sense that they are believable and plausible. Common themes in legends are the struggle against evil and superhuman feats of courage, strength, and intellect. Legends are localized, deeply tied in with the religion and culture of a region. Folklorists, anthropologists, psychologists, and other scholars look to legends to help understand the history, religion, and culture of the legends' owners. Some examples of well-known legends are those of King Arthur, Johnny Appleseed, Davy Crockett, and Jesse James. Epics and hero tales, such as *The Aeneid* and *The Iliad*, meet the criteria for legend and are often included under the broader label of legend.

Folktales

The Grimm Brothers used the term Märchen to refer to tales of wonder and magic. They distinguished these from the historical Sagen because these magical tales are accepted as fictional narratives of less than likely to be real

events. A popular translation of Märchen is “fairy tale,” as many of the stories involve the actions of small magical beings known as fairies. The terms *fairy tale* and *folktale* have been used interchangeably. Specifically, only those tales that have fairies as characters are true examples of fairy tales, but the term has been broadened to include stories without small magical beings. The term folktale is used to refer to any traditional narrative, written or oral, that is assumed to be false. The broad term folktale includes tall tales, animal tales, fables, and fairy tales. The characters in folktales are usually humans alongside animals (some with human traits), trolls, ogres, fairies, witches, goblins, and other magical creatures. The events in a folktale take place “Once upon a time,” meaning that they do not refer to specific times and events as legends and myths do. This lack of specification is a key element of folktales, allowing for the appearance of the same tale across many cultures. For example, there are several instances of “Cinderella” stories in various cultures, each with its local customs and characters, all with the same underlying plot and theme. Folktales, unlike myths and legends, are not intended to be taken as serious lessons on history and culture. Their main purpose is to entertain, though there are examples of folktales, such as Aesop’s fables, that teach morals and warn against bad behavior.

Myth

Myths, like legends, are considered to be accounts of true events. Unlike legends, myths take place in a remote time and space. The events in myth occur in a world that exists well before the current world, or sometimes even in a different world. The characters in myth are supernatural, usually deities, animals, or humans with special powers. The word *myth* comes from the Greek *mythos*, “to make a sound with the mouth” and has been incorrectly used to describe untrue statements or beliefs. Despite their supernatural nature, myths are considered to be truths, in many cases, religious truths. Myths are deeply rooted in a culture’s belief system and tied to their spiritual and personal understanding of the world around them. Myths serve to celebrate origins, explain mysteries such as natural disasters, and soothe fears of the unknown. Well-known examples of myths are the stories of the Greek and Roman gods and goddesses, and the creation myths of North American Indians. Due to their religious and philosophical nature, myths have garnered the attention of scholars from those disciplines as well as folklorists and anthropologists. According to Segal (1996), anthropologists such as Franz Boas and Ruth Benedict have looked to myth to help explain cultures and their belief systems. While anthropologists and folklorists include myth within the realm of folklore, there are scholars who look at myth exclusively. These scholars consider themselves to be mythologists and their collection and study of myths to be mythology. Comparative mythology takes the extra step of comparing myths of different cultures, looking for universal themes and

origins. Important scholars of myth include E. B. Tylor, Max Müller, James Frazer, Joseph Campbell, and Jaan Puhvel.

Nontraditional: Urban and Contemporary

Nontraditional stories are those stories that are not considered to be a direct part of or a descendent of a communities’ oral tradition. They do not fit the description of myth, legend, or folktale, though they may share characteristics with these traditional forms. More contemporary in nature, nontraditional stories transcend the traditional model of story, adding deeper dimensions to the definition of storytelling. Not all of the mentioned forms of nontraditional storytelling are recognized by everyone to be true forms of storytelling.

Urban Legend

Originally, stories collected by scholars came from the oral tradition of rural areas. In the first half of the 20th century, scholars began to look to the stories, both oral and written, being passed around in cities. Scholars referred to these as urban legends, contemporary legends, or modern legends. The spread of urban legends takes place informally through casual conversation and different modes of media (newspaper, e-mail, etc.). Urban legends differ from traditional legends in that they lack specific names and times. The characters in the legends are often a “friend-of-a-friend’s friend,” the place is not always specified, and the time is the recent past. The details are vague, providing room for modification and adaptation. Like traditional legends, these stories are presumed to be true or at least based on true events. The themes are cautionary, usually warning and advising the listener, and less historic and heroic than traditional legends.

Early folklorists took note of the commonalities in urban legends among different cultures. In the past, it was less likely that these stories had been spread from culture to culture but more likely that the common themes were universal. Today, the origins of specific urban legends are less apparent as they are spread and modified so quickly in today’s global communication via e-mail, blogs, social-networking sites, and video-sharing sites. These legends are consistently changing and being adapted to the time and place where they are transmitted. Examples of different variations across cultures have been explored by American folklorist Jan Harold Brunvand (1981). His book, *The Vanishing Hitchhiker: American Urban Legends and Their Meaning*, was the first of many in which he provides descriptions and variations of common urban legends, such as the vanishing hitchhiker, spiders in the hair, and a murderer hiding in the trunk. The popularity of urban legends in the United States today is proven by the many books, Web sites, and even television shows that attempt to collect, prove, and debunk the myriad stories about that “friend-of-a-friend’s friend” and their unfortunate experiences.

Personal Narrative

Personal narratives are the individual stories of a person or group of people. They are presented in both formal and informal settings and through diverse mediums. An example of formal personal narrative is StoryCorps (www.storycorps.org), “whose mission is to honor and celebrate one another’s lives through listening.” StoryCorps provides people with the means to record and archive the stories of themselves and their loved ones. Another example provided is the theatrical performance of one’s life story, or vernacular storytelling (Preston, 1995). Informal personal narrative takes place everyday as part of daily conversation. Personal narratives are the true stories of real people, told by the actual person experiencing the events. Telling one’s own story is an important way to pass on family history, influence and teach younger generations, and even provide therapeutic or psychological healing.

Organizational Stories

The power and influence of a good story has not gone unnoticed by organizations. Organizational stories include stories told both within and without organization. Stories within the organization serve to inspire, educate, and help members make sense of the organization. The stories usually involve the leadership of the organization in day-to-day events. These stories can serve to validate the corporate culture through everyday examples as well as provide a personal side to management. Raspa (1999) provided an example where the CEO of IBM does not have his ID to gain entrance to a secure area. The guard refuses him entry, even though she recognizes him. He calmly waits while someone is sent to get his ID card. This story provides those within the organization with assurance and security as to the importance of doing their job, regardless of who is in front of them. Many organization stories have made their way into the public, such as the legend of how a Post-it note was created. Raspa describes how an employee was first denied permission to conduct the research but ended up doing it on his own time. When the successful product was launched, he was eventually rewarded for his diligence. Stories like these help the public remember a product and at the same time provide positive reinforcement about the company that makes the product. Some instances of organizational stories can actually be considered advertisements. Another form of organizational story is when individuals in leadership positions use personal narratives to inspire others. The story of great success through hardship is often repeated by politicians and business leaders in order to provide their audiences with an emotional connection and understanding of them personally.

Digital Stories

According to Fields and Diaz (2008), a digital story is a video that conveys a dramatic point, using any combination

of images, video, music, and voiceover. The majority of digital stories are personal narratives, as individuals and organizations use this technology in order to share events in their lives with a large audience. Digital stories are created by amateurs and professionals with a variety of tools. They take place formally and informally. In 1990, the Center for Digital Storytelling (www.storycenter.org/about.html) was founded in order to “assist people in using digital media to tell meaningful stories from their lives.” The center teams with communities and organizations to create formal digital story events, such as the Capture Wales project for the British Broadcasting Corporation (BBC) (www.bbc.co.uk/wales/audiovideo/sites/galleries/pages/capturewales.shtml). The center also provides information and workshops for teachers who are interested in using digital stories in the classroom and for individuals interested in creating their own digital stories. Digital stories are active and in some cases collaborated on by many individuals. This sense of community in creation continues in the presentation. Fields and Diaz (2008) explained that a digital story allows people to connect socially beyond their communities with a diverse and vast audience. Vastly different from the early scholars’ ideas of traditional storytelling, digital storytelling provides a new dimension to the study of storytelling.

The Study of Storytelling

The first acknowledged scholarly work about stories is Jacob and Wilhelm Grimm’s publication *Kinder und Hausmärchen* (1812). Prior to this publication, the legends and lore of a culture were not highly regarded by intellectuals. There are previous examples of collectors of tales such as Charles Perrault who collected and transcribed children’s fairy tales at the end of the 17th century. However, these collections were thought to be childish and primitive and not given much scholarly attention.

The Brothers Grimm are considered to be the first to introduce the fieldwork research method involved in collecting stories. They did not distinguish between oral and written stories; all the stories they encountered were transcribed. According to Kamenetsky (1992), there was some disagreement between the two when it came to presenting the collected stories. Jacob felt that the stories should remain unaltered, while Wilhelm wished to modify the stories to be more literary. The final outcome produced stories that were modified yet remained loyal to the tradition of the story.

The Grimms’s work inspired other scholars around the world to collect and present their country’s stories. Early collectors include Alexander Afansyev (Russia), Joseph Jacobs (England), Peter Asbjornsen (Scandinavia), and Jeremiah Curtin (Ireland). As stories were collected and presented, scholars began to see similarities in themes. These themes were cataloged and classified in Aarne and Thompson’s (1961) *The Types of the Folktale*. The collection of stories

and other oral traditions (riddles, songs, etc.) came to be known as folklore, and those who studied it were folklorists.

By the beginning of the 20th century, scholars had recognized connections between these stories and other academic disciplines, such as mythology (already its own academic field), anthropology, and ethnography. In Leeming and Sader (1997), it is stated that the British scholar Andrew Lang is attributed with being one of the first to recognize these connections. Other contributors to these connections include Vladimir Prop, James Frazer, Stith Thompson, and Franz Boas.

The connection with anthropology in American academia is evident in the fact that much of the early study of folklore occurred within anthropology departments. According to R. M. Dorson (1972), The American Folklore Society, founded in 1888, was sustained by anthropologists. As anthropologists began to see storytelling as a vital part of the cultures they observed, the study of folklore took on more prominence. Anthropologists such as Ruth Benedict and Franz Boas had previously explored the importance of myth in a culture. These studies were expanded to include all stories as being valuable to culture. Dorson (1972) explained that Franz Boas encouraged his students to collect and analyze the oral literature of a culture. This action made the collecting of stories a valid part of anthropological fieldwork. The connection between anthropology and folklore is also evident in the statement by Dorson (1972) that members of the English Folklore Society referred to themselves as anthropological folklorists.

For many years, folklore studies were included within anthropology departments and courses. It is stated in Leeming and Sader (1997) that American folklorist Stith Thompson taught the first folklore class at Indiana University. While also working on the update of Aarne's classification system, Thompson and his students began working toward the legitimization of folklore as a separate academic department. At the same time that folklore was working to establish itself in the world of academia, storytelling was becoming popular in libraries. According to Pellowski (1990), by 1927 most libraries had begun to conduct scheduled storytelling events. The storytelling in these events was based on the written word, with librarians being trained to make the stories come to life. These practitioners of storytelling in libraries and other public places are no less important to the field than the academics who research it. Librarians and storytellers such as Augusta Baker and her students Ellin Green and Anne Pellowski have contributed a great deal to the discussion and definition of storytelling.

Brunvand (1976) explained that, in the 1950s and 1960s, folklorists began to flex their independence from anthropology departments. Folklorist Richard Dorson was a strong advocate for folklore as an independent discipline. He replaced Stith Thompson at the Indiana University where the first Department of Folklore was established in 1963. With the establishment of more departments and

courses specific to folklore, academics from different backgrounds turned toward folklore. This led to different perspectives and new ideas, and during the 1960s, the traditional study of folklore was challenged.

Early scholars of folklore focused on the oral and written traditions of mostly nonliterate cultures. The focus of these scholars was on the actual text of the stories. Collectors transcribed and recorded the words, often ignoring the context of the story's performance. In the 1960s, American folklorist Richard Bauman introduced a method of looking at the text within its performance. Bauman (1986) encouraged his peers to include the teller, tale, audience, and occasion in looking at the whole storytelling event. This method has been adopted by most researchers today. Descriptions of this method of fieldwork are included in Jaber Gubrium's *Analyzing Narrative Reality* (2009) and Bauman's *Story, Performance, and Event: Contextual Studies of Oral Narrative* (1986).

As more recent studies focus on the performance and emotional aspects of the field, storytelling has moved from being a part of the field of folklore to being recognized by some as its own interdisciplinary field. Already appearing in library science departments due to the tradition of children's storytelling, courses on storytelling are now being taught in departments of communication arts, anthropology, folklore, liberal studies, education, media studies, information studies, theater, art, writing, psychology, and even business and management. Courses range from the history and theory of storytelling to its technique and practice. A few schools worldwide offer advanced degrees in the field.

The theory and practice of storytelling are not limited to academia. Professional storytellers have been learning and studying storytelling along with trained academics. Before there were professional organizations, storytellers passed their knowledge and skills through inheritance, guilds, and apprenticeships. Today, storytellers learn the art in a variety of additional ways. Pellowski (1990) described five ways in which storytellers are trained: through inherited function or office, apprenticeship by guild, apprenticeship by individual, school (formal and informal), and imitation. Storytellers perpetuate their art through workshops, festivals, publications, and organizations. Publications include practical advice and how-to guides on conducting effective storytelling events.

While American universities were trying to determine where folklore and storytelling should reside, professional storytellers were trying to keep the art of storytelling alive. According to storyteller Joseph Sobol (1999), a storytelling revival took place in the United States beginning in the 1970s. In response to this renewed interest in the art of storytelling, the first National Storytelling Festival took place in 1973 in Jonesborough, Tennessee. Two years after this successful festival, the National Association for the Perpetuation and Preservation of Storytelling was formed. Currently known as the National Storytelling Network

(renamed in 1994), this organization is a place for storytellers to connect with each other in order to share, learn, and improve the art of storytelling. Special interest groups within the network address contemporary uses of storytelling, such as storytelling in organizations, uses of storytelling in higher education, and therapeutic storytelling. Internationally, organizations are also addressing the importance of storytelling. In a global environment, more people are able to connect through the universal human need to tell a story. The International Storytelling Center (www.storytellingcenter.net) focuses on the power of storytelling to elicit understanding among cultures and change in the world.

The power of storytelling is universally accepted by both academics and professionals. They do not, however, always agree on the theories, approaches, and definitions of storytelling. As storytelling studies develop, the paths of academics and professionals are getting closer, bringing the emotional and spiritual to the theoretical and practical. There are examples of individuals who have been able to bridge the divide between the academic and professional worlds by teaching and performing. Helping to build this bridge is a journal that, according to its inaugural issue (Sobol, Gentile, & Sunwolf, 2004), seeks to “create a marriage of emotionally connected research and intellectually open, exploratory storytelling.” The editors and reviewers of *Storytelling, Self, Society: An Interdisciplinary Journal of Storytelling Studies* are both academics and professionals. Using both perspectives, the journal seeks to explore the applied fields of storytelling (organizational, educational, therapeutic, etc.) while remaining dedicated to the artistic and performance studies of traditional storytelling studies.

Current Trends

The importance and value of storytelling to all cultures has been proven by a number of researchers in a variety of areas. As a distinct part of every culture, it can be determined that storytelling is vital to all human civilizations. Traditionally, the term *storytelling* has conjured up images of children’s bedtime stories, rural folk spinning yarns, epic poems, and tribal chants. All of these images are indeed examples of storytelling, but storytelling is no longer limited to these images. Storytelling also takes place everyday in our own here and now. Storytelling occurs around us—influencing, teaching, healing, and entertaining us. Storytelling’s ability to enrapture an audience has brought it the attention of politicians, corporations, therapists, and governments. Current trends involve the application of storytelling in untraditional places and uncustomary ways.

Stories have always appeared everywhere in the day-to-day events. Now however, they are showing up in unconventional areas, such as in the corporate boardroom, in advertizing, on the campaign trail, and on the therapist’s

couch. Corporations are embracing storytelling as a means not only to define their culture for their workers, but also to present themselves in a positive way to their consumers. Advertisements for a variety of products include stories of the designers, creators, and users. Politicians have recognized the importance of storytelling to connect with audiences. Political candidates attempt to personalize their cause, providing personal narratives of their own while also presenting the stories of their supporters and constituents. Therapists are acknowledging the healing powers of storytelling and listening to stories, as people attempt to make sense of their surroundings.

Education has always been a function of storytelling, and storytelling has always been a part of education. Current trends, however, place a stronger emphasis on the use of storytelling in education. While stories have been included in the classroom during story hours or free time, stories have begun to appear within the curriculum of all subjects. Educators, like politicians and corporations, see storytelling as a tool to inspire and influence. Not only are stories being presented to students, but also students are learning how to create and share their own stories through digital storytelling.

As with many disciplines, current trends flow toward the new technology that is available. Storytelling and storytelling studies are no different since they are spreading to a digital platform. While nontraditional areas are embracing storytelling, storytellers, both amateur and professional, are embracing new technologies to continue to entertain and engage audiences in traditional and nontraditional ways.

Technology and the Future

Storytelling began as a way to educate and entertain using the current forms of communication available to humans: words and gestures. As communication technology developed, so did the nature of storytelling. With the written word came the ability to write down the stories and share them among other communities. As technologies grew, so too did the reach of storytelling. Stories have been spread over the phone, via fax, in e-mails, on radio, television, film, and through other forms of media. New forms of communication have allowed not only for the broader dissemination of stories but also for unique experiences for both the teller and the listener. Storytelling is no longer limited to the live performance of an event in front of a single audience. It is an understatement to say that the Internet has had a profound effect on storytelling. With the emergence of collaborative and communicative applications, known as Web 2.0, storytelling has reached more listeners and inspired more creators while also providing a connection between the two. The rise of technology has been blamed for a decrease in the oral tradition and a loss of traditional storytelling. However, recent examples might

argue that technology is strengthening both traditional and contemporary storytelling by making it available to a larger audience.

Audio

As soon as the technology became available, collectors of stories began to record the spoken words of storytellers. These recordings were used for the purposes of transcription and not often made available to other researchers or the public. Fortunately, with the change in emphasis from text to context, researchers began to share the audio events. Audio has allowed not only for improvements in fieldwork but also for the sharing of stories in the way in which they were intended. The act of storytelling implies that there is a listener. Audio technology allows for listeners, even if they are not present at the time of the telling. Recordings and radio have been the usual technology for transmitting stories. Recently, podcasting has become a fixture in the storytelling world. Podcasting is similar to radio but without some of the limitations of radio. A listener is not limited to the time that the event is being produced but has the option of listening at a more convenient time. Podcasts may be downloaded and used with mobile technologies. Podcasting is performed by both professionals and amateurs, as recordings can be created by and are easy to use with inexpensive software. Public libraries have embraced podcasting as a way to expand their storytelling services to a wider audience rather than only to those who can attend the events in person. Podcasting has provided exposure to storytellers who were once known only locally, making their stories available globally.

Visual

Some of the earliest examples of storytelling are pictographs and drawings. Humans were able to convey historical and culturally important events through pictures. Technology today has allowed for a return to this simple form of storytelling. Digital technology allows for the ease of capturing and sharing digital images. These images can be put together to form a story or a sequence of events. Sites that provide global sharing of pictures such as Flickr (www.flickr.com), provide a forum for the telling of visual stories.

Video has had an influential role in both the study of storytelling and storytelling itself. With an emphasis on the entire context of a story performance, the addition of video technology to fieldwork has greatly improved a researcher's ability to analyze an event. Digital stories, or videos depicting an event or a sequence of events, are by far the greatest example of the effect of technology on storytelling today. The emergence of digital stories has provided a new dimension to the world of storytelling. Professional, amateur, traditional, nontraditional, formal, and informal stories all meet in digital space, sharing

audiences and crossing boundaries. Video-sharing sites, such as YouTube (www.youtube.com), return storytelling to the age when everyone was a storyteller, providing the platform for anyone to share their stories.

Social

Storytelling is social in nature, bringing together a teller and a listener and connecting them with a shared emotional experience. New technologies are providing more outlets for the sharing of information, emotions, ideas, and day-to-day events. Social-networking software, or applications that allow for the sharing of pictures, Web sites, articles, audio, or video, are in heavy use today. These applications not only allow a person to share their stories but also provide a forum for comment, questions, and conversation. Social networks create communities and conversations, connecting the teller and listener as with traditional storytelling events. An interesting question for the future is whether the personal narratives told on blogs, microblogs, and social-networking sites can be defined as stories.

The Future

In a sense, storytelling is ageless and timeless. It has always been and is not likely to cease to be, as long as humans are able to communicate. The past is not forgotten simply because there is a new future. Instead, the future is built on past stories and previous studies. The role of the storyteller may not be easily defined, but there will always be a teller of stories. The definition of story may be disputed, but the fact that the events, however they are classified, are important to the teller and the listener is not argued. The future of storytelling studies is moving toward an interdisciplinary cooperation with storytelling professionals. Storytelling itself builds on its past while embracing technologies of the future. Specifically with the community-driven and social technologies, storytelling will be shared, created, and enjoyed by broader audiences than ever before. These social and sharing technologies offer an interesting outlook for the future of storytelling.

Conclusion

Telling and listening to stories bring a community together with a shared emotional event that helps them relate to each other and to the world around them. Along with the need to pass on vital cultural, historical, and moral information, there is an innate human need to provide explanations for things that are not understood. While storytelling perpetuates cultural heritage and helps individuals make sense of the world, it also fulfills a basic biological need for entertainment and escape. The function of storytelling has not changed but the means by which storytelling takes place has. Storytelling has moved

from the formal tradition of oration by a professional to a 3-minute video of a 10-year-old interviewing their veteran grandfather for a school project. The importance of storytelling continues today as it did in the past. Future storytellers may find other ways to present narratives of events, but their ancestors' traditions of storytelling will always be a part of the event.

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MASS MEDIA AND ANTHROPOLOGY

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According to *Merriam-Webster's Dictionary*, a *medium* is a channel or an intervening agency by means of which something is conveyed or accomplished. By this definition, languages and rituals are probably the examples of the earliest forms of media because ideas of belonging are conveyed and contested through words, rites, ceremonies, and practices. Also, just as all other kinds of media, rituals, as Victor Turner (1974) noted, have a sensory aspect, that is, they engage our senses of sight and sound and have an ideological aspect. They convey important messages. Thus, the study of human society cannot proceed without looking at the media, and both the language and the ritual have been concerns of the anthropologists for a long time. Yet the study of mass media has to emerge as a separate subdiscipline in anthropology because of the improvements and spread of technologies of mass communication and mediation on an unprecedented scale in the post-World War II era. This ubiquity of media worldwide made it increasingly difficult for anthropologists to study rituals and interactions without looking at how they take place in settings saturated with information, images, sounds, and ideas dished out by different kinds of media, such as television, photography, film, radio, and the Internet. Such empirical urgency led the anthropologists to understand the significance of mass media in the lives of the people whom they study. Thus, to emphasize the centrality of mass media to life in the late 20th century, Arjun Appadurai (1991) invented the concept

of “mediascapes” in the early 1990s. During the same time, Debra Spitulnik (1993) pointed out a major lacuna in anthropological understanding of human society by announcing that “there is as yet no anthropology of mass media” (p. 293). Since the 1990s, anthropologists have been deeply engaged in study of mass media and have, thereby, contributed much to the understanding of the media-saturated world in all its aspects. Therefore, the theoretical understanding of media-related social practices has advanced so much that Spitulnik’s lament seems untenable in the 21st century. The following is a brief overview of the major theoretical and methodological contributions that the study of mass media has made to the general understanding of nationalism, globalization, modernity, and society.

Theory

The Anthropological Perspective on Mass Media: Questions the Anthropologist Asks

The invention of printing in the 1400s and appearance of newspapers in the 1600s were watershed moments in human history. Since then, developments and improvements in mass media technologies not only transformed the way space and time was experienced and imagined, but

they also changed intimate relations among individuals and groups. Therefore, an anthropological perspective on mass media is chiefly concerned with people's engagement with media and how that shapes their ideas of themselves and of the intimate and the distant, the places and peoples, and economic, political, religious, and cultural actions and their practices. Thus, ethnographic studies of production, transmission and reception of mass-mediated images, sounds, and ideas are concerned with how media technologies mediate between people rather than simply looking at the effects of media on individuals. The questions that anthropologists explore are: What meanings do individuals and groups make out of mass-mediated images and sounds? How do they negotiate ideas, practices of domination, power, and stereotyping embedded in the mass-mediated programs? How do media technologies enable new forms of social interaction? How do existing social formations, such as the nation, the state, and ethnic groups, get transformed? How does engagement with media transform the conceptions of space and time? How and to what effect do the marginalized groups use mass media?

Although anthropology came late to the study of mass media, the latter as a domain of inquiry had a profound effect on anthropology's core concept—culture. Faye Ginsberg, Lila Abu-Lughod, and Brian Larkin (2002) wrote that for many years mass media were seen as almost a taboo topic for anthropology, “too redolent of Western modernity for a field identified with tradition, the non-Western, and vitality and authenticity of the local culture” (p. 4). In the post-World War II era, anthropologists working in non-Western settings routinely encountered processes in which media played an increasingly important part. For example, Lila Abu-Lughod (1993), one of the pioneers of the subfield that emerged in recent years, came across rapid commercialization of local popular songs among the Bedouins in Egypt and observed the ensuing generational conflicts depicted in national media forms, such as radio soap operas. Abu-Lughod (1993) questioned the “otherness” of the non-Western societies, and it made her rethink the bounded character of one's field site. Such doubts, which challenged the fundamentals of anthropology, had serious implications for the axiomatic understanding of postwar social and political geographies. An analysis of porous boundaries meant that the anthropologists were more attentive to the flows and traffic of people, goods, images, and sounds across the geographical spheres that were also imagined in temporal terms of *modern* and *traditional*. Thus, rural and urban and/or first and third worlds came to share the same geographical and historical space. Consequent ruptures in anthropological theories and methodology of the 1980s and 1990s led to the development of the “anthropology of the present” (Fox, 1991). Anthropologists recognized that they work in societies where media were more central and that electronic media were influencing societies once considered beyond their reach. These shifts catalyzed a critical reorganization of the

concept of culture by unleashing the concept from its traditional “bounded” moorings.

Recognition of the role that the mass media played brought the mediated quality of culture to the foreground. Thus, Louisa Schein (2002) stated that “the way the people understand who they are and how they belong is never anterior to, indeed is inseparable from, the kinds of media they use or consume” (p. 231). In other words, self-understanding and identity is not given to one in its authentic form, but it is produced, of course, within relationships of power and domination and is constituted within a system of representation.

Representations

Representation and systems of representation are key concepts in the anthropology of mass media. According to Stuart Hall (1997), the meaning is produced, communicated, and understood within systems of representation. The systems of representations work like languages, not because they are spoken or written but because they all use some element to stand for, or represent, what we want to say and to express. They communicate a thought, concept, idea, or feeling. Sounds, musical notes, words, items of clothing, facial expressions, gestures, body movements, and digitally produced dots on the screen do not have any clear meaning in themselves, but they signify. They operate as symbols and carry meanings as vehicles or media. In short, they function as signs. It is in these webs of signification that we make sense of ourselves.

Thus, Hall (1997) framed the study of mass media in terms of production and reception or encoding and decoding of meanings within systems of representations. This encoding/decoding formulation allowed for multiple interpretations of media texts during the process of production and reception. However, Hall was quick to point out that representational strategies prevalent in media practice try to fix the meanings of images, sound bytes, and visuals. Power, Hall argued, works through such representational strategies, such as those that try to fix the meanings and thereby invoke an ideal viewer/listener. Nonetheless, Hall emphasized the active participation of the audience and actors involved in the production of media. Audiences interpret and read the media texts in ways other than what has been intentioned in the strategies of who control the production of the media text. Thus, meaning of mass mediated images and sounds are slippery. Hall brought to media studies a perspective that went beyond the model of mass media as simply a tool in the hands of the authorities to propagate their images and views of the world. Hall's model provided anthropologists with a theoretical framework to study production, dissemination, and reception of media ethnographically.

The Medium and the Message

While Hall emphasized the importance of participation and representations in communication, Debra Spitulnik (1993)

turned our attention to technological forms of mediation and social contexts in which such technologies are appropriated. While Hall's encoding/decoding model helps us to imagine an active audience, an attention to technologies of mediation helps us to realize how a medium shapes the social relations and the audience's perception. For Marshall McLuhan (1964), the message of any medium or technology is in the way it changes the scale or pace or pattern of human interaction and affairs. McLuhan connected the rise of the print media to increased individualism, social separation, continuity of space and time, uniformity of codes, and nationalism. McLuhan's contentions were reasserted by Benedict Anderson (1991), who showed that print media was one of the necessary factors for the spread of nationalist consciousness. Nationalist consciousness was not simply produced through the nationalist thought and rhetoric that the print media disseminated. Equally important, the print media enabled participation of millions of people in the practice of imagining an inclusive community.

This ability of the mass media to facilitate the imagination of social entities—larger than those arising from the immediate and concrete contexts—inextricably links the study of mass media with discussions on identities arising out of nationalism and transnationalism. The national frame of reference with which citizens of a nation tend to identify is partly produced through media productions, and the idea of nation is continuously in formation. Spitulnik (1999) showed that radio helped create the postcolonial nation in Zambia by formalizing language hierarchies in a multilingual state, influencing speech styles, signifying modernity itself, and even embodying the state. Similarly, Purnima Mankekar (1999) argued that the televised Indian epic *Ramayan* “might have participated in reconfigurations of nation, culture, and community that overlapped with and reinforced Hindu nationalism” in the early 1990s. The televised epic, Mankekar notes, was part of a sociohistorical conjuncture in which inclusion and exclusion within the Indian national community was constructed in terms of being a Hindu. Also, the media may transform nationalistic feelings for the purposes of specific commercial imperatives of selling commodities to a particular group. Arlene Davila (1999) examined the construction of “Latinidad” by the U.S. Hispanic advertising industry. Davila's work leads us to the consideration of the relationships between the media and capitalism and the state and corporate powers. One of the pioneering studies in this area was carried out by the American anthropologist Hortense Powdermaker (1950). While doing her fieldwork in a small town in Mississippi, Powdermaker was struck by the fact that going to the movies was the primary source of entertainment for her survey respondents and other residents of the town. This realization led Powdermaker to carry out an ethnography of the Hollywood film industry from 1946 to 1947. Although she produced a very dense and insightful ethnography of the Hollywood film industry, her theoretical conclusions

were partly influenced by the theorists of the Frankfurt school such as Max Horkheimer and Theodor Adorno. Powdermaker concluded that Hollywood represents totalitarianism because the overriding profit motive underlying formulaic and dehumanized Hollywood productions not only “mechanizes” creativity, but also makes the audience passive by making it conform to certain aesthetic standards of entertainment. Thus, for Powdermaker, the film industry was an organ of mass deception in capitalist society dominated by big corporations, which hinders the development of autonomous and independent individuals.

Media and Power: Transnationalism, Capitalism, and Multiple Modernities

However, the relationship between the media and the state and corporate interests are more complex than it is often thought. Media are also used by activists and indigenous groups, which is discussed later. But what implications do the contradictory interests of the state have for the media? Ruth Mandel (2002) studied the reception of a television serial called “Crossroads” produced by a private British company as part of a British government-funded project for teaching capitalism to communists in the post-Soviet state of Kazakhstan. Mandel shows how a Thatcherite propaganda tool for teaching privatization, market reform, and democracy to ex-Soviet citizens was repeatedly hijacked and transformed—even derailed—until ultimately it became, at least in part, the voice of a nationalized highly censored, state-controlled media empire not dissimilar from its Soviet predecessor. But such Kazakhstan state-censored broadcasts were also used to transmit diverse and competing messages outside the domain of the state censors. Similarly, Mayfair Yang's (1994) ethnography of post-Mao China draws attention to the contradictions arising out of the Chinese state's embrace of capitalism and encouragement of links for investment to overseas Chinese. The overseas, or pan-Chinese, connections thrive through films, popular music, and television from the mainland. Such transnational subjectivities and desires threaten to shake the authority of the communist regime.

Mayfair Yang's ethnography of media practices in post-Mao China brings a new perspective to the anthropology of mass media, which also studies how media productions circulate across the boundaries of nations. Anthropologists have tried to go beyond the dominant framework of cultural imperialism of the West or cultural resistance of indigenous people. The popularity of Hindi films in places beyond the Hindi-speaking part of the Indian subcontinent and in diverse locations, such as Egypt, Kenya, Japan, and Nigeria, underscores the significance of the alternative circuits of media flows that operate outside the West. Also, there are circulations of small media serving an audience of diasporic communities as Yang has shown. Another very important example of circulation of small media is the

circuit of Hmong videos that span across continents. Louisa Schein (2002) studied how the Hmong, who came to the United States after the end of the Vietnam War, have developed both a pop music world of their own and a thriving video industry. Through these videos, Schein notes that Hmongs not only create a community that transcends the boundaries of nations but also market it as transnational and emphasize the role of the Hmongs Central Intelligence Agency (CIA) recruits during the Vietnam War. Schein theorizes the effect of such media circuits in terms of the concept of “transnational subjectification.” While national subjectification is an understanding of oneself as a citizen of one nation, transnational subjectification is an anchoring of one’s identity in transnational interstitial space. For the Hmong such a transnational space has deep historical significance in terms of wars and conflicts with dominant groups in various nations.

The cultural imperialism model of looking at transnational media circulation has also been complicated by Richard Wilk (1994) in his study of the consequences of the introduction of direct access to U.S. television in Belize through a satellite hookup. Such access to U.S. television, Wilk argues, gave the people in Belize a sense of coevalness that disturbs their ideas about themselves making them feel backward or lagging behind the metropole. Instead, such access reinforced an idea of nationhood in the minds of people who could see the difference between Belize and the United States in terms of cultural difference rather than a historical time lag.

The cultural imperialism model has been further complicated by anthropologists of the media who discovered that ideas and practices generated by circulation of non-Western films, television serials, and popular songs create new sensibilities signifying modernity in various countries. In his study of media in northern Nigeria, for example, Brian Larkin (1997) used the concept of parallel modernities to describe the worlds of those who are not mobile but who, nonetheless, through media participate in imagined realities of other cultures as part of their daily lives. Larkin argues that spectacles and plots of Indian films and their indigenization in a local genre of *soyyaya* (“songs”) books as well as in locally produced videos offer Hausa youth of Nigeria a medium to consider what it means to be modern. Similarly, in Kathmandu, Nepal, circulation of Hindi and Hollywood films, “teen” magazines, pirated cassettes, and interactive radio shows create a transnational public sphere that provides the experience of modernity as a space of imagined possibilities defined by commodities (Liechty, 1994). Thus, media circulation, production, and reception occur within political, economic contexts that define access to cultural and material resources and occur within the constant gaze of the state trying to control its representations to the citizens. Yet new subjectivities and sensibilities and networks that surpass the national and state borders emerge to form a transnational public sphere that span geolinguistic regions and beyond.

As we can see, ethnographic studies enable subtle understanding of operation of power and actions of individuals and groups by looking at influences of state ideologies, histories of migration, and transborder connections on reception and appropriation of images, sounds, and ideas dished up by various kinds of media. Ethnographic focus on particular sites of production makes anthropology of mass media richer. Thus, recent work on media has been described as bifocal as it attends to both the institutional structures and the agency and circumstances of cultural producers. These works emphasize how producers of programs imagine the audience. For example, Barry Dornfeld (1998) demonstrated that the production of a 7-hour educational documentary series on childhood for American public television entails complex negotiations. The audience, Dornfeld shows, is not only anticipated but is also constructed and reconstructed at every stage of the production. Public television workers bring certain assumptions about the particular class fraction of “the American public” that they imagine and hope will watch their work.

Ginsburg, Abu-Lughod, and Larkin (2002) commented that media technologies are not neutral. Each new medium impresses on society not simply new interpersonal relations. But a medium transforms one’s relations to the body and perception and to time and space as theorists from McLuhan (1964) to Jack Goody (1977), Walter Ong (1991), Jean Baudrillard (1984), and Friedrich Kittler (1999) have argued. In recent years, Brian Larkin (1997) has examined the ways in which cinema halls were part of the construction of public space under colonial rule in Nigeria. Cinema halls along with other new spaces, such as libraries, parks, and theaters, created new modes of racial, social, and sexual interaction that raised anxieties about social hierarchies and spatial segregation in Nigeria.

Use of Media Technology in Anthropology

So far we have seen how anthropologists have engaged with questions of production and contestation of identities in a mass-mediated world. An equally important and closely related concern has been the use of media technologies in the production of truth. By emphasizing the mediated quality of truth, anthropologists not only question positivist celebration of value-free science but also turn the critical lens of inquiry on themselves as figures who authoritatively comment on others. Margaret Mead and Gregory Bateson introduced the use of camera (both still and moving) in their 1930s research on Balinese culture and personality. Although they disagreed on how to use camera, they accepted that the camera constituted a privileged medium for scientific research (see Askew, 2002). Similarly, Franz Boas encouraged the use of phonograph for documentation purposes. Use of media technology in early ethnography reflected the positivist concern for truth, objectivity, and science. Photography, however, was never an innocent technology. Photography was used

in categorization and classification of human subjects, especially the criminal, the mentally ill, and the culturally exotic. Yet careful scrutiny of who was photographed and under what conditions reveals in every case a whole host of precursory judgments that negates the purported objectivity of the medium (Askew, 2002). Similarly, by analyzing the photographs in *National Geographic*, Catherine Lutz and Jane Collins show that the magazine relies on two intertwined strategies in the marketplace of images. *National Geographic's* reputation is built on humanism—that under the skin all humans are basically the same. But this foundational idea contradicts the Western common-sense knowledge about the hierarchy of races. Thus, they demonstrate how photographs and the stories told through them in the *National Geographic* reflect the Euro-American notion that the people of color are poor, dirty, technologically backward, and superstitious. They further argue that photographs also distinguish bronze people from black by portraying the former as less poor and more technologically adept than the latter. An idea of a fatalistic link between skin color and progress underlie the so-called objective photographs of the *National Geographic*, contend Lutz and Collins.

Media and Activism

The use of media technologies and perpetuation of power and dominance has been a well-commented topic. The marshalling of media technologies in modernization and racialization projects, which often lead to genocides, is not uncommon. However, McLuhan and others viewed media technologies as tools available to disenfranchised members of society that can be used to undermine existing power relations and to instigate societal change. Since the 1980s, indigenous and minority peoples have begun to take up a range of media in order to talk back to structures of power that have distorted their interests and realities. Such cultural activism, as Ginsburg, Abu-Lughod, and Larkin (1997) called it, emphasizes the political agency and the ability to intervene in the production of the representations. George Marcus and Michael Fischer (1986) identified an activist imaginary in such cultural productions that tends to pursue not only broad-based social change through identity and representation but also produces a utopian desire for “emancipation” by raising fresh issues about citizenship and public sphere.

However, indigenous and marginalized use of media raises many debates and questions about representations of culture. Mediation of an objectified culture to an urban or Western audience can create political cultural assets that can be deployed to make moral and economic claims over land. But many scholars also question if the objectification also results in a paradox of primitivism that often distort the processes that indigenous people are committed to preserving. Ginsburg (1991) suggested that indigenous use of media presents a kind of Faustian contract with technologies of

modernity, enabling some degree of agency to control representation under less-than-ideal conditions. Daniel Miller (1992) accepted the objectification of indigenous or local cultures but said that an anthropologist's first concern is not to resolve these contradictions in theory but to observe how people sometimes resolve or commonly live out these contradictions in local practice.

Methodological Issues and Future Directions

Media and Methodological Issues in Anthropology

Anthropological studies of production, distribution, and reception of mass media not only help us see mass media in a different way, but the studies also have left a deep influence on the way anthropologists do fieldwork and conceive of culture. Thus, Abu-Lughod (1993) has argued that the study of media forces us to represent people in distant villages as part of the same cultural worlds we inhabit—worlds of mass media, consumption, and dispersed communities of the imagination. Yet William Mazzarella (2004) noted a contradiction in narratives of globalization. He points out that in the various discourses on globalization and its implication, there is a growing awareness of the role media and mediation in people's lives; however, there is also a simultaneous disavowal of mediation. This tendency, Mazzarella says, manifests itself in the ideas of “resurgence of the local,” “cultural proximity,” and “hybridity” (p. 352). The celebration of the local is based on the assumption that we value things, which we know from our immediate surroundings. Such assumptions and ideas give rise to a substantialist or essentialist or “unmediated” view of culture. Accounts and analyses based on such assumptions tend to portray the media as something that happen to or are imposed on already-constituted local worlds. The local, in this view, is composed of a certain set of cultural values and practices in which media intrude in beneficial or deleterious ways. But rarely is it acknowledged that mediation and its attendant cultural politics necessarily precede the arrival of what we commonly recognize as “media”: that, in fact, local worlds are necessarily already the outcome of more or less stable, more or less local social technologies of mediation.

Thus, William Mazzarella (2004) and Rosalind Morris (2007) proposed to push anthropology of media and globalization further in order to develop an anthropology of mediation. Mediation, Mazzarella claims, is the general foundation of social and cultural life. Mediation, for Mazzarella, does not simply constitute what we conventionally understand as our lives represented in television, newspaper, and radio; the ritual is itself already a medium that facilitates self-understandings by routing the personal through the collective or the impersonal, the near through

the far, the self through the other, and the real through the virtual. Therefore, study of mediation entails the study of the intersections, tensions, and collaborations of various systems of mediation, which includes ritual practices, as well as the production and consumption of images, sounds, and stories, dished out by the media.

The analytic of mediation helps anthropologists to do away with dichotomies such as outside and inside, global and local, technology and culture, or real and virtual. Thus, Daniel Miller and Don Slater (2000), in laying out an ethnographic approach to the study of the Internet, avoid treating the Internet as global technology that is appropriated in a locale or society. Their study of Internet practices in Trinidad shows that, contrary to the expectations, uses of the Internet are not opposed to “traditional” or “real” forms of relationship, especially kinship. The Internet, Miller and Slater find, is strongly continuous with those values that were developed first in kinship and later through the experience of mass consumption. Thus, they conclude that online and offline worlds penetrate each other deeply and in complex ways. People use the Internet to realize older concepts of identity or to pursue new modes of sociality.

In the next section, we will briefly touch on the ways of designing and executing an ethnographic project to study mass media.

Studying Media Ethnographically

The review of anthropological works on media studies gives us a range of perspectives from which one can come up with a hypothesis or a research question for carrying out an ethnographic research. For example, one may look at use of the newspaper as a source of information that forms political opinion and shapes political behavior and practice. With such a broad area in mind, the first step would be to narrow the topic of newspaper reading in two ways. One should identify one or more particular sectors of the society and sample population for studying the practices associated with newspapers in those sectors or groups. Nonetheless, one should be open to whatever one comes across. Miller and Slater in their study of the Internet used anything that seemed relevant to their understanding of Internet-related practices in Trinidad. Second, one should also try to identify an anthropological problem from certain theoretical perspectives, which has been discussed.

Carrying out the ethnography will require interviewing individuals and groups and observing them in their everyday settings. The questions that will be asked and the things that will be observed will partially depend on the theoretical framework one uses. But one must be open to details because it is the details that help one to contribute to the theoretical understanding of the mass media and the practices that they entail. The aim should not be to make statements that allow us to generalize about all people but to reveal something about the way that particular people behave in the world. The goal is to gain insight into some

of the characteristic ways people use media (e.g., news in case of newspapers) and the information that they give to relate to the wider structures and the people around them. Therefore, interviews should always be matched with what people do. Only by combining observation and interviews can one achieve what Daniel Miller (1992) said is the first concern of the anthropologists; it is not to resolve the everyday contradictions of individuals and groups in theory but to observe how people sometimes resolve or commonly live out these contradictions in various contexts.

Conclusion

In this short review of anthropology of mass media, we see that the study of mass media by the anthropologists has contributed as much to the understanding of media as it has enriched anthropology. Engagement with mass media has subtly shifted anthropology's focus from understanding human beings to how human beings understand themselves. The key point that all anthropological studies of mass media with their focus on production, reception, use, and appropriation of representations emphasize, is that the human interactions and identities have a mediated quality. Thus, the dichotomies between oral and literate cultures and societies with or without mass media or between immediate, or face-to-face, and mediated encounters are false dichotomies. Power, identities, and collectivities always emerge by routing or mediating the self through the other and the near through the far. Anthropology's primary task, therefore, is to look at how various technologies of mediation, such as television, radio, cinema, newspapers, and also rituals, languages, and symbolic practices, interact and to study the tensions and collaborations between these technologies and contradictions in self-understanding arising out of such interactions. Ethnographies must engage with how such tensions and contradictions are reconciled and lived with in different contexts and circumstances.

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PART V

APPLIED ANTHROPOLOGY

APPLIED ANTHROPOLOGY

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This chapter explores the subject of applied anthropology. It was found to be most productive to do this from a historical perspective in order to see the formation of the discipline from its earliest, inchoate form to its current state. This method lends a processual understanding of how applied anthropology arrived at the state in which it is found in early 21st-century anthropology.

The chapter commences with a brief definition of applied anthropology in both its broader and more restrictive senses. What follows then is an examination of the origins of applied anthropology within the matrix of anthropology, generally, in the 19th century. The early history of the discipline through the post–World War II, or mid-20th century, era is explored in the next section. The mid-20th-century era was dominated by three subjects: the Fox Project, the Peru Vicos Project, and Project Camelot, which is treated separately. The section on the later 20th century leads into applied anthropology today, which is followed by a section on areas for future research.

Without doubt, some readers will question why particular topics are not presented in this chapter. To them, the reply is that some subjects were considered to be just as easily, and perhaps more fully, discussed in other chapters. In other cases, the sections were perceived as becoming too large to the point of confusing the discussions. In some cases, articles published in some applied anthropology

journals did not appear to do anything but describe situations without offering practical, applied solutions. It is hoped that this interpretation will not be taken personally by any authors or other scholars.

What Is Applied Anthropology?

Applied anthropology, in its broader sense, is distinguished primarily from academic anthropology as anthropological methods and data put to use outside of the classroom. This is not to say that all anthropological methods and data put to use outside of the classroom is applied anthropology; field research also is anthropological methods and data put to use outside of the classroom, but it can be used for academic purposes, as well as for practical application. Applied anthropology is used to solve practical problems outside of the academic world, and it has appeared under such names as action anthropology, development anthropology, practicing anthropology, and advocacy anthropology among others.

In its narrower sense, applied anthropology is distinguished from practicing anthropology. Practicing anthropology is the application of anthropology strictly outside of academia by nonacademics; applied anthropology can be practiced outside of academia or within academia by academics. To some, the differences are considered to be minimal, but to others they are of great importance.

Origins

Early in the 19th century, anthropology was a religious philosophy that examined how to view the place of humans in the cosmos. This began to change by the mid-19th century, and people who were to become the founders of what is called anthropology today began to look at the more earthly nature of humanity. One of these individuals was Lewis Henry Morgan. Morgan, who was an attorney, began to work with the Iroquois in the 1840s on legal issues involving railroad right of ways. This may have been one of the first, if not the first, application of the nascent but as yet still inchoate discipline.

Across the Atlantic, Sir Edward Burnett Tylor, the “father of anthropology” who defined “culture,” considered anthropology to be a “policy science” that should be implemented to ameliorate the problems of humanity. James Hunt, who founded the Anthropological Society of London, began to use the term *practical anthropology* by the 1860s, and in 1869, the Royal Anthropological Institute of Great Britain and Ireland (this was later to be titled the Royal Anthropological Institute) was formed.

In North America, the federal government formed the Bureau of American Ethnology (BAE) under John Wesley Powell in order to perform research that was intended to guide government policy toward Native Americans, and in 1879, Powell dispatched Frank Hamilton Cushing to the Zuñi pueblo to perform some of the first anthropological field research. By 1895, the BAE had hired anthropologist James Mooney to research a revitalization movement, the ghost dance. It also was in the 1890s that Franz Boas, the “father of American anthropology,” worked outside of academia with the Chicago Field Museum.

Early History

Boas developed a lifelong hatred of racism arising from anti-Semitic experiences he had had in school in Germany. This led him to attempt to dispel the prevailing racist notions of the day in anthropology. From 1910 to 1913, Boas applied anthropometry to disprove a basic racist assumption: Cranial shape was a factor of race. To accomplish this, he measured the heads of Jewish immigrants in New York City ghettos. Presumably, they were members of the dolichocephalic (longheaded) Mediterranean race, and indeed, the immigrants tended to fit that pattern. However, their children, born in America, were members of the brachicephalic (roundheaded) Alpine race. Apparently, they had changed race within one generation of having moved to America. Boas explained this anomaly as being the product of different diets between the parents and their children during their growth years and not the result of race at all.

Boas’s first PhD student, Alfred Louis Kroeber, and Kroeber’s students spent the first two decades of the 20th century conducting “salvage ethnology” to preserve

cultures that were, or already had, become extinct. The most famous of these cases, both within and outside of anthropology, is the story of Ishi, the last member of the California Yahi tribe, whom Kroeber brought to Berkeley to serve as the key respondent from a vanished people. In 1919, Kroeber applied anthropological techniques to discover the rapprochement between fashion and economic cycles in his hem-length study. He demonstrated that one could determine (and perhaps predict) economic cycles by the rise or fall of women’s dress and skirt lengths. The 1920s also found Margaret Mead (1928/1973) making recommendations on sex education to the American educational establishment in the last two chapters of her doctoral dissertation, published as *Coming of Age in Samoa*.

In Europe, it was common during this time for anthropologists to seek employment in colonial governments: Anthropologists from the Netherlands were employed by their government to provide ethnographic data on its Indonesian colony; Northcote Thomas used anthropology to aid in administrating the British colony in Nigeria; and Alfred Reginald Radcliffe-Brown served as director of education on Tonga. Somewhat later, in the 1930s, Edward Evan Evans-Pritchard (1969), in the employment of the government of the Anglo-Egyptian Sudan, spent several research periods among the Nuer to determine why they did not consider it necessary to uphold their treaty with the British government, among other projects. Also in the 1930s, Radcliffe-Brown first used the term *applied anthropology* in the article “Anthropology as Public Service and Malinowski’s Contribution to It” (although the term already had appeared in 1906 in a degree program at Oxford). Bronislaw Malinowski himself, had coined the term *practicing anthropology* for nonacademic anthropology.

In 1932, President Franklin Delano Roosevelt appointed the anthropologist John Collier to Commissioner of the Bureau of Indian Affairs (BIA). Collier then employed fellow anthropologists Julian Steward, Clyde Kluckhohn, and others in the applied anthropology office to investigate Native American cultures and to counsel the BIA in regard to the Indian Reorganization Act. The anthropologists served as intermediaries between the BIA and Native Americans during the drawing of tribal constitutions and charters. Also in the 1930s, Edward Sapir’s student, Benjamin Lee Whorf, applied anthropological linguistics to the analysis of fire insurance investigations, and anthropologist W. Lloyd Warner was hired by the Western Electric Company to study worker productivity in its bank-wiring facility. Warner employed qualitative ethnographic techniques, such as participant observation and informal interviewing, that previously had been used in nonindustrial, non-Western societies in one of the first applications of “industrial anthropology.”

The 1940s brought about the efflorescence of the field with the founding of the Society for Applied Anthropology (SfAA) by Margaret Mead, Conrad Arensburg, and Eliot Chapple. They published the journal *Applied Anthropology*

to counter what they saw as academic bias against practical, nontheoretical work. In 1949, the name of the journal was changed to *Human Organization*, and the SfAA code of ethics was created. Despite this, Melville Herskovits taught in the late 1940s that applied anthropology was racist and should not be practiced, according to one of his former students.

Today, a variety of organizations specialize in applied anthropology. The Consortium of Practicing and Applied Anthropology Programs (COPAA), chaired by Linda A. Bennett of the University of Memphis, lists and gives a brief description of some of these organizations on its Web site, including the COPAA, the SfAA, and the National Association for the Practice of Anthropology within the American Anthropological Association.

The COPAA also lists regional organizations, which include the Washington Association of Professional Anthropologists; the High Plains Society for Applied Anthropology; the Chicago Association for Practicing Anthropologists; the Sun Coast Organization of Practicing Anthropologists; the California Alliance of Local Practitioner Organizations that embraces the Southern California Applied Anthropology Network, the Bay Area Association of Practicing Anthropologists, and the Central Valley Applied Anthropology Network; and the Mid-South Association of Professional Anthropologists. It was during World War II that Margaret Mead headed a group of anthropologists who served in the Office of Strategic Services. In addition to Mead, Ruth Benedict, Ralph Linton, Julian Steward, and Clyde Kluckhohn, among others (including such interdisciplinary notables as Erik Erikson), worked on the Committee on Food Habits, the Culture at a Distance national character project, the War Relocation Authority, and others, in order to aid in the U.S. war effort. A description of their work and methods was published (Mead & Rhoda, 1949) after the war as *The Study of Culture at a Distance*. Following the war, anthropologists also worked for the U.S. Pacific protectorates' administrations.

Mid-20th Century

The Fox Project

In the late 1940s, Sol Tax of the University of Chicago wanted to develop a program that would give field experience to anthropology students. To do this, he began the Fox Project in 1948 to look into social organization and leadership in the Fox/Tama settlement, which was facing acculturative pressures from the neighboring Euro-American community. Although they tried to become involved in the amelioration of the acculturative process, they had no authority to do so. Thus, they developed a theoretical agenda that became known as "action anthropology." In 1953, the group consulted with the Fox project and developed a framework for action that was funded by a private

foundation. University of Iowa students joined the University of Chicago group, and together they created the Fox Indian Educational Program and began the Tama Indian Crafts industry.

About the time that the Fox project was nearing its completion in 1952, Edward Spicer's book, *Human Problems in Technological Change*, was published. That same year Allen Holmberg began Cornell University's 14-year experiment: the "Peru Vicos Project." Cornell University had rented Vicos, a feudal estate in Peru, as a living laboratory to study social engineering on the Quechua-speaking peasantry, to test theories of modernization, and to develop models for community advocacy and culture brokering.

1964: Project Camelot

Project Camelot had the potential to be a low point in the application of anthropology in the late 20th century. In December 1964, the Office of the Director of the Special Operations Research Office of the American University in Washington, D.C., announced a new program to be funded by the army and the Department of Defense. The program extensively would employ anthropological fieldworkers in government research for 3 to 4 years. In theory, it was a project that was intended to develop a systems model that would enable the prediction of social changes that in turn could develop into political movements in third world nations that might threaten the United States—specifically in Latin American countries (where a field office was planned) but with plans to expand globally. Its objectives were to formulate means to predict civil wars and revolutions; to identify means to prevent civil wars, insurgency, and counterinsurgency movements in particular societies; and to develop a system of field methods to collect the information to accomplish the two previous objectives. The budget was expected to be in the \$1.5 million range annually.

Some anthropologists feared that applying anthropology to aid Latin American government's repression of political movements was unethical and would hinder development of societies in those countries. A more horrific potential outcome to the field ethnographers was the possible executions of their field respondents. In response to the outcry from the social science community, Project Camelot was cancelled in July 1965.

Nonetheless, not all social scientists found Project Camelot to be totally objectionable. Beyond the satisfaction of the obvious and never-ending quest for research funding, which it would have provided, albeit from sources that are suspect to many in the academic community, there is the less obvious appeal of ethnography finally having some input into government international policy, something that had been called for over decades. Likewise, many anthropologists in that era had gotten their starts in the military by having had their first international experiences during the second World War and their educations financed by the government issue, or GI, Bill. Rather, it

was the possible outcomes of their research that convinced the community to object to Project Camelot.

Also in the 1960s, medical anthropologists working with the Foré tribe of New Guinea traced the origins of a deadly neurological disease, *kuru*, to cannibalism by using traditional qualitative techniques, such as collecting life histories; Margaret Mead testified before Congress on birth control and marijuana, and she coined the term *generation gap* to describe a global phenomenon that had never occurred previously in human history; Jules Henry's *Culture Against Man* described the Orwellian nature of popular advertising in American society; Jomo Kenyatta applied his PhD in anthropology from the London School of Economics under Malinowski to running the government of Kenya, with its diverse ethnic makeup, as its first president under the slogan *Harambe*, or "let us pull together" in Kiswahili. Oscar Lewis conducted his "family life histories" in Mexico City (*The Children of Sanchez*) and New York (*La Vida*) and described the poor as living in a self-perpetuating "culture of poverty." Although this was criticized widely as an attempt to blame the poor for their condition, it also could be said that Lewis was acknowledging the wisdom of people who lived on the edge and their ability to survive and fully exploit their economic niches.

James P. Spradley conducted a Herculean application of ethnoscience to "tramp" culture in Seattle in the 1960s to determine the emic structure of the society in order to make recommendations for improved treatments to social workers, police, psychiatrists, and alcohol treatment centers. It was published as *You Owe Yourself a Drunk: An Ethnography of Urban Nomads* in 1970. In 1969, George Foster wrote the first textbook on development and change agency, *Applied Anthropology*, in which he cited changes in human behavior as a primary goal in order to solve social, economic, and technological problems. He followed this up in 1973 with *Traditional Societies and Technological Change*.

Late 20th Century

In 1974, the University of South Florida began the first master of arts degree program to focus specifically on training students for careers in applied anthropology. The options available to those students form a wide range of topics that define applied anthropology. Among them are archaeology, Cultural Resource Management, economic development, educational anthropology, immigration, medical anthropology, race, gender, ethnicity, and urban policy and community development. Among the reasons for such theoretical breadth is the realization that many master of arts students do not choose to pursue a doctor of philosophy degree, and this curriculum, then, qualifies them to work in specialized professions outside of academia. The reader will note that work outside of academia is known as practicing anthropology, and in 1978 the

University of South Florida first published the journal *Practicing Anthropology*. Graduate programs in applied anthropology are becoming more widespread in the United States since that time; for example, the master's program in applied anthropology at California State University, Long Beach, has three program options: communities/organizations, health, and education. Northern Kentucky University's anthropology program is long known for its award-winning Web site with information on where undergraduate anthropology majors, who cannot or do not choose to attend graduate programs, can find jobs outside of academia; currently, it is in the process of developing a master's program in applied anthropology.

Programs in Applied Anthropology

COPAA lists member programs on its Web site for those interested in pursuing a career in applied anthropology. The Web site notes that there are other programs that are not currently COPAA members. Among the universities in consortium are the University of Alaska, Anchorage; American University; University of Arizona; California State University, East Bay; California State University, Long Beach; University of Florida, Gainesville; The George Washington University; University of Georgia; Georgia State University; Indiana University-Purdue University at Indianapolis; University of Kentucky; University of Maryland; University of Memphis; Mississippi State University; Montclair State University; University of North Carolina at Greensboro; University of North Texas; Northern Arizona University; Oregon State University; Santa Clara University; San Jose State University; the University of South Florida; the University of Texas at San Antonio; and Wayne State University.

The first doctoral program in applied anthropology was begun at the University of South Florida (USF) in 1984. Although the master of arts curriculum had been intended for nonacademic professions, the PhD curriculum trained students for university careers, as well as for practicing anthropology. USF's Center for Applied Anthropology combines these two objectives in ventures such as the Human Services Information System database and the Alliance for Applied Research in Education and Anthropology.

In the 1960s and 1970s, Napoleon Chagnon and James Neel conducted genetics research for the American Atomic Energy Commission in an ethnographic setting. Chagnon was the ethnographer, and Neel was the geneticist. Their work was designed to determine the effects of the forces of evolution (such as the founder effect) on small populations in order to determine how genes might affect survival following a nuclear destruction of modern civilization. Their research took them to the Orinoco River basin in southeastern Venezuela where they established contact and conducted research among the Yanomamo, an isolated, horticultural, tribal society. Out of this research came

Chagnon's ethnography, *The Yanomamo: The Fierce People*. From its very early days, the project was heavily documented on film, and their classic documentary, *The Yanomamo: A Multidisciplinary Study*, became a standard in both cultural and physical anthropology classrooms. In the film, Chagnon and Neal become aware of a measles epidemic sweeping up the Orinoco Basin toward the Yanomamo. They acquire a vaccine that contains a weakened strain of the live virus and conduct mass inoculations of the Yanomamo against measles.

Although their work was met with criticism from the outset, none was quite as virulent as the later criticism contained in Patrick Tierney's 2000 book, *Darkness in El Dorado*, and its aftermath. Tierney claimed that Chagnon and Neel had been conducting Josef Mengele-like genetics experiments on the Yanomamo by injecting them with the live measles virus to see who would live and who would die—not, as shown in the documentary, to protect them from an epidemic. The author of this chapter recalls sweeping condemnations of Chagnon and Neel from the anthropological community on several Internet electronic mailing lists originating throughout the United States at that time based on *Darkness in El Dorado*—although the book had not yet been released. By that time, Neel was dead, and although Chagnon was retired, he filed a lawsuit against Tierney in which he and Neel eventually were vindicated. Currently, calls are being made in anthropology to disband the “El Dorado Task Force” set up to investigate this case.

In the 1980s, Philippe Bourgois conducted field research among Hispanic crack (“rock” cocaine, which is smoked) dealers in the Harlem area of New York. This was not an update of Elliott Liebow's *Tally's Corner* nor of Oscar Lewis's *La Vida*. Rather, it is what Bourgois refers to as a “culture of terror” that exploits an underground economy. Bourgois argues that this renders the crack dealers unexploitable by the larger, legal society as they pursue their interpretations of the “American dream.”

Across the Atlantic, anthropologists and other social scientists began to influence government policies in the Republic of Ireland in the late 1980s, according to Thomas Wilson and Hastings Donnan, via what are called the economic and social partnerships with government. This should not be confused with hegemony as may have been the case with the 1960s American “military-industrial complex.” Rather, in a country in which anthropology traditionally had been practiced by foreign scholars investigating semi-isolated rural communities, it was a remarkable innovation for anthropologists and other academics to have creative input, with their governmental partner, in the policies that led to the Celtic Tiger economy in what had been one of the poorest countries in Europe and the social structural transformations that allowed the “boom” to filter down to the public at large. Anthropologists also have been called on more recently in Ireland to assist the government with ethnic minority issues, especially those of the indigenous minority, the travelling community.

Since the beginning of the 1990s, nonacademic jobs for anthropologists have increased, and more anthropologists have found themselves involved in the business world, especially in marketing, although the irony of this may not be lost on those who were students when Jules Henry's anti-Madison Avenue research, published as *Culture Against Man*, was a popular textbook in the 1960s and 1970s. Much of the new material centers around *cultural miscues* that corporations and individuals make in advertising—physical gestures, slang, and so on—when acting cross-culturally (e.g., Chevrolet's attempt to market the *Nova* automobile in Latin America where the homonym of the name means “does not go” or Gerber's attempt to market baby food with an infant's picture on the label in parts of Africa where labels routinely showed the containers' contents for consumers who could not read). Other business-oriented approaches fall more along the lines of the Western Electric bank-wiring study (noted above) conducted by W. Lloyd Warner in the 1930s.

Nonetheless, some members of the anthropological community still consider business anthropology to be “colluding with the enemy,” according to Jason S. Parker of Youngstown State University in a recent article in the *Society for Applied Anthropology Newsletter*. Parker points out that these same critics, who stigmatize those applied anthropologists that work in business, are not offering any jobs to their recently minted bachelor's degree graduates, who must then look elsewhere. Parker argues that the anthropological perspective can benefit the employees, as well as the corporations, through the inclusion of their input in the manufacturing processes.

Ann T. Jordan has written a persuasive argument for the use of anthropology in the business world in her book *Business Anthropology*. Jordan cites a number of cases in which anthropologists have ameliorated conditions that had the potential to lead to labor disharmony through managerial insensitivity to working conditions. Likewise, she explains that cross-cultural conflicts and misunderstandings on the job could easily be avoided with anthropological input.

Applied Anthropology Today

Louise Lamphere suggested a convergence of applied, practicing, and public anthropology in 2004. Lamphere argues that anthropologists in the 21st century should collaborate with each other, as well as with the groups that they are investigating, on archaeological research, health, urban, and environmental topics to unify their work on critical social, educational, and political issues. The traditional research populations increasingly want greater degrees of jurisdiction over what is written about them, and applied anthropologists, especially those influenced by the feminist critique, have advocated more collaboration with their respondents on ethnographic publications and

museum exhibits in order to express more emic perspectives. This joint participation in the research and presentation process (whether by publication or museum display) fosters skills and generates capacities for indigenous change within communities.

Charles Menzies erects a paradigm to foster these joint ventures based on his work with the Gitksa Nation in British Columbia, which consists of four stages. First, the anthropologist opens a dialogue with the community that may suggest modifications to the research protocol. Then, research continues to grow and change in consultation with the respondents—who now are becoming “coethnographers.” Next, the research is conducted jointly between academics and members of the society. Finally, the data and results are analyzed by the joint team and the reports are coauthored. Lamphere advocates training students to conduct collaborative research of this nature as anthropologists increasingly find themselves employed by nonacademic public and private organizations.

21st-century anthropologists increasingly find themselves involved in policy-making jobs in areas as diverse as libraries and the army. The University of Rochester library hired anthropologist Nancy Fried Foster, under a grant from the Institute of Museum and Library Services, to study undergraduates’ term paper research, to steer library renovations, and to make suggestions on the redesign of its Web site. Foster used traditional anthropological research methods to discover that not only are many students extremely uncomfortable with the increasing technological changes that universities are forcing on them but also that they use the libraries to escape from them.

Anthropologists and the Military

A recent *Society for Applied Anthropology Newsletter* reports that anthropologists increasingly may become involved in work with the military via a program called the Human Terrain System under the Department of Defense (DoD). According to Susan L. Andreatta, president of the SfAA, the DoD wants to employ graduate-level anthropologists in Iraq and Afghanistan. Opinions on this are divided, but one may note that the Society was founded by anthropologists who worked for the war effort in the 1940s.

The anthropologist and senior consultant to the Human Terrain Systems project is Montgomery McFate. William Roberts of St. Mary’s College, Maryland, describes her argument as one in which a military that has greater understanding of indigenous civilians in war zones will reduce loss of life and cultural destruction.

Also, archaeologists may be involved with the military on sensitive issues. As of this writing, archaeologist Laurie Rush serves as a cultural resources manager at the United States Army’s Fort Drum, where she works with the Integrated Training Area Management unit of the DoD’s Legacy Program to develop a consciousness

for archaeological treasures. This project arose out of a British Museum report that detailed the construction of a helicopter pad by U.S. Marines on the ruins of the ancient city of Babylon, the destruction of a 2.5-millennia-old brick road, and the filling of sandbags with artifacts. Part of Rush’s program involves building models of archaeological sites, mosques, and cemeteries for soldiers to train to avoid.

Forensic Anthropology, Ethnic Cleansing, and Political Dissidents

Television programs such as *Crime Scene Investigation (CSI)*, *CSI: Miami*, *CSI: New York*, and *Naval Criminal Investigative Service (NCIS)* have sparked an international interest in forensics. This, in turn, has led to a student population interested in forensic anthropology. Cable television’s Discovery Health channel has created a true-life version of the *CSI* phenomenon with its *Forensic Files* program, which features cases solved by forensic anthropologists, such as Elizabeth Murray of the College of Mount St. Joseph in Cincinnati who works regularly with law enforcement agencies across the country.

The *ABC News* and *Christian Science Monitor* Web sites occasionally report on the applications of forensic science. They describe forensic anthropologists and archaeologists who have been involved in the identification of the remains of the nearly 3,000 victims of the September 11, 2001, attack; Jon Stereberg, a forensic archaeologist, has tried to trace the evidence of 1992 gas attacks in the clothing of victims in the Balkans; and Clyde Collins Snow, a retired forensic archaeologist, has investigated grave sites in Guatemala, Bosnia, and Iraq. Currently, forensic specialists, such as Ariana Fernandez, are examining the bodies of Kurdish people who were found in mass graves and who are believed to have been massacred in a genocide attack during the Saddam Hussein regime in Iraq.

Tourism

The travel and tourism industry is in dire need of the services of anthropologists, and this is becoming an attractive employment option to anthropology graduates, according to Susan Banks, an anthropologist involved in the travel industry. Too often, tourists will go to exotic locales where they believe that they are seeing the actual types of lives lived in those places, unaware that they are being fed a fabricated culture designed, not to expose them to life in other places, but to screen them from the true ways of life found in those locations. Commonly, tourists are discouraged from visiting local towns and actually learning something about the countries that they have visited. Anthropology can offer a remedy to this problem and provide some much-needed income to the local economies. Exploitation

and insensitivity to indigenous people by culturally uninformed tourists does little to change the image of the “ugly American.” Likewise, the international sex trade both exploits and victimizes indigenous peoples and furthers the spread of dangerous diseases, such as HIV/AIDS.

Environmental degradation of local ecologies is another problem of culturally ignorant tourism. For this reason, Susan Charnley, in an article in *Human Organization* in 2005, suggests a change from nature tourism to ecotourism. She cites the case of Ngorongoro Conservation Area (NCA) in Tanzania. Nature tourism involves traveling to pristine locations where tourists can experience and enjoy nature; ecotourism involves traveling to natural areas that conserve the local ecology while respecting the rights of the local cultures and encouraging sustainable development. Charnley makes the case for the increasingly difficult position of the Massai people since the creation of the NCA and the negative effect it has had on their economy. Charnley argues for culturally appropriate involvement of local people in tourist destinations in ways that will provide actual benefits to their communities. These benefits would include social and political justice and involvement in decision-making processes that directly influence their lives.

A selection of articles from *Human Organization* from the first decade of the 21st century includes such topics as the administration of federally managed fisheries, including a discussion of the role of James A. Acheson who was the first applied anthropologist hired by the National Marine Fisheries Service in 1974 to conduct policy research and implementation through conservation and stewardship of marine ecosystems.

Another article described the importance of beer parties among Xhosa labor cooperatives on homesteads in South Africa. An article that has to do with changes in gender relations and commercial activities, as the global market expands to countries such as Mali, explores how the outside world can force local peoples to change the structure of their society by giving advantages to one gender over the other when that may not have been the case previously. Another article illustrates what the author of this chapter sees as a parallel between the popular use of family trusts in the United States in the 1980s and 1990s and a move from individual land tenure to collective, kin-based ownership on Mokil Atoll in Micronesia, as the region's political, economic, and demographic transformation has imperiled the rights of absentee owners. By placing the land ownership in the kin group, it is protected from individual alienation.

A 2007 article by Kathryn Forbes is especially topical in the current social, economic, and political climate of the United States today. Forbes's article examines how the regional land use of ideologies and popular images of farm workers has contributed to a housing crisis for Mexican agricultural laborers in Fresno County, California. Stereotypic descriptions of Mexican farm workers have resulted in the formulation of zoning codes that exacerbate

demographic segregation in Fresno County. Most farm workers live in rural areas, which are more economical and more convenient to their sources of income but where there are fewer retail outlets—including groceries. The arrival of seasonal laborers, combined with a lack of affordable housing thanks to local policymakers, has engendered a regional overcrowding crisis for Mexican farm workers. Forbes's role in this discussion is similar to the review of the roles that anthropology can play in public policy cited by Wilson and Donnan (2006) in Ireland.

Future Directions

Forbes's article is especially relevant to the United States today as the influx of immigrant labor, thanks in part to the North American Free Trade Agreement (NAFTA), has made the appearance of Hispanic laborers a topic of vituperative discussion on national radio talk shows and political campaigns. This is a point that falls clearly within the purview of social science rather than politics as anthropological demographers and gerontologists clearly can demonstrate that not only does the country require immigrant labor because of statistical “full employment,” but also it needs to save social security from the influx of baby boom retirees.

The bankruptcy of social security was predicted in university classes as long ago as the 1970s. The increase in life spans, coupled with the potentially disastrous demographic effect of a baby boom generation that will retire to be supported by a much smaller (thanks to the introduction of the birth control pill in the 1960s) birth dearth/baby bust cohort, has the potential to lead to economic disaster for the latter group as their increasing social security taxes erode their quality of life. The baby boom retirees' social security taxes must be replaced from somewhere—if not by eroding the birth dearth/baby bust cohort's quality of life, then by an influx of tax contributors, for example, immigrant laborers.

Anthropologists are in a unique position to act as the social partners of policymakers on this issue not only by means of their demographic and gerontological expertise but also by their ethnographic contributions to allay the concerns of the extant non-Hispanic population of the United States over its possible perception of cultural drowning by immersion in a neo-Hispanic society *del Norte* (“land of the north”).

Likewise, anthropological expertise in indigenous Latin American medical beliefs, such as *hot* and *cold*, *wet* and *dry* bodily conditions derived from the ancient Mediterranean medical concept of *humors* where illnesses were believed to be caused by an imbalance of humors; folk illnesses, such as *susto* (“fright”), a culture bound syndrome found in southern Mexico in which an individual who does not recover from an illness is believed to have had a terrible fright in the past that prevents recovery from

the unrelated illness (Rubel, O'Neill, & Collado-Ardon, 1991); and cultural sensitivities to variations in conceptions of sexual modesty and familial responsibilities will form a necessary component in the rapprochement of the two larger cultures although this may be difficult in cases of smaller subcultures.

Other areas for future research in applied anthropology include human trafficking (briefly cited in the discussion of tourism); indigenous rights (e.g., salmon fishing among the native Northwest coast peoples in North America, cattle grazing in the Burren in County Clare, Ireland, or the effects of water control on the Marsh Arabs of southern Iraq); anthropometry and gender (in the cultural sense, not the linguistic sense) stereotypes and gender rearing roles; cultural relativism versus cultural interference, including whether or not Muslim women need to be "saved" or if Western hegemonists even have the right to do so; genital mutilation (male as well as female); the role of nongovernmental organizations (NGOs) in distributing information and treatment of HIV/AIDS; food waste, diet and health, and body image; intelligent design, globalization and high-tech industry; and the role of biology and culture in psychiatric illnesses, to name but a few of the possibilities open to applied research in anthropology.

In an article titled "Making Our Voices Heard—Ethical Dilemmas and Opportunities," in the November 2007 *Society for Applied Anthropology Newsletter*, Mark Schuller of Vassar College gives a good review of the future of applied research in anthropology. Schuller writes that many anthropologists believe that their contributions are considered marginal and irrelevant and are passed over in policy making based on a review of the leading anthropological journals and newsletters. He argues that applied anthropologists with a holistic viewpoint can inform policymakers regarding the integrated structural correlation among debt and poverty, education, health care, and local welfare via their engagement with local communities. Schuller calls for local, global, and ethical analysis of current concerns to make anthropology applicable in the "real" world. He suggests that a good way to apply anthropology is through teaching; his students investigate public policies and then send letters to the editors of newspapers in order to introduce anthropological viewpoints into current policy discussions.

Schuller has been keyword-searching "anthropology" on Google and reports that he has found at least two stories a day in which anthropologists are interviewed or have authored stories in media outlets. Among the included issues that his students or other anthropologists have written about in daily news publications is the part played by anthropologists in clandestine activities, inequalities of globalization, the State Children's Health Insurance Program (CHIP) health care bill, the UN Declaration of the Rights of Indigenous Peoples, No Child Left Behind, prison reform, disclosure of hormone content in milk, Hurricane Katrina "fatigue," and the cancellation of international debt in impoverished nations of South America.

In the same issue, Amanda Stronza of Texas A&M University describes a new program in applied biodiversity science, which also will tackle poverty and cultural inequality. The interdisciplinary research program integrates cooperation between social and biological sciences and conservation organizations at the applied level. Research topics are to incorporate biodiversity with local legislative policy in partnership among academia, governments, NGOs, and local societies in four regions of the Americas.

Conclusion

This chapter has explored the subject of applied anthropology. It was done from a historical perspective in order to gain a processual understanding of how it arrived at the state in which it is found in early 21st-century anthropology.

A brief definition of applied anthropology was followed by a review of the origins of applied anthropology in the 19th century and a history of the field through World War II, the Fox Project, the Peru Vicos Project, and Project Camelot. The section on the later 20th century led into applied anthropology today and topics for future research.

Some topics were not presented in this chapter as they are more fully discussed in other chapters in this book. The author has expressed the opinion that some articles published in some applied anthropology journals do not appear to do more than describe situations without offering any real, useful solutions that are likely to be applied by the nonacademic. This is not to say that practical solutions to problems that have been described have not been made in many cases—They have. Rather, it is a call for anthropologists to do what they do best: engage with communities. It is hoped that my interpretation will not be taken personally by any authors or other scholars.

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LAW AND ANTHROPOLOGY

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Law is a cultural achievement of humankind. On the basis of rules that are typically connected with sanctions, it is meant to prevent or overcome social conflicts. The nature of these rules can generally be distinguished by their purpose: They either serve the purpose of deciding legal cases (rules of decision) or the purpose of conducting a legal process (rules of conduct). The foundation of the rules, too, can vary. Some legal cultures base their rules on (unwritten) traditions (common law), usually replenished with precedents of case decisions by the judge's dispensation of justice (case law). In contemporary legal systems, however, the foundation of legal decisions is above all provided by the state legislature (statutory law). In modern judicial terms, the sum of legal norms, which forms a more or less coherent legal system, can be described as objective law. The (legally guaranteed) authorizations of the individual member of this legal system (e.g., the citizen), on the other hand, are subjective rights, guaranteed, for instance, in the form of civil rights.

The social function of preventative conflict avoidance or reliable conflict resolution can be fulfilled, lastingly, only when law is also able to offer criteria in terms of content to justify legal decisions. Since ancient times, law has therefore been characterized not only by its sanctions but also by its reference to justice. At the beginning of Justinian the Great's *Digesta* (533 BCE), a collection of the works of Roman legal scholars, it is stated in that respect: "Law is the art of the good and the fair" (*ius est ars aequi et boni*

[*Digesten*, 1.1.1. pr.]). Similar definitions can be found in other legal cultures that have not been influenced by Roman law. Yet law also involves the "authorization to coerce" (Kant, 1996, p. 25), as we learn from Immanuel Kant (1724–1804). Both sides, coercion as much as justice, have at all times during the history of humankind decisively influenced the development of law. One essential reason for the continuously tense relationship between these two dimensions of law is the strong correlation between law and human life. Friedrich Carl von Savigny (1779–1861), a distinguished German legal scholar and the founder of the so-called Historical School of Law, once noted rightly that law had no intrinsic content; it is directed toward and, at the same time, dependent on the life of human beings. This fact displays the anthropological foundation of every law. Moreover, it bears legal consequences that are concisely expressed in a canon of ancient Roman law: No one can be obligated beyond his or her capabilities (*ultra posse nemo obligatur*). This principle is rooted in the insight that a legal norm that asks too much of an individual is simply unjust.

Anthropological Foundations of Law

From the viewpoint of evolutionary biology, the development of law shows itself to be a matter of adjustment to the benefit of our own species' self-preservation and reproduction. This concept is above all based on the

findings of primatology. This science informs about the phylogenetic background of *Homo sapiens* and allows conclusions to be drawn about the emergence of normativity in human relationships. The phenomenon of reciprocity is of major importance in this context; it can, for instance, be observed in the social behavior of chimpanzees, our closest relatives. To meet the basic challenges of self-preservation and reproduction, chimpanzees live in social groups. The advantages are obvious: The offspring is more effectively protected, and food is more efficiently secured. Our species develops affection for the building of societies, an *appetites societas*. Not unlike human associations, though, living in groups is never without disadvantages. These occur whenever competition arises within the group in the struggle for scarce supplies that ultimately decide on the individual fate of the group members. Chimpanzees have obviously developed the ability to ensure a regulated exchange of goods among each other. The disposition to share goods among one another considerably depends on whether the “beggar” was, in a reversed situation, also willing to share his food or to provide the “proprietor” with other “services” (e.g., “grooming”). Generosity will generally be answered likewise; parsimony will be socially sanctioned. Chimpanzees appear to have a highly developed long-term memory for social relationships; it lays the foundations for an equipment that stabilizes the social order and that sanctions deviance, for instance, through the building of coalitions. To a certain extent, the success of social associations is the result of “chimpanzee politics” (de Waal, 1982).

But are these observations of altruistic behavior compatible with the genetic self-interest that constitutes the fundamental axiom of evolutionary biology? They are and in two ways: First of all, it should be noted that the thesis of a “selfish gene” (Dawkins, 1989) does not refer to the individual or the population. These are only “agents” of the “victorious” genes, which survive at the expense of the less suitable genes. Biological evolution is genocentric. Natural selection in principle awards features that encourage survival and reproduction—not only of single individuals but also of relatives. This is at least applicable to highly developed creatures in social associations. Here, organized forms of family support have been observed. The basis to this *nepotistic altruism* is consequently the self-interest of each individual’s genetic programs. Their purpose, the reproduction of genetic information, is achieved through the fitness of the family. Nepotism is oriented toward this fitness.

The self-interest of nepotistic altruism for the family is different from *reciprocal altruism*, which, under two conditions, can also include nonrelatives: First, in the long run, solidarity must pay off for the individual, for example, when food supply is dependent on good fortune during the hunt. In this case, solidarity serves to diminish the individual risks of life; if there is no shortage in food resources, then solidarity generally vanishes, too. Second, the mechanism of reciprocity must work out. While nepotistic altruism

involves the danger of a bad investment, reciprocal altruism involves the danger of an exploitation by “free riders.” In both cases, the problem expands with the size of the group and thus endangers altruistic behavior—in the end, to the disadvantage of everyone.

From the standpoint of evolutionary biology, it is evident that (moral and legal) normativity has biological roots. Norms of reciprocity help to perform the adjustment that could not be performed within the parameters of egoistic behavioral patterns. Reciprocity is the beginning of a moral consciousness that distinguishes between factual and normative behavior. But it requires stabilization by means of specified rules and sanctions. Human ability to establish a legal system and the simultaneous need to live in such a system reveals humanity’s special position in nature. This has been evident since the natural sciences have contributed to the self-enlightenment of humankind: In terms of the objective parameters of natural science, there is not much that could distinguish humans from other life-forms. Subjectively, however, our species can do nothing other than turn itself into the center of its environment; humanity has no alternative but to build its world according to its own criteria. Max Scheler (1874–1928) tried to grasp this situation in his concept of the “openness to the world.” It is meant to denote human independence from organic bondages. Man or woman is instinct driven, but also he or she possesses the ability to say “no” in order to postpone or to sublimate his or her urges. The resulting opportunity and necessity is not merely to live but to lead his or her own life. Like Nietzsche, Arnold Gehlen (1904–1976) regards a human as the “not determined animal.” Man or woman cannot be sure of his or her surroundings; he or she lacks the protective instincts. As a result of his or her biologically deficient vesting, there are no natural habitats; everything and everybody can turn into an enemy. Consequently, a human is a being whose life is constantly at risk. Thus, humans have no choice but to create their own relations to the world and to themselves through active performance. Her or his nature is culture; this is how she or he compensates for her or his “deficient constitution.” And yet woman or man is not only defenseless against her or his environments, but she or he is also dangerous. Undetermined but driven by her or his physical desires, she or he is latently threatened by degeneration. Hence, man or woman not only has to lead his or her life, but he or she also has to be led, namely by institutions. Institutions make up for his or her absent instincts; they support man or woman by obliging him or her to behave in a given way and, at the same time, relieve him or her from the burden of incessant decisions.

Institutions can evolve and persist wherever things that are taken for granted are valued accordingly. The modern world, however, is marked by an increasing absence of customs and by a growing plurality of values. Customs and values as institution-building factors are replaced by law that is in fact free of contents but still has a stabilizing

effect. Humanity's modern world is literally a world of law. The close connection between human nature and human culture, entailed by humankind's lack of instinct and world-openness (i.e., the idea that humans are not limited by their environment but can transcend it), leaves humankind no choice but to build humanity's life on law.

Ethical Foundations of Law

Moral and ethical claims of today's norms have evolved from the social history of humankind. Most notably, this is true of custom. It provides tradition with a generally binding authority to which law, too, was subject for a long time. Old law was good law. Nowadays, it is typically the other way around. Accordingly, a later law overrules an earlier law (*lex posterior derogat legi priori*). In the course of time, law has emancipated itself from customs and has become more independent. Nonetheless, law remains dependent on acceptance, approval, and discernment. The phenomenon of an increasing juridification of social life should not be regarded only as a process of law's emancipation from ethics and morals. On the contrary, in the question about the right law and about its connection with justice, the bond between law and the prelegal foundations of human social existence recurs.

Juridification is a process that commences whenever social norms lose their effect. Above all, habit and custom belong to the social norms; fashion, too, can be part of it. While habit lives on permanence and repetition, fashion is, and must be, ephemeral in order to consistently reinvent itself. Its aim is disparity; chic and elegance is not for everyone but only for the few. Habits are unspecific in this regard; one has a habit, or one does not. But a particular habit can only rise to a common law if it is shared not only by the individual but also by the majority. In the English language, this is expressed in the differentiation between habit (of the individual) and custom (of the group) (French *habitude, coutume*; Latin *habitus, consuetudo*). As opposed to habit, custom, just like the law, claims to be valid for every member of a given group. It is therefore oriented toward equality. Religion constitutes its own category of ethical norms.

The Greek term *ethos* illustrates the close bond between habit and custom as it is related to "habitation": One can get accustomed to various habits. However, habit requires more than just a superficial adaptation; namely, it requires a certain inner attitude. From this, a basic attitude can evolve that shows "character." This, too, is covered by the meaning of *ethos*. Accordingly, character always has to be formed first. The virtue whose *ethos* keeps law and ethics together is uprightness. It illuminates the ethical meaning of being right; namely, being right is to strive for the establishment of a system based on law. A dogmatic attitude, however, destroys such an order as it gives the desire to be right precedence over the right itself.

Moreover, it is part of the ethical foundation to give reasons, not only for a court judgment but also for all forms of institutionalized legal decisions. The obligation to state reasons directly results from a particular concept of justice and consequently from an ethical commandment. As per Aristotle (*Nicomachean Ethics*, V 3, 1129b), justice is "perfect virtue, though with a qualification, namely that it is displayed toward others." It is perfect, "because its possessor can practice his virtue toward others and not merely by himself." For the judge, who can decide in favor of only one party, this means an obligation to state reasons above all toward the unsuccessful party. The winner of a lawsuit does not usually care too much for grounds; thus, the loser will ask for the grounds. Owing to the judge's commitment to law, these grounds must be deduced from positive law. The reason for the grounds, however, is not of a legal nature but of an ethical one; this is to ensure a continuously peaceful social existence of those who were having a conflict with each other while insisting on their (assumed) legal right. The realization of fair proceedings alone, which allows each side to present their views and to be heard (*audiatur et altera pars*), contributes to this appeasement. A prudent judge will attach less value to the applause of the successful side than to the silence of the unsuccessful one. The procedural law obligates the judge only to the stating of reasons. The quality of these reasons is up to his or her professional ethics. It requires an appropriate translation of the judicial into the layperson's language and a comprehensive conveying for the unsuccessful side. In some cases, the latent tension becomes tangible between law's rationality and predictability on the one hand and the respective demands for material justice of all litigants on the other hand. For an appropriate decision, much will then depend on the judge's ability to meet the ethical foundations of law.

This problem has a long history. Basically, there are still two opposing notions: Legal positivism takes the stand that the legal concept is to be understood as not including moral or ethical elements. Law is regarded as being separated from these values. Following the logic of this separating thesis, law can have any given content. The positivistic legal concept solely depends on whether a law was created in accordance with regulations and whether it is socially effective. Those who, beyond that, require the legal concept to create a just law, follow the tradition of the theory of natural law. They associate law with a claim for correctness in terms of its content that cannot be given up without giving up the legal concept itself.

Characteristics of Law

In the course of time, law has occurred in many places in various shapes. Not only norms have changed and multiplied, but also legal institutions have been extensively transformed. Yet there is no shortage of attempts to define the characteristic element of law. Three approaches are of particular significance.

The first concept holds that law's characteristic is founded on its abstract rules. This view can advert to a long historical/cultural tradition, such as Hammurabi's Code (ca. 1760 BCE) or the Roman Twelve Tables of Law (ca. 450 BCE). The theories of natural law have also contributed to this opinion. Through Stoicism, natural law had first found its way into the philosophy of ancient Greece and later into the works of the ruling classes of ancient Rome. Cicero, for instance, adapted the idea that human life is subject to the purpose of a highest law. This legal concept is the starting point for a hierarchy of law, with the three components being eternal law (*lex aeterna*), natural law (*lex naturalis*), and human, or positive law (*lex humana*, or *lex positiva*). In antiquity, eternal law was understood as unchangeable and inevitably valid for everyone. Positive, or human law, contains all those norms that determine the social life of the respective society. Natural law, in turn, comprises all norms that humans and peoples reasonably share.

The notion of a legal hierarchy has gone through many enduring transformations. Among others are those that were introduced by Christianity, particularly by the influential doctrines of Augustine of Hippo (354–430) and Thomas Aquinas (1225–1274). Both do not interpret the *lex aeterna* as a cosmic principle but rather as the expression of God (there still are disagreements as to whether this must be interpreted as divine reason or divine will). *Mutatis mutandis*, the concept of a hierarchy, can also be found in modern legal systems. Examples include the precedence of international law over national law, the special status of human rights in democratic states, or the enhancement of the constitution (e.g., by the Supreme Court in the famous decision *Maryury v. Madison*, 1803) to the “supreme law of the land.”

Modern legal theory has seen many attempts to describe law as a coherent system of norms. The most notable representatives include, among others, John Austin, H. L. A. Hart, Ronald Dworkin, and Hans Kelsen or, more recently, Robert Alexy and Joseph Raz. Within the transatlantic discourse, the theory of Kelsen (1881–1973) has proved particularly influential. The center to his analytical reconstruction of an objective legal system is a norm pyramid: An individual legal norm derives its validity from a higher norm and itself validates a lower-ranking norm. To solve the problem of an infinite regress, Kelsen introduced the so-called *hypothetical basic norm*. This norm serves as a transcendental-logical condition for the coherence of a legal system. A norm is part of a legal order only when it can be deduced from the basic norm.

A fundamentally different view was held by Eugen Ehrlich (1936), which he also developed through the examination of Kelsen's “pure theory of law.” According to Ehrlich, it is important to comprehend the “living law.” By this, he understands those rules that the citizens actually comply with. This law had to be differentiated from the “laws in the books,” as well as from laws and their concretion,

through legal practice. For all these norms could not force a certain human behavior but are themselves dependent on the effective rules of social behavior. Bronislaw Malinowski has made a similar attempt to define law from the reality of community life and, above all, referred to the obligating power of reciprocity.

The third version sees law as those principles that can be deduced from the decision of legal authorities. Significant preparatory work to this was, among others, produced by Karl N. Llewellyn and E. Adamson Hoebel. Oliver Wendell Holmes (1897) put this concept in a nutshell: “The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law” (p. 461). While in the first version, law is determined by norms and the legal system, in the second version, law is determined by social effectiveness. The former could be termed *normativism*, the latter *vitalism*. The third version regards itself as belonging to *realism* as it defines law according to the actual behavior of authorities. As opposed to the other two approaches, legal disputes become the center of attention. From this perspective, law is different from politics, as well as from customs and morals.

The realistic approach, just as the vitalistic approach, regards law as a social phenomenon. But it is not only the community's compliance, which this approach examines, but also the realistic approach does not differ from custom. The focus is mainly on the authorities' actions in case of conflict. These do not perform only a regulating function qua mediator but also offer an orientation for the citizens. Normativism and realism generally agree about the regulating function of law. To realism, it is less a result of norm parameters than it is the task of the institution, which finally has to apply the law to a case. For the obligation of legal application, especially in the light of social changes, the judge needs the faculty of judgment and creativity. However, the judge's role is usually confined to understanding the social dimensions of a dispute between opponents, to transforming it into a legal relationship, and to settling it by means of law. Lawsuits are about the actual claims of the parties involved as well as the reestablishment of a symmetric legal relationship among them. Advanced social interventions are the responsibility of the government. In modern societies, politics typically makes use of the law to realize its targets. Yet by using the law as an instrument, politics also submits to the legal form that is, above all, the prohibition of arbitrariness (which is guarded by jurisdiction in modern constitutional states, above all by administrative and constitutional courts).

Its connection with authority also distinguishes law from other social behavioral norms, such as customs and morals, whose sanctioning mechanisms are, typically, hardly institutionalized. If and to what degree sanctions occur, in the case of norm violations, are not certain. The authority of law, on the contrary, is decisively based on the certitude that law is also enforced. It otherwise represents dead law. By no means does a sanction always have to

imply coercion or physical force. A sanction's form is not essential but the effective implementation of the decision is. For example, the Inca civilization's prevailing penalty for community members consisted of corporal punishment, including the death penalty. However, the Inca nobles were punished with public exposure and removal from office, as they feared social death more than physical death. Modern constitutional jurisdiction is another example of effective sanctions: Constitutional courts cannot force the government to comply with their decisions. Finally, it is the court's authority with regard to constitutional issues that the government submits to. If it does not comply, then the government's action would most likely result in a bad public reputation for intending to practice unlawful politics in a state based on the rule of law. However, this requires the court to present itself to the public as a reliable guardian of the constitution by making equitable and wise decisions.

Evolution of Law

Ancient and Modern Law

With the establishment of modern statehood, law changes its character. Ideally and typically, the differences can be described as follows: Prestate societies often aim at solving conflicts by reaching a consensus among the opponents during negotiations. If they fail in this attempt, then physical force is usually applied as a means of self-help. Law in modern societies, on the other hand, provides for judicial proceedings in litigations. In case of need, law is enforced by state power. Modern states can resort to a differentiated system of institutions. On the norm level, law is abstract and impersonal; it is valid for everyone in the same way and it does not regard differences in status or reputation. Thus, individuals have to take responsibility for their actions. He or she knows what to expect when violating a norm. Punishment is based on this transparency and predictability. For what reasons the individuals comply with the rules is insignificant to the law.

This distinction between exterior behaviors and inner motives is largely unknown in prestate systems. In the case of norm violation, the entire person will be regarded, not only his or her actions. Strictly speaking, the individual is not only solely responsible for his or her own behavior but also is part of a family that is just as much affected by the dispute. Every sanction has to bear this in mind. Finally, it is less about a personal punishment than it is about compensation in order to maintain the social system.

Owing to these differences, there is a long history of debates between historians and ethnologists about law as to whether the norms of prestate societies should be regarded as law or customs. By now, the views tend to accept that (in these orders) laws, morals, and customs cannot be reasonably discriminated. These elements,

rather, display a process in the course of which the several fields slowly differentiate.

Law in Segmentary Societies

The order of segmentary societies is organized through extraction and kinship. These societies usually consist of small communities (villages, tribes, etc.), which live in separated areas. They lack a central political authority; each community autonomously governs its social life. The regulating norms form a mixture of religion, custom, and law. In hunter-gatherer societies, the need for legal regulations is only very low and primarily occurs in the spheres of matrimony and family. Violations of the incest ban are punished as a severe offence against the community. Adultery, assumed or actual, is among the most prevalent conflicts. Property, on the contrary, is seldom a cause of quarrel. Hardly anyone owns something that would not be owned by the others. There are scarcely incentives for covetousness; probate disputes play no role at all.

The necessity for regulation increases with the change to agriculture and settledness. The population grows and with it the significance of lineages and clans. These are the actual bearers of rights, which now increasingly refer to property and particularly to real estate. The land or the livestock belongs to the clans; they are the owners, but individuals are not. Without their association, the individual is not only poor but also defenseless. In the absence of a state monopoly on force, it is the lineages that guarantee the individual's security, namely through the threat of a blood vendetta.

To threaten in this manner with a maximum of vengeance follows the principle of deterrence. De-escalation is therefore a major requirement for all sides. There is no norm violation that could justify an endangerment of the community as a whole. A blood feud not only destabilizes the system within but also weakens the community outwardly. Although the individuals may not live in a so-called state of nature, the respective communities do. There is no valid law or custom beyond the community "segment." In this no-man's-land, life is, as Thomas Hobbes put it, solitary, poor, nasty, brutish, and short. The responsibility to maintain peace within the community is all the higher; law is oriented toward this. In case of a norm violation, it is therefore less relevant to impose sanctions than to compensate for the detriment incurred or to requite in the same way through the *ius talionis* ("an eye for an eye"). If very serious crimes are committed, then the community as a whole unites against the culprit in order to prevent a spiral of violence. Furthermore, various norms are provided to obviate violence and to secure peace: Among the most famous are the asylum by the leopard-skin priest, purification ceremonies, and negotiations of expiatory payment, and so on.

This kind of self-regulation without political order can be kept alive only within small spaces. With spatial extension, a political form of governance evolves that is in effect founded

on the precedence and subordination of lineages and clans. The reasons for these processes can vary, but they mostly lie in the person's charisma to which certain skills are attributed. The respective clan can turn into a chiefly lineage if it succeeds in connecting the myth of a special governance competence with the myth of a special derivation (of gods or heroes). A chiefdom can comprise multiple levels, each with one hierarchical top (headman, headwoman, chief). The paramount chief is distinguished by a series of privileges to which only he or she has access (tributes, trade with prestigious objects, claims on the prey, etc.). For it is he or she who exclusively possesses direct admission to the gods. Owing to the paramount chief, the gods are well disposed toward the people and present them with fertility, rich harvest, and victory in case of war. It is also the paramount chief who makes the final decision to end disputes. These cases are of particular importance, and that is why his or her judgment usually avoids a distinct decision. The paramount chief, too, is primarily concerned about fathoming out possibilities for reestablishing social peace. To this end, it can now and then be advisable not to make his or her own decisions but to consult the gods directly through oracles or ordeals.

Yet the paramount chief's status is fragile for three major reasons: His or her competition arises from within his or her own family, as every member of the chiefly lineage is principally able and entitled to take over the rule; although the paramount chief can protect himself or herself from a coup with personal life guards, she or he cannot prevent enemies from having the same guns at their disposal (bow and arrow, spear, and shield cannot be monopolized, but they can be independently produced by anyone); and finally, it is not in his or her hands whether the gods maintain their well-disposed attitude toward her or him. Plagues, crop failures, and other forms of disaster inevitably initiate considerable doubt about his or her rule. Rise and fission of this kind of political rule are very close.

Law in Premodern States

The premodern state differs from segmentary societies and from the chiefdom in its institutionalization of political order. The information and decision-making processes become structured and are organized hierarchically. First and foremost, this is done by the establishment of a bureaucratic administration. The introduction of the written form of communication permits the collecting and processing of larger amounts of information. Archives provide experiences for future decision making, and reforms can be compassed on a grand scale. Information is gathered from bottom to top, but decisions are carried out from top to bottom. This rationalization creates space for delegation and results in a differentiation of politics: It is not only guidance, for it also turns into an organization whose routines ensure the functioning of the political association.

The organization's effect can be felt in every scope of the state; taxes lose their character of donations, which are

connected with the expectation of reciprocation (they become charges, which are mandatory duties for the financing of the state). The level of physical force within the society is lowered; it becomes illegal to take the law into one's own hands or to feud with another citizen. The state monopolizes the instruments for the use of force, regulates the equipment of the army, supervises the arms production, and arranges for the logistics of the forces. The power to secure peace and order is not anymore in the hands of clans but rather lies in the organizing authority of politics. Lasting changes can also be observed in the field of jurisdiction: The establishment of the written form fundamentally alters the character of law. The gain in clarity is accompanied by a loss of flexibility. This generally results in an enhancement of the written text in law; some states (e.g., imperial China) even cultivate a legalistic tradition. Yet the character of the legal culture also depends on the institutionalization of jurisdiction. In ancient Rome, courts continue to play an important role under the modified conditions of the written form. In the democratic *polis* of Athens, however, courts are an instrument of self-help for the parties of the litigation; moreover, their character as true mass events (up to 500 judges participate in a usual hearing) necessitates a strict formalism that has not displayed much impact on the development of law contents.

Just as in segmentary societies, the law of premodern states significantly contributes to the preservation of the social order. This order, however, is marked by social differences in status. The chiefdom was already based on relationships of precedence and the subordination of clans; in premodern states, the social stratification increases. Law is primarily a question of status. The upper classes possess exclusive access to public offices and hence to political power. The lower classes, including peasants, tradesmen, and merchants, hardly possess any rights. Slaves are without any rights at all; the homicide of slaves by someone who is not their owner, at the most, results in a responsibility to compensate for the loss. Other parts of the society are also excluded from law, as they are not able to claim their own rights. Among them are mainly women and children but also wards (clients). All of them are subordinate to their protector according to Roman law, the *pater familias*, or the patron, who represents them before the court or at other institutions. Within this static order, the individual scarcely has opportunities for advancement. One is born into one's fate, and this fate is cemented by the law. Correspondingly, being marginal is the significance of legislation. Law does not serve to regulate social transformation but rather to secure a social order that is founded on inequality.

Law in Modern States

Caused by dramatic social upheavals, the processes that lead to an increased concentration on lawmaking accelerate during the 16th century. Law is still seen, in general, as

an expression of divine will, but as a result of religious division, the certainty about the content of this will begins to dwindle. Rather, this issue becomes the object of a dispute that irrevocably splits the Christians' unity and leads to the destruction of Europe during the Thirty Years' War. More and more, the idea prevails (which had already been proclaimed by Bodin, Hobbes, and others) that law alone cannot ensure peace. Peace also requires politics, more specifically, a sovereign power that holds the reins of law and justice in its own hand. Thus, law becomes an object of human creation and an instrument of a constantly growing political will to create. This is the beginning of the politicization of law. From the mid-16th century to the early 19th century, law serves more and more to consolidate the peacekeeping system of the territorial state, to reduce privileges, to control jurisdiction, and to centralize administrative structures. In the course of these developments, legislation continuously increases in importance; as a consequence, the relationship between law and politics begins to shift. Law, formerly an expression of the concept of justice, becomes less important as a binding parameter for political orientation. Whatever remains of the concept of justice is turned into nonbinding natural law, which does not endanger the legislative sovereignty of the ruler nor its peacekeeping, system-securing effect.

With the rise of the bourgeoisie as a political power, the situation changes as was manifested in America's War of Independence (1775–1783) and in the French Revolution (1789–1799). The claim to power as a divine right is challenged just as vehemently as the state's unrestricted authority. Instead, all of a sudden, it is a "self-evident" truth "that all men are created equal [and] that they are endowed with certain unalienable rights," as the Declaration of Independence written by Thomas Jefferson stated in 1776. The firm belief that society can rule itself for the greater public good is the common core of the different strands of liberalism. To the liberals, law becomes a guarantor of individual liberty, that is, equal rights for everyone and not privileges just for the few. After all, it is the people, the citizens, whose cumulative effort forms the whole of society. Accordingly, people must also be granted the right to political self-determination as put forth by Abbé Sieyès in his famous pamphlet *Qu'est-ce que le tiers État?* (1789). It has since been the legacy of the Enlightenment era that political power can be justified only when its claim to power is democratically legitimized and legally limited. This is only one element that contributed to the process of the juridification of politics.

The other main element is the constant expansion of legislative activity in response to tremendous social transitions, for the most part caused by the Industrial Revolution. While the growing social demands intensify the political process by increasing the number of political decisions as well as their purview, an internal hierarchy is established within the European legal system. It differentiates between two principal levels of law: statutory law, which is enacted

by the legislative power, and constitutional law, which is enacted by the constituent power. Constitutional law provides a regulatory framework for the establishment and purview of statutory law, but it is kept safe from a hasty interference of politics. The creation of a constitution itself differs fundamentally in its historic importance from the everyday passing of laws in a constitutional state. Most states store their own historical "constitutional moment" (Ackerman, 1989) in their collective memory. Furthermore, amending the constitution requires in most countries a much more complicated and consensus-oriented process than changing laws. This internal hierarchy between constitutional law and statutory law enables a mutual dependence of politics and law. It empowers the lawmaker to act politically, swiftly, and effectively in order to change or adapt the law according to his or her own ideas and to even create a completely new legal situation. Nevertheless, he or she must adhere to the constitutional requirements.

Law of the International Community

The sovereignty of states, which arose from the close connection between politics and law, is also of major importance in international relations. Sovereignty dominated classic international law, which came into being with the Peace of Westphalia in 1648. Until the beginning of the 20th century, international law was primarily interstate law, resulting from agreements among individual states. Rules and institutions at the international level were subject to the principle of unanimity; nothing could be implemented against the will of a state. In this regard, every state was equal in sovereignty. The sovereignty was primarily documented in the right to wage war (*ius ad bellum*). The disaster of World War I, however, led to a change of views. The League of Nations (1920) was a first attempt to transform the unrestricted right into a partial ban on war. The Briand-Kellogg Pact (1928) went even further and aimed at a general outlawing of war. But not until after World War II was the time ripe for a substantial modification of classic international law: With the Charter of the United Nations (1945), a general prohibition of force has been introduced, complemented by a global obligation to ensure peace. The multitude of transnational players and international organizations has already at the time of the Cold War (with its debilitating consequences primarily for the UN Security Council) resulted in an advancement of international law. It has become an "international law of cooperation" (Friedmann, 1964, p. 251). International human rights are increasingly established as the critical criterion for international politics.

Since the end of the Cold War, the challenges of globalization can no longer be ignored: It is manifest in the daily, global forms of communication (e.g., the Internet) and traffic (e.g., the international employment market); it appears in the form of ecological problems (e.g., climate change), which overtax the individual states as much as economical issues (e.g., unregulated financial markets).

The state's power is no longer sufficient to protect against threats coming from inside and outside its territory (e.g., international terrorism). As these key words illustrate, the sovereignty of the state is put into question. It once was the expression of the connection between law and politics in a state; now, however, social systems and political fields begin to disengage themselves from state-defined (territorial) frameworks. Politics is increasingly dependent on transnational players, which are organized in networks and equipped with their own negotiating power. Foreign relations are no longer a government's prerogative.

From this, crucial challenges for international law follow whose further development is part of the paramount tasks of the international community; international law has to enhance and consolidate those processes that stay abreast of the diversification of players as well as of the extension of activity levels (this also includes the divers regional orders as an autonomous level within world politics). This will require a reconsideration of the relationship between universalism and particularism in international law. The crucial question in this regard is, How much legal pluralism is possible, and How much constitutionalization of international law is necessary on the way to an effective legal order that would be worthy of the name "law of mankind"?

On the way to this effective legal order, international law has already partly developed into a regulatory law of the international public order. The sovereignty of the state is no longer an insurmountable barrier toward the international protection of human rights. The international community can and must intervene in case of gross human rights violations. This self-commitment of the international community constitutes a major break in international law. It will succeed in justifying this, though, only if the interventions themselves form an inevitable step toward the juridification of international politics. The guiding principle of legal reason is to exit the state of nature as Immanuel Kant stipulates. And he adds that as long as a free society based on law is not realized, it can, under certain circumstances, be permitted to coerce another person to exit the state of nature and to enter into the civil society organized by the rule of law. The obligation of international law is to clarify the conditions of these permitted compulsory measures. This would be a main contribution to the strengthening of international law's legitimacy.

Conclusion: Functions of Law

Abstractly speaking, the specific function of law is to protect the (normative) structure of expectations within a group against disappointments. This is primarily done by means of sanctions, which are imposed in case of disappointed expectations. At the same time, sanctions serve as incentives for the community members to fulfill the generalized expectations. The prerequisite for a socially effective, or "living" law, is not merely its standardization but also its institutionalization. Both developments are closely connected; they facilitate a division of legal work

that is of major importance above all for the modern law. Under the conditions of an increasingly complex society, the uncertainty is growing as to what is expected of the individual and if this expectation is shared by others. Law tends to reduce this uncertainty by providing general rules of conduct, which are directed at everyone. The more abstract the standardization of behavioral rules becomes, the more necessary is the individualization of case decisions by appropriate institutions. The history of law is therefore as much a history of standardization as a history of institutionalization.

The invention of a triangular relationship is of crucial importance for the institutionalization of law. It consists of two conflicting parties and one impartial person, or institution, with the obligation to settle the dispute. The character of the third person can vary (judge, chief, council of elders, etc.), but its function relieves community life in several ways that can ideally and typically be summarized as follows: First, the mediation by a neutral third person represents an alternative to the logic of mutual vengeance. On principal, this contributes to a decline in violence and consequently strengthens a community's integration capacity. Second, the function of the judge marks the beginning of an institutionalization of social roles that structure the distribution of power within a group. Socially accepted behavior and legally protected expectations connect and stabilize themselves in the respective roles; and the roles themselves forward the anticipation of sanctions and typically increase the self-domestication of the group members. This supports the interplay of leadership and followers and decreases arbitrary behavior on both sides. Third, the repetition of the application of the law and the law enforcement are augmentative, in terms of the reliability of expectations, provided that the dispensation of justice will lead to the same or to very similar results in the concrete case. This incentive can encourage the authority's self-commitment to precedents. Furthermore, it can be a stimulus to the development of legal equality within a group, for law lives (as opposed to the privilege) not on the exception but on the rule.

Sir Henry Maine (1822–1888) regarded the transformation from law based on privileges to law based on equality as the evolutionary principle that is ultimately decisive for every legal system. His formula "from status to contract" is nowadays regarded with skepticism because of its strong teleological connotations that do not leave much room for cultural diversity. But it still expresses a valid idea: Law displays a tendency toward formalization itself. The exceptions to the rule are also put into a legal form and are, consequently, incorporated by the law. It does not turn blind to the necessity of exceptions; however, as part of legal rules, they require an intense substantiation. The limits are typically reached when the exception is reinterpreted to become the rule. Such cases raise problems of justice that let law appear to be arbitrary and thus illegitimate. According to its own intention, law forms the counterpart to arbitrary decisions as it can otherwise not fulfill its function of protecting expectations even in the case of norm violations.

The problem of arbitrariness illustrates that law's main function, its protection of expectations, can be concretized and differentiated into a regulating function and a directing function; one is oriented toward stability, the other one toward justice. Both functions are connected: To the same degree to which a political order is based on acceptance by the citizens, the question about the legitimacy of law gains in influence for a system's stability. Examples of historically far-reaching consequences include the great revolutions of the United States (1776), France (1789), and Germany (1898), a comparatively young example. Below these major caesuras, the pursuit of legitimate law continues. At all times, this has also been a quest for (social) justice and has thus fostered the struggle for law in modern legal systems.

For some, the field of tension between the ideal of legal equality for all citizens and the socioeconomic inequalities in modern societies presents itself as a productive challenge; to others, on the contrary, law is merely an instrument that is supposed to conceal or stabilize social inequalities in the interest of the ruling classes. These differing ideological views explain that, with institutionalization progressing, law is attributed further functions within the political system: on the one side, the function of authorizing political power; on the other side, the function of controlling political power and civilizing it. Historically, the state's gain in power by the combining of law and politics has evoked countervailing powers that are, nevertheless, dependent on law: Liberalism and constitutionalism see law as a suitable instrument for confining politics' claim to authority. This balancing of law and politics is based on a constant mutual adjustment that has led to a considerable juridification in all areas of modern social life.

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FORENSIC ANTHROPOLOGY

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Forensic anthropology involves the identification of an individual. As such, it can be considered a *medico-legal subspecialty* of both physical anthropology and forensic science. Forensic anthropology focuses on the study of human osteology in order to make a positive identification, while physical anthropology focuses on the study of our species in terms of primate evolution, human genetics, and biological variations. A difference between physical anthropology and forensic anthropology is the age of the human remains. Physical anthropology is interested in all ages, while the focus of forensic anthropology is specific to human remains that are less than 50 years old. A second difference between physical anthropology and forensic anthropology is that while each analyzes human remains, forensic anthropology does so in order to meet a specific objective of identifying the dead through biological characteristics and, if possible, determining the circumstances of unexplained death. Forensic anthropology focuses on differences in the human skeleton to determine specific physical traits, such as age, sex, height, weight, health, anomalies, and ethnic background.

These differences came to light particularly in 1972 when the American Academy of Forensic Sciences (AAFS) established a physical anthropology section. Membership in this section entailed exclusively forensic applications of anthropology rather than all anthropology in general; the 14 members in 1972 became known as forensic anthropologists. This led to the establishment in 1977 of the

American Board of Forensic Anthropology (ABFA) (www.theabfa.org/index.html) with sponsorship by the AAFS and the Forensic Sciences Foundation.

Origin of Forensic Science

Forensic sciences were practiced before they were identified as forensic anthropology or even forensic science. Forensic science was first documented in France in 1910 with Dr. Edmond Locard's establishment of a center where scientists studying biology, physics, and medicine came together to examine evidence for criminal investigations. This group analyzed materials and shared resources in an attempt to reconstruct crime scenes. Eventually known as a criminalistics laboratory, or crime lab, this model was followed in 1914 by the city of Montreal. The center in Montreal followed Locard's philosophy, called Locard's *exchange principle*, the foundation of the field of forensic science. Montreal's center was run by a physician and thus became known as a *medico-legal lab*, a subspecialty of medicine. The structure of this model lab became popular, and in 1923, the first lab based on this model was established in the United States by the Los Angeles Sheriff's Department. In 1932, the newly established Federal Bureau of Investigation (FBI) set up its own lab, which could be accessed nationwide, although unlike the lab in France, contributions were minimal from different areas of science such as biology, chemistry, and physics.

Over the last 100 years, physical anthropologists have assisted with medico-legal investigations. Many physical anthropologists, especially from the Smithsonian Institute, acted as advisors to medico-legal officials through published articles and law enforcement bulletins during the 1930s and 1940s. In the 1960s, Lawrence Angel joined the Smithsonian staff and continued as a consultant for the FBI, including the launching of a training program for the forensic applications of skeletal biology.

Forensic Anthropology

The Need for Forensic Anthropology

There are five main objectives in forensic anthropology: (1) Determine ancestry, sex, age, and living height; (2) attempt to identify the nature and causative agent if evidence of traumatic injury to human bone exists; (3) render a determination of postmortem interval; (4) assist in locating and recovering remains so that all evidence relevant to a forensic investigation is recovered; (5) provide information useful in obtaining a positive identification of deceased persons (Byers, 2002, p. 1).

Forensic anthropology is needed to restore names and identities to unknown human remains from murder, mass disaster, or other found human remains. Forensic anthropologists assist both in the identification of bones and also in the recovery of bodies. Besides identifying the bones, forensic anthropologists also analyze trauma to the bone in order to gain necessary knowledge on the cause and manner of death. Nafté (2000) asserted that identifying remains may actually prevent the time and expense of a large-scale legal investigation. Forensic anthropologists not only process and analyze human remains in a laboratory but also are called on to assist in locating and recovering remains as well as to interpret any ante-, peri-, or postmortem (pre, during, or after death) movements or modifications of the remains.

Development of Forensic Anthropology

Forensic anthropology can be divided into three time periods, according to Rhine (1998): formative (early 1800s–1938), consolidation (1939–1971), and modern (1972 onward). Prior to the 1970s, those physical anthropologists working particularly with the medico-legal and forensic aspects of anthropology had no official name. The father of American forensic anthropology is Thomas Dwight, a Harvard anatomy professor in the late 19th century who published *The Identification of the Human Skeleton, a Medicolegal Study* in 1878. In his book, Dwight discussed how an examination of human bones could lead to the determination of gender and stature of the remains.

During the formative period (early 1800s–1938), one of the first known cases occurred. In 1849, Dr. Jeffries Wyman

of Harvard University identified human remains in order to help solve the death of a prominent Boston-area doctor, George Parkman. In this case, Dr. John White Webster, a colleague of Dr. Wyman, was accused of the murder based on evidence that on November 23, 1849, Parkman went to claim money owed to him by Webster. This date was the last time anyone saw Parkman alive. Less than a week later, a janitor at the Harvard Medical School called the police on discovery of what appeared to be human remains in a stone vault underneath Webster's office. While officers suspected these approximately 150 bones, some of which were burned, and set of false teeth belonged to Parkman, the police left it up to a team of doctors and dentists to prove it in court. On examination, the doctors were able to testify that these remains matched a person of Parkman's age, build, and height. Three hours of deliberation led to a guilty verdict for Webster.

More forensic anthropological activity was recorded during the consolidation period (1939–1971), such as the identification of servicemen killed on the battlefields during World War II and the Korean War. The work of the physical anthropologists called on by the United States Army during World War II for the identification of skeletal remains for repatriation led to the establishment of the Central Identification Laboratory (CIL) at the Hickman Air Force Base in Hawaii in 1947.

The third, or modern period, which began approximately 20 years ago, is when the application of forensic anthropology to the investigation of human rights violations increased dramatically, mostly due to the reinstatement of democratic governments along with higher levels of public awareness and social action. Requests for such action have been from countries such as those in Latin America, Africa, the Middle East, and Eastern Europe. One team in particular demand is the Forensic Anthropology Team of Argentina (EAAF), which has established its own precedent by becoming involved in other missions worldwide; this team is very much in demand due to their expertise, particularly in presenting evidence for war tribunals.

Methods in Forensic Anthropology

The process of forensic anthropology can be described, according to Mercedes Doretti of the EAAF, as three parts: interviews, excavation, and analysis (Burns, 1999). However, interviews are less likely to be conducted by forensic anthropologists as the bones are often already decomposed and witnesses are not easily located. In addition, many forensic anthropologists prefer to work with as little preconceived knowledge as possible to avoid tainting their conclusions and findings. The three parts identified by Doretti can be redefined into two types of methods: data gathering (interviews and excavation) and data analysis (analysis). The data is gathered from skeletal remains, while the analysis answers questions posed by forensic-anthropology protocol.

Data Gathering

Data is gathered using four techniques: anthroposcopic, osteometric, chemical, and histological. Anthroposcopic data is gathered visually, including through the use of X-rays, and involves such characteristics as ancestry, sex, age, and stature. Osteometric data involves the measurement of human bone on an objective scale using calipers or an osteometric board in an attempt to quantify many of the anthroposcopic characteristics. Chemical data is gathered through the examination of chemical makeup of certain structures of the skeleton, including mitochondrial DNA (mtDNA) and associated matter such as the ground beneath the skeleton. Histological data is gathered through the study of the microstructure of teeth and bone.

Data Analysis

There are five methods to analyze the data from the skeleton: decision table, range chart, index, discriminant function, and regression equation. The last two methods come from statistics.

A decision table helps the researcher judge the importance of conflicting information to arrive at a single conclusion. In a decision table, options are listed across the top of the table, while characteristics for determining these options are listed down the left-hand side. A forensic anthropologist marks the columns where characteristics observed indicate agreement with the option at the top. The name of the column (option) with the most marks is the one most likely to be correct.

A range chart provides multiple ranges of estimates so that a central tendency can be determined. To use a range chart, a forensic anthropologist charts the ranges of features observed. Where the most overlap on the chart occurs is the data range that is most likely to be correct. These are particularly useful for parameters in which multiple sources of data are encountered such as time since death and age at death.

An index is a method to standardize skeletal measures for two dimensions. This method was developed so that numerical expressions of the shape of a structure can be compared between two groups. An index is a simple yet powerful statistical method for quantifying anthroposcopic traits. When two measurements express visually identifiable characteristics, the forensic anthropologist will divide one into the other, multiple the quotient by 100, and arrive at an index.

A discriminant function is a method for calculating a numerical expression of shape that can be used when more than two measurements are available. A forensic anthropologist would use a discriminant function whenever there are discrete categories to determine to assist in distinguishing between two or more predetermined groups. These might consist of gender or hair color.

A regression equation is a method by which one value can be predicted from the values of other measurements.

While regression equations are included in the five methods to analyze data from skeletons, these are often incorrect because they do not account for the increasingly unknown nature of points away from the middle line of a set of values, and they do not consider that other samples might yield other values.

Facial Reconstruction

Facial reconstruction is a subset of the methods of forensic anthropology. In facial reconstruction, the forensic anthropologist works to recreate the facial characteristics to assist in identification. This is considered a last resort, one to use only if a search of missing persons' files has not revealed a potential match. Traditionally, this was done manually by molding and casting the original skull, applying spacers to indicate the amount of tissue thickness at various places on the facial skeleton, and filling in the areas between and around these spacers. Today, preferably, computer software is used to produce faces on images of the skull. However, in other cases, artists drawings, restoration of disrupted or damaged tissue put back on the skull, or photo/portrait superimposition is also used. There are still problems found by forensic anthropologists and other practitioners such as predicting individual characteristics not apparent on the skull regardless of the method used.

There are three software programs commonly used: CARES (computer assisted reconstruction and enhancement system), FACE (composite picture software), and Faces (face recognition software); each of which uses radiographs or photographs of faces or skulls, which are then digitized. Using banks of stored features from both cadavers and living samples using magnetic resonance imaging (MRIs) and computerized tomography (CT) scans, a face is then electronically restored or reconstructed.

Human Skeleton

Forensic anthropologists should be familiar with every feature of the human skeleton, including the range of variation between individuals and the differences between human and nonhuman bones. The familiarity is needed to assist in the critical matter of identifying human skeletal remains. The bones to be familiar with include the 29 bones of the head (cranium, inner ear, mandible, and hyoid) and the 177 bones of the postcranial skeleton below the head. This number varies, however, based on age and other circumstances, all of which the forensic anthropologist needs to be aware of. In particular, a child's skeleton will have more bones since not all bones found in a younger body will have fused together to create the bones found in the adult skeleton. Forensic anthropologists need to be familiar with the landmarks and features, growth and development of each of these bones and their components to help determine age and other characteristics of the skeleton.

The postcranial skeleton can be further subdivided into the torso and limbs. The torso includes the ribs, vertebra, scapulae, clavicles, sternum, pelvis, and sacrum. The limbs include the arms (the humerus, radius, ulna) and legs (the femur, tibia, and fibula). The pelvis, composed of three portions (ilium, ischium, and pubis), contains information critical to determination of age at death or gender in adults.

When referring to bones in the human skeleton, it is necessary to use specific terminology to assist others in locating the same bones one is referencing. This is done by thinking of the skeleton standing (or lying on its back) with arms at the sides, palms forward, and thumbs to the outside. This position was chosen, in part, due to the fact that in this position none of the bones cross each other, and it is possible to consistently describe the relationships between bones (Adams, 2007).

Identification Process

Identification occurs after the forensic anthropologist has gathered all of the data and analyzed this data through various methods. The identification is rarely definitive but rather provides a guide or range from which identification can be drawn. As time passes, modeling and remodeling of bones within the skeleton records events in the person's life such as growth, disease, and environmental change, providing a lasting record of past events, lifestyle habits, and occupational stress. Earlier in life, generally within the first three decades of life, the growth and maturation of the human skeleton is most reliable for its relation to the time and sequence of age change as it relates to sex and race differences.

Definitive identification is rare based solely on the skeleton as there are external factors that can affect the records stored in the bones, for example, nutritional deficiencies, diseases, medications, pathological conditions, anomalies, and more. The markers on the bones indicating occupational stress provide an additional means of identifying a person from a skeleton, which is particularly helpful in aiding law enforcement officials in their search for a missing person. The most important details in the identification of an individual person occur in the head: eyes, ears, nose, and mouth.

How Bones Change

Though living bone is mainly inorganic, it is a dynamic tissue that is capable of responding to a wide variety of stimuli. As such, it is in a constant state of change. Modeling is the change, or growth and development, of living bone that takes place from approximately the third intrauterine month to approximately 25 to 30 years of age. Remodeling, or changes in the density, shape, and size of bone, takes place throughout the person's life. Remodeling is due to factors such as aging, exercise, diet, injury, trauma, disease, and occupational stress. In particular, there can be

lesions due to occupational stress. These lesions manifest in four ways: modifications to areas of insertion, osteophytosis, discrete markers, and stress fractures.

The forensic anthropologist needs to be aware of the different responses of bone to stress during and after life. The type and patterning of a fracture can help establish the sequence of damage to skeletal material.

Age

The forensic anthropologist can estimate the age of the decedent through knowledge of changes to the skeleton that occur both during growth and deterioration. There are several methods to determine age at death that require special instruments such as cortical bone loss, counts of bone histological structures, and the Gustafson method on teeth. Byers (2002) asserted that the "methods for determining age are not accurate enough to be usable in forensic situations" (p. 192) although the age for individuals under the age of 12 years is said to be estimable from the lengths of the long bones combined with the development and eruption of teeth and fusion of primary and secondary ossification centers. In adolescents, the forensic anthropologist can also estimate the age of the skeleton at death through the amount of union in various epiphyses. In adults, the forensic anthropologist needs to be aware of changes in pubic face, auricular surface, the sternal ends of ribs, and the amount of suture closure in the skull. In general, the age of a skeleton is more accurately determined the younger the decedent was at time of death.

Gender

In determining gender, the statistics are generally higher than for most other characteristics. There is a 50% chance of a correct guess without other information available. The pelvis is where the strongest and most accurate indication of male versus female is found as the pelvis of a woman is generally broader than that of a male. When examining the pelvis, particular attention should be paid to the bone of the anterior pelvic area (the pubis) as the lower margin of the pubis forming the border of the subpubic angle is wider in a female than a male. This margin is determined using the ischium-pubic index, the only commonly used metric method for distinguishing sexes. If the pubis is missing, then the skull difference can assist in determining the gender, but there is a certain amount of overlap in the middle of the size differences.

Stature

The stature of a skeleton is determined by adding together the measurements of many bones in the skeleton. It is very important to obtain as many bones as possible and to correctly identify each bone. The bones measured to determine the stature include the skull and the combined

heights of the vertebrae, the femur and tibia, and articulated calcaneus. Although it is less accurate, forensic anthropologists commonly calculate stature based on the lengths of the long limb bones solely: the humerus, ulna, radius, femur, tibia, and fibula. Because it has been documented that persons lose stature with age, estimates of living heights among persons determined to be 45 years or older at death need to be adjusted downward.

Race/Ancestry

When determining the race or ancestry of a skeleton, the forensic anthropologist depends on the skull. The skull has the most traits to use in determining the race or ancestry. Without a skull, there are a limited number of postcranial skeleton traits to use. This categorization is often the most difficult and least precise due to problems of inconsistency between racial categories. Forensic anthropologists depend on the categories for race/ancestry most widely used by law enforcement agencies: Caucasian, African, Asian, Native American, and Hispanic.

Handedness

When examining the skeleton, the forensic anthropologist often can estimate the handedness of the decedent by comparing the right- and left-upper-limb bones. The side with the largest and most modified bones is generally the dominant side.

Basis of Examination and Evaluation to Identify the Dead

Krogman and Iscan (1986) provided a guideline that forensic anthropologists follow today when examining and evaluating to identify the dead. Krogman and Iscan suggest beginning with “the big four”—stature, age at time of death, sex, and race/ethnicity. Once this information is determined as well as possible, the forensic anthropologist should then continue with the “accessory” information—weight/body build, duration of interment, cause of death if registered in the bones, and a final registry of miscellaneous details of individuality to assist in identifying the decedent such as fractures, amputations, and so on.

The Human Genome (DNA)

The human genome provides the ability to chart any person’s genetic makeup. However, particularly for forensic anthropologists, this is not always possible to obtain. When it is obtainable, often it is the forensic biologist who processes the DNA, not the forensic anthropologist. The human genome, or DNA, is, according to Bass and Jefferson (2007), the “gold standard” for making a positive identification. However, they note, this is not always the

fastest or most efficient method to obtain a positive identification. There are still older methods that are much faster and more affordable than DNA testing. Advances in the analysis of DNA extraction from archaeological bone allows for personal identification. However, the DNA preserved from crime scenes or other evidence may be affected by human errors that will affect the quality of the DNA, degrade the DNA, or be in minute quantities. As the DNA falls apart due to degradation, the pieces become smaller and smaller, which causes DNA analysis to become harder and harder.

Newer DNA analysis is based on DNA (such as mitochondria) that is not located in the cell’s nucleus as it was in the past. Cells have organelles just as bodies do; these organelles are called organelles, existing in the cell but outside of the nucleus. Select organelles have their own packets of DNA, such as the mitochondria. This DNA, called mtDNA, is carried on the mother’s side and survives in numerous quantities in hairs, bone, and teeth, according to Houck (2007).

Other Evidence

Other evidence gathered can be from the location itself, scraps of clothing or human remains beyond the skeleton, and interviews with people. In collecting evidence through interviews, one needs to be sensitive to the culture of those being addressed as this can vary from place to place, culture to culture, and country to country.

Collecting Evidence

There are four major steps in collecting evidence: location, mapping, excavation (if needed), and retrieval. The forensic anthropologist is not always involved with these steps although it is helpful and often time and cost saving to have the forensic anthropologist involved from the start rather than relying on the findings of others. Locating the remains is the first step of the process. Next is mapping, which includes drawings, photographs, videos, and other methods of recording the location and the process itself from locating to retrieving to relocating the remains to the forensic anthropologist’s laboratory. The excavation includes searching and collecting the bones and other materials considered necessary for the forensic anthropologist’s work, while the retrieval includes packing and transporting the materials to the forensic anthropologist’s laboratory.

It is helpful, from the start, to make an inventory of what is found. This inventory will help establish the number of sets of human remains. If there is more than one left femur, other limb bones, or skulls, then this is a general indication of collocation (arrangement) of more than one human skeleton, or commingling. Additional vertebra, ribs, or sesamoid bones (bones that grow in tendons) are not indicators of commingling as it is not

abnormal for an individual to have one or more of these. The recording of the process, along with the proper usage of methods of collection and retrieval, will enhance the reliability and success with which the case can be resolved.

Interpreting and Applying Evidence

When interpreting evidence to assist in making an identification, attempts made by humans to disguise or destroy remains can cause problems. Problems can also be caused by any other postmortem damage from a number of sources, including human dismemberment to prevent identification or to show disregard for the victim, and nonhuman animals; heat such as fire; and weathering, burial, and water. The effects of fire include charring, cracking, discoloration, warping, and shrinkage, while weathering—due mainly to sunlight—manifests itself through cracking and warping. Burial has similar effects to weathering and low-temperature burning, whereas water causes abrading and scattering of skeletal elements. The overlap of effects can also cause problems in interpretation for cause of death or postmortem damage that has occurred.

There are three types of bone disease (deformative, lytic, and proliferative) as well as four types of skeletal anomalies (accessory ossicles, nonfusion anomalies, accessory foramina, and miscellaneous anomalies) that the forensic anthropologist needs to be aware of to better help determine what has happened to a bone.

One of the main interpretations by the forensic anthropologist is the manner of death, or the manner in which a person died. There are five recognized manners of death: homicide, suicide, accident, natural, and unknown. It is the forensic anthropologist's job to avoid as much as possible an unknown cause of death, unless there is insufficient evidence to prove one of the other four manners of death.

While determining the type of bone injury, the forensic anthropologist should also attempt to determine the timing of the bone injury: during life, or *antemortem* trauma; around the time of death, or *perimortem* trauma; or damage done after death, or *postmortem* damage. This timing will help establish if the bone trauma discovered is the cause of death.

The bones can tell a lot about the cause of death. There are four types of bone trauma that can indicate the type of death: blunt, sharp, projectile, and miscellaneous. In the analysis of a blunt force bone trauma, the forensic anthropologist must start with a complete description of the injury, including the type (fracture or infraction), the bone affected, which side of the bone, and the placement in the bone of the injury. Next, the forensic anthropologist should attempt to determine the size, shape, and weight of the causative instrument. Of particular note, a fracture of the hyoid bone is the main osteological consequence of death

by strangulation, which is caused by hanging, ligature, or manual strangulation. Sharp trauma results from narrowly focused dynamic compression forces applied to the surface of a bone, such as evidenced in punctures, incisions, and clefts. A projectile bone trauma needs to be analyzed by a forensic anthropologist who understands a number of characteristics of firearms and ammunition such as size (e.g., caliber gauge), velocity, and bullet construction. The forensic anthropologist, when examining a gunshot wound to the bone, should also determine, to the best of his or her ability and knowledge, the causative weapon, the placement of the firearm, and any other information that can be accurately determined.

The forensic anthropologist should create a report that is stated clearly. The report should be generated after careful examination, research, and reflection and based on notes taken throughout the process. The length of time it takes to create a report depends on the complexity of the case. Regardless, the forensic anthropologist's report should provide as much detail and precise data as possible at the time of writing, although modifications for further clarification can be made if needed. This report "records physical observations on the remains, identifies important biological characteristics, and identifies and differentiates changes in the remains due to natural and cultural forces" in a way that is understandable to the medico-legal officer in charge (Pickering & Bachman, 1997, p. 35). The report should be presented in two parts. The first part of the report should be approximately one page in length and should briefly describe the results in a readable form to the nonforensic anthropologist and include a description of methods used and discuss details of the results obtained from the analysis.

The second part of the report consists of six sections. Part 1 presents background, including names, dates, and places as they apply to the case, including how the forensic anthropologist was summoned, what was done prior to the summoning of the forensic anthropologist, and who was present during the analyses. In Part 2, the general condition of soft tissue that is present and the state of preservation of osteological material along with any photos of the body, which are included as an appendix to the report, can be referenced here. Part 3 is a complete inventory of osteological and odontological remains, including the number of individuals present. Part 4 presents each of the four aspects of demography (ancestry, sex, age at death, and stature) in separate subsections that fully describe how these characteristics were determined. Part 5 explains antemortem, perimortem, and postmortem injuries using photographs, line drawings, and other supportive material. Part 6 includes any recommendations for further testing outside the realm of the forensic anthropologist, which can include searches of missing persons' files or the names of ethnic enclaves to approach for information on the decedent. Appendices can include supportive photographs and tables.

Expert Witness

1948 was the turning point in the United States for the forensic anthropologist to be accepted by the legal system as an expert witness. Today, forensic anthropologists are being asked to offer expert testimony for both prosecuting and defense attorneys.

A biological profile is the information presented by the forensic anthropologist as testimony in a court of law. The human skeleton or other human remains are *not* part of an exhibit in a court of law. Therefore, a well-documented analysis or conclusion with verbal testimony, written statements, photographs, and slides are the supporting facts and exhibits in the court of law.

The forensic anthropologist must always be certain, whether in the report or when testifying as an expert witness, to present the data and opinion honestly. Particularly in court, this must be done so as to ensure that the judicial process is not affected by the forensic anthropologist's presentation of the data and opinion. It is imperative for the forensic anthropologist to differentiate between evidence or data and opinion or interpretation. This evidence-opinion dichotomy is one of the most important distinctions for a forensic anthropologist to make before presenting findings for others' use.

There are three types of opinions a forensic anthropologist may form: speculation, possible, and probable. Speculation is based on few or no data and should be given only if specifically asked and never in a written form. A possible opinion is one that is based on a characteristic or event that is possible but is too unlikely to be taken seriously. A probable opinion is one with the highest level of certainty,

Ongoing Advances in Modern Forensic Anthropology

In 1986, the Forensic Anthropology Data Bank was created at the University of Tennessee in Knoxville to help identify the race or ancestry of a skeleton. The Forensic Anthropology Data Bank contains measurements and observations of thousands of individual skeletons analyzed in forensic cases and from museum collections. This vast data helps the forensic anthropologist to detect previously unrealized subtleties. This data bank is the foundation for FORDISC, a computer tool that analyzes these subtleties to confirm or challenge an anthropologist's findings. FORDISC enables the user to enter measurements from a current case to help estimate sex, ancestry, and stature.

Forensic anthropology has become used more for identifying victims of current disasters, such as 9/11, and mass disasters, such as hurricanes and earthquakes. Forensic anthropology has also become used more and more as a way to gather evidence of victims who can no longer speak, those who are dead—such as in cases of human

rights violations worldwide. Forensic anthropologists are stepping outside serving not only the community in which they work but also serving internationally, traveling to large-scale conflicts to work with governments.

Future Use of Forensic Anthropology

Forensic anthropologists are being called on more and more to assist in the identification of victims of homicides, mass disasters, and political atrocities (Camenson, 2001). As the methods to identify human remains become more accurate and exacting, older cases will be reopened for further analysis by forensic anthropologists to assist in solving cold cases.

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PALEOPATHOLOGY AND ANTHROPOLOGY

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Paleopathology, an application of biological anthropology, offers us an interesting perspective into the lives of the ancients. When skeletal remains are all that are left from many ancient civilizations, paleopathologists rely on strict skeletal analysis to offer insight into ancient civilizations. Combining scientific inquiry with educated reasoning can give anthropologists an idea of the daily activities of individuals; their diet, health, and environment; and even more, specifically, the cause of death of each individual. This can offer anthropologists insight not only into the prevalence and evolution of a disease in a past civilization but also into what trends to expect from the same or similar diseases today. While paleopathology can focus on more recent cases from a forensic anthropological standpoint, most paleopathologists focus more specifically on what can be learned from the remains of individuals long gone. Often, these remains consist almost entirely of bone. However, in more unique cases, such as with “Ötzi the Iceman,” tissue structure remained incredibly preserved over thousands of years (Fowler, 2000). This allowed anthropologists astonishing insights into human life in the Copper, or Chalcolithic Age.

Paleopathology started as a subspecialty with the emergence of archaeology. However, in the beginning, most archaeologists were concerned with artifacts instead of skeletal remains, since the latter seemed to have little monetary value compared to golden relicts. On the few occasions that attention was paid to human remains, usually

only the skull was studied (Waldron, 2001). A series of measurements, known as cranial fixation, were taken while the postcranial skeleton drew little attention from even the most senior of archaeologists, who were after greater riches (Jarcho, 1966). At roughly the same time, paleopathology was being looked at from another front: medicine. As the United States continued to move westward in the middle to late 1800s, doctors began to take interest in the skeletal remains of Native Americans. One of the first studies, published in 1876, looked at the prevalence of syphilis in Native American skulls (Jones, 1876). Little advances were made into the field of paleopathology until the first decade of the 1900s, when archaeologists began excavating Egyptian temples. Under the direction of George Reisner, over 6,000 bodies were examined although the pathological findings were not well reported (Waldron, 2000). Again, the field seemed to fade into obscurity for several decades until the emergence of Calvin Wells, one of the most respected and imaginative paleopathologists in history. With a strong passion and enthusiasm for the field, he drew on his medical training and enthusiasm for the field, he drew on his medical training to work with archaeologists to study the history of human disease. His book *Bones, Bodies and Disease* (Wells, 1964) was a landmark publication in the field and advanced the field of paleopathology to the level it is today.

To detect the subtle signs of illness in skeletal remains, paleopathologists must receive extensive training to master this art form. During undergraduate studies, most receive a

broad background in anthropology overall, taking classes in biological anthropology, cultural anthropology, archaeology, and linguistics (Klepinger, 2006). Alternatively, paleopathologists may graduate with a bachelor's degree in the sciences, with a heavy emphasis on anatomy and the human body. They should have knowledge of the basic sciences and mathematics. Some may include medical training in their studies, as paleopathology is a survey of the history of disease. Many then go on to pursue a master's degree as well as a doctorate in biological anthropology, with a strong emphasis on the human skeleton, osteopathy, and the skeletal record. Unfortunately, there are currently no regulations in place on the practice of paleopathology and forensic science. Thus, quality control is an issue as amateur sleuths, with inadequate training, can attempt to interpret skeletal remains.

Human Osteopathology

Paleopathology can be broken into several general components: arthropathy, infection, oral pathology, trauma, and tumors (Aufderheide & Rodríguez-Martín, 1998). Arthropathy, or disease of the joints, includes some of the more common findings of paleopathology, including simple arthritis and gout. Serious infections can often leave their mark on bones, especially debilitating chronic diseases, such as syphilis and tuberculosis. Oral pathology, which examines diseases of the oral and maxillofacial regions, may offer insights into not only dental practices and oral health but also diet. Trauma is one of the most obvious abnormalities in bone to identify, even to an untrained observer. Fractures and breaks can be examined, and paleopathologists are often able to determine if the individual lived beyond the initial injury based on bone-healing patterns. Lastly, tumors, or neoplastic osteosarcomas, may not be as obvious as some may be led to believe. Although obvious outgrowths may be observed in the bone itself, many times these tumors can be subtle, remodeling the internal bone structure before the cancer metastasizes to different parts of the body.

Arthropathy

From a pathological perspective, changes in the joints appear to be most common when analyzing fossil skeletons (Waldron, 2001). While this can include many rare and unusual disorders, most paleopathologists are more familiar with common ailments, including osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, and gout.

Osteoarthritis is a very common disorder in the living (Resnick, 1981). Many of the joints in our body are bathed in synovial fluid, including joints of the knee, hands, toes, and neck. This fluid acts as a lubricant for the constant pressures placed on the ends of our bones with each movement. Many of our bones also have a layer of cartilage on their ends, also acting as a shock absorber. This cartilage

may degenerate from the normal wear and tear through time, and is replaced by less plastic bone in an effort for the joint to repair itself. This new bone, forming on the ends of the bones, is known as an *eburnation* and is the classic indication of this illness when examining fossil skeletons. This can cause pain and inflammation in the effected joint, making every movement very painful. However, although this disease may actually be pathologically present in many individuals, some are completely unaware of its presence and have little or no pain.

Rheumatoid arthritis, similar to osteoarthritis, involves destruction of the articular cartilage (Abdel-Nasser, Rasker, & Valkenburg, 1997). This occurs from an autoimmune response in which the body produces antibodies against the synovial membrane enclosing the joint. This inflammation of the membrane spreads to the cartilage and bone, causing deformities and, in some cases, fusing the two bones. Paleopathologists can distinguish rheumatoid arthritis from osteoarthritis by the lack of new bone formation during the degenerative process. This can often be difficult, however, as arthritic bones tend to be fragile and damage easily during excavation or from erosion over time. Therefore, care must be taken to be sure the degenerations observed are truly from rheumatoid arthritis and not simply erosions of points of entry from blood vessels and nerves. New techniques in radiography have been helpful in confirming this diagnosis. Since this disorder targets the synovial membrane, the joint margins are affected first, then rheumatoid arthritis invades the rest of the joint surface. If radiographic studies show the joint surface has degenerated but not the joint margins, then paleopathologists can conclusively say that the skeleton did not suffer from rheumatoid arthritis.

Ankylosing spondylitis, unlike the previous two joint diseases, affects the spinal column as opposed to the synovial joints of the body (Waldron, 2001). This disease presents with a fusion of the spinal column, starting at the sacrum and moving slowly upward toward the cervical vertebrae. In this disorder, which has been linked with a genetic abnormality, no vertebrae are skipped in the disease's progression, helping to distinguish it from other spinal fusion disorders, such as reactive arthropathy. Due to the gross morphological changes to the spinal column, and even to the rib cage in some cases, paleopathologists can easily arrive at this diagnosis. Needless to say, this disease is extremely debilitating to those persons who are afflicted.

Gout is an extremely common disease in which uric acid crystals are deposited in the joints, leading to painful inflammation in the affected areas (Ball, 1971). If this becomes a chronic problem, the deposits may become large tophi, leading to erosions in the joint. This disease is most commonly presented in the joint between the phalange of the large toe and the first metatarsal. Paleopathologists can diagnose gout with the use of X-ray imaging, which will show asymmetrical degenerations in only a single area of

the skeleton, with no osteoporosis associated as with other joint diseases.

Infectious Diseases

As most diseases directly affect body tissue, which is rarely if ever preserved, the signs of an infectious disease may not be apparent to a paleopathologist (Waldron, 2001). Relative to the overwhelming number of potential infections, very few present themselves in the bone. Aside from very rare diseases, such as Proteus syndrome, several widespread diseases do in fact make their mark on the bone: tuberculosis, leprosy, and syphilis.

Up until the creation of streptomycin, tuberculosis was one of the deadliest diseases known to man. Caused by *Mycobacterium tuberculosis*, tuberculosis is an airborne illness characterized by primary lesions in the lung (Bauman, 2009). After the initial infection, the *Mycobacterium* may lie dormant for many years within a lesion in the lung tissue, with the patient being relatively asymptomatic. This period, which is variable among patients, will end when the lesion ruptures, releasing the bacteria back into the lung tissue. The bacteria will continue to spread throughout the body, most notably in areas of the chest, lymph nodes, and skeleton. If the infection reaches the bone, then degeneration of the tissue is observed, most commonly in the spine and hands. In the hands, a condition known as tuberculosis dactylitis is observed, characterized by extreme inflammation in the fingers. In the spine, the anterior portion of the vertebral column is destroyed, creating a distinct angulation known as *Pott's disease*. If the disease continues to progress, then this angulation may ultimately lead to a complete collapse of the spine. It is this dramatic change to the spine that paleopathologists rely on to make the diagnosis of tuberculosis. However, since the prevalence of this gross anatomical change is much lower than the overall prevalence of the disease, paleopathologists are looking for new techniques in order to identify tuberculosis in skeletal remains. One such technique is the extraction of *ancient DNA*, or aDNA, from *M. tuberculosis* remains within the skeleton (Taylor, Goyal, Legge, Shaw, & Young, 1999). This DNA can be replicated, using the polymerase chain reaction, and analyzed to confirm the presence of the disease. An even more inventive technique is the extraction of mycolic acids from skeletal remains, which make up the outer layer of the bacteria (Donaghue, Spigelman, Zias, Gernaey-Child, & Minnikin, 1998).

Of the infectious diseases studied by paleopathologists, none have had such a profound clinical impact as the study of *leprosy* (Møller-Christensen, 1965). Caused by *Mycobacterium leprae*, the bacteria initially infect the peripheral nerves (Bauman, 2009). If the immune system cannot overcome this initial infection, then the disease may progress systemically, affecting bones throughout the body, especially the hands, feet, and skull. In both the hands and feet, the phalanges are absorbed. In the skull, the anterior

nasal spine is also absorbed, creating a round, wide opening for the nose. The front teeth are also absorbed. These distinct changes in the skull are known as *facies leprosa* (Møller-Christensen, 1965) and are telltale signs for any paleopathologist looking to make this diagnosis. Study of the remains of skeletons with leprosy paired with the remains of skeletons with tuberculosis can help to explain the history of these two diseases in humankind. Since both diseases are caused by a strain of *Mycobacterium*, partial immunity from one disease occurs when infected with the other. Since the incidence of leprosy seemed to suddenly decline in Europe at around the same time the incidence of tuberculosis rose, paleopathologists hypothesize that the emergence of tuberculosis created immunity to leprosy throughout the population. However, extensive studies must continue to estimate the true prevalence of the diseases at that time in order to support this theory.

The disease *syphilis*, caused by *Treponema pallidum*, has several distinct stages of progression (Bauman, 2009). Transmitted sexually, the primary infection of syphilis is characterized by chancres, or sores, in the genitalia, or occasionally, other areas of the body. This may occur after a short incubation period following the initial exposure. Secondary syphilis, which usually begins several months after the primary period, is characterized by more numerous and painful lesions that occur in moist areas of the body, as well as in the palms of hands and on the soles of feet. It is at this stage when the host is most contagious. From secondary syphilis, the patient may enter a latent stage in which there are no signs or symptoms of the disease despite its presence in the body. The bacteria can remain dormant in this stage for many years, and some patients never progress to tertiary syphilis, the final and most debilitating stage. In tertiary syphilis, *granulomas*, or inflammatory balls created as an immune response, occur throughout the body in an attempt to destroy the bacteria. Since these granulomas, also known as gummas, can occur in any tissue, any organ system can be affected. Thus, a variety of symptoms are observed in patients at this stage. From a paleopathologic perspective, gross anatomical changes to the bone are the most profound changes. Erosion and healing of the skull is cyclic as the disease progresses, creating what is known as *caries sicca* (Hackett, 1976). Bone depositions can also occur extracranially, especially on the anterior surface of the tibia. In some cases, especially in infants, the deposition is so severe in this area that it is known as *sabre tibia* (Waldron, 2001).

Trauma

Trauma, or body-altering physical injuries, can often have very distinct presentations in skeletal remains (Waldron, 2001). Fractures and breaks can be identified with relative ease by even the most inexperienced paleopathologists. These fractures can be further analyzed to see if they resulted in death or if the specimen received

medical attention based on the presence or absence of healing patterns. When observing fractures, there are many different types based on the style of break and how the bones interact with the surrounding tissues.

One of the most common type of fracture is, unsurprisingly, named the *simple fracture* (Müller, Nazarian, Koch, Schatzker, & Heim, 1994). In this fracture, the surrounding tissue may be damaged; however, the skin is not broken, giving it the additional name of closed fracture. Due to these criteria, paleopathologists can only suspect this type of fracture with little to no bone displacement, such as with small hairline or incomplete fractures where the bone ends never separate. The alternate type of fracture, where there is enough displacement to break the skin, is known as a *compound, or open fracture*. These are much more susceptible to infection, since the exposed bone ends may come into contact with pathogens in the environment.

Within these broader fracture types, there are many other fracture types, usually related to how the bone broke (Müller et al., 1994). For example, a *transverse fracture* refers to the angle of the breakage in relation to the axis of the long bone: 90 degrees. Similarly, an *oblique fracture* is a fracture that occurs diagonally in relation to the axis of the long bone. Different types of forces also result in different types of fractures. For example, *stress fractures* are caused due to repeated stress on the bone and not necessarily from acute trauma. This type is common in the feet of long distance runners, which are constantly feeling the forces of stress between the body and the pavement. Another type is a *depression fracture* in which the outer layer of the bone, the cortex, is driven into the inner bone and underlying tissue. Since most long bones cleanly break with enough force, depression fractures are most commonly seen with fractures of the skull. Another notable fracture type, which is only seen in immature bones, is the *greenstick fracture*, in which only the outer cortex of the bone is fractured while the inner, immature bone bends.

While healing rates can be highly variable throughout the different bone types and different patient ages, healing does take place in well-defined stages, which can help paleopathologists determine how long, after the initial injury, the patient survived (Waldron, 2001). Within the first 4 to 8 weeks, union between the fragments usually takes place, holding the two together. During this time period, it is very important that the two ends be aligned anatomically correct to ensure proper healing. If this is not established, especially in the long bones of the limbs, then a patient will likely experience an extreme deficit in limb functionality. After this period of union, it will usually take an additional 4 to 6 weeks until the bone can support the weight, or handle the forces it once could. Interestingly, many studies of skeletal remains with severe breaks have found the bone to be properly aligned, leading paleopathologists to believe that even the earliest civilizations knew the importance of proper alignment in the healing process (Waldron, 2001).

While many types of trauma observed in past civilizations are acute injuries, such as fractures, there are also many documented instances of *ritualistic trauma*. One such type is *trephination*, in which a hole is drilled into the skull with a specific instrument designed specifically for that purpose (Margetts, 1967). Similar to burr holes performed by surgeons to release cranial pressure during hemorrhaging, it is believed that trephination may have been performed on individuals with chronic headaches and brain injuries. However, unlike burr holes, which are based on science and performed in an effort to relieve cranial pressure, trephination was performed in hopes of releasing the evil spirits from the body of the patient, thereby, hoping to cure them. The paleopathologist generally has no trouble identifying trephinations in skeletal remains, which often have more clean-cut holes relative to depression fractures. Often, there are signs of healing, indicating that this procedure, if not successful, was at least not immediately fatal.

Another ritualistic trauma performed is *artificial cranial deformation*, which can include the flattening or the elongating of the skull. Paleopathologists have dated skulls with these abnormalities to 45000 BCE (Trinkaus, 1982). It is believed that these abnormalities are related to either a social class or to very specific groups or clans, as with the ancient Mayans. Since the sutures between cranial bones do not fuse during youth, intentional deformation begins early in life (Tubbs, Salter, & Oakes, 2006). It was often achieved by tying stones or boards to the head with a great deal of pressure, forcing the bone to slowly remodel itself over many years.

Tumors

In modern medicine, it is difficult to find a dirtier word than *tumor* or *cancer*. This group of diseases has sidestepped the best efforts of countless scientists as the battle against cancer continues. A tumor, or neoplasm, is a mass of cells, dividing uncontrollably due to faulty genetics or molecular cues gone wrong. This rapid cellular division can cause an accumulation of mutations, spreading and changing faster than modern medicine can keep up with. While this certainly is not true of all cancer types, as great strides have been made against breast cancer, cervical cancer, and prostate cancer, many other cancer types still have scientists scratching their heads in dismay. While relatively rare compared to other cancers (roughly 200 deaths a year), primary bone tumors generally occur in areas of the bone still undergoing division, such as the growth plate of the long bones (Waldron, 2001). Since bone growth ends in adulthood, primary bone tumors, such as osteosarcomas, generally occur only in children under 20 years of age. These can be difficult to initially diagnose, which is the very key in successful treatment. Usually, osteosarcomas are not detected until metastasis to other regions, resulting in more distinct symptoms. From a paleopathology perspective, little

information can be found on osteosarcomas throughout time due to their extreme rarity even today.

Secondary bone tumors are much more common and occur from the metastasis of cancer from other regions of the body. These secondary tumors can present themselves anywhere, although they are most common in the spine, pelvis, femur, and skull (Waldron, 2001). In this type of cancer, malignant tissue invades the bone, replacing the normal bone tissue with the rapidly dividing malignant tissue. Therefore, in examining fossil skeletons, a variably shaped hole marks the site of tumor invasion, which is quite distinct in appearance compared with other holes such as those caused by bullets. Since the tissue decomposed long ago, paleopathologists can only guess the type of cancer the individual suffered from, except in one unique cancer type.

Unlike other secondary tumors from other cancer metastases, prostate cancer invasion actually causes deposition of bone instead of degeneration. It is believed that similar proteins, activated in both prostate cancer cells and normal bone stromal cells, activate osteoblasts to begin bone deposition (Koeneman, Yeung, & Chung, 1999). While this interaction still isn't entirely clear, the results are striking for any paleopathologist to observe, with prominent neoplasms on the bone surface.

Oral Pathology

Built to withstand the constant mechanical and chemical stresses of a typical human lifetime, it is no wonder that teeth can remain remarkably intact over thousands of years. Generally, being the only piece of skeletal remains that has come into direct and constant contact with the environment, teeth can provide paleopathologists with quite a bit of evidence on the lifestyle and activities in the daily living of an individual (Klepinger, 2006). With fairly standard growth rates for younger skeletons, anthropologists can gain a rough idea of the age of the skeleton when they passed. While this may be important for statistical studies, paleopathologists are most interested in the diseases that have affected the teeth through time.

Cavities are a nuisance that a good portion of the population has experienced at one point in their lives. With an increase of acidic beverages and sweets in our diet, fluoride is removed from the teeth, causing weakness and demineralization of the teeth. This breakdown, coupled with acid production by bacteria in the oral cavity, causes the formation of dental caries, or cavities. These decompositions can be quite apparent in the dental record of our ancestors as the lesions form deep between the teeth. In more dramatic cases, the cavities may have advanced all the way into the root of the tooth, which, if allowed to continue to spread, can even cause an infection in the maxillary sinus. If an infection occurs at this level, gross anatomical changes are apparent in the teeth as well as small changes within the sinus that can be viewed with fiber optics (Waldron, 2001). It is interesting to note that

the prevalence of cavities in the dental record increases with the amount of sugar introduced into the diet at the time (Moore & Corbett, 1971, 1973, 1975).

While cavities may be somewhat rarer in more dated specimens, an *oral calculus* is relatively more common. These are formed by the mineralization of the teeth, leaving deposits on the teeth (subgingival) or gums (supragingival). Since mineralization forming calculi are directly opposite of the demineralization of cavities, it is no wonder that the two seem to exist in inverse proportions in the fossil record (Waldron, 2001). Studies on these calculi have shown bacterial presence within the calculi, along with the remnants of any other debris that may have been in the oral cavity (Dobney & Brothwell, 1986). Whether this can include food remnants, offering insight into the individual's diet, is the subject of further research.

Periodontal disease, associated with poor oral hygiene, is characterized by bone loss around the teeth due to a high level of bacteria in plaque. This decay can be horizontal and occur across all levels or vertical, occurring at each individual tooth at varying rates (Rogers, 2008). If the decay reaches a certain point, then the individual will begin to lose teeth, which is quite evident in the fossil record. This can easily be distinguished from any teeth lost after death due to the presence of new bone growth around the tooth socket in an attempt at repair. It is important to note that all tooth loss is not necessarily from periodontal disease but can also be caused by trauma, scurvy, leprosy, or other illnesses. Thus, care must be taken to closely examine the surrounding bone structure for degeneration before a correct diagnosis can be made.

The Iceman

In September 1991, two German tourists, Helmut and Erica Simon, were hiking along the Italian-Austrian border on a Similaun mountain when they came across a corpse sticking out from the snow (Fowler, 2000). He was crudely removed, the excavation team not realizing he was more than a stray backpacker caught in bad weather. Causing quite a bit of damage during the process of excavation, including damage to the hip and limbs, the mysterious man was brought to an Austrian morgue. Because of suspicion over the ancient-looking objects found with the corpse, including a copper axe, unfinished bow and arrows, and a stone knife, archaeologist Konrad Spindler was called to examine the body. It didn't take long for the archaeologist to confirm that this was no ordinary corpse.

Dated to be from 3300 BCE (or roughly 5,300 years old), Ötzi the Iceman is one of the oldest specimens ever recovered with tissue structure still intact (Fowler, 2000). This has allowed scientists, anthropologists, and paleopathologists a unique opportunity to look at not only skeletal remains but also organ and tissue remains. Attributed to the cold glacier environment, Ötzi is remarkably preserved, an almost

completely unheard of phenomenon in the archaeological realm; he was lying completely safe in a shallow trench as the ancient glacier moved over his frozen body. This relatively unchanging condition of Ötzi's icy tomb has allowed DNA and histological analyses, giving paleopathologists a very detailed overview of his health.

Due to the importance of this archaeological find, painstaking care was taken to ensure Ötzi's preservation (Fowler, 2000). This made research rather difficult, as Ötzi must be kept in a constant state of humidity and temperature, mimicking the conditions he spent the last 5,300 years in. Thus, paleopathologists, who normally rely on skeletal interpretations, had to rely on X-rays and other diagnostic tests to discover Ötzi's ailments. Strictly from a paleopathological standpoint, Ötzi was not in the best of health when he died. X-rays of Ötzi's chest revealed broken ribs, with both complete fractures and hairline cracks. Doctors closely examined the films and reported no signs of healing around the bones. Due to Ötzi's semidehydrated state, they could not detect the normal inflammatory response associated with breaks that occur right at death. Thus, doctors could not ascertain whether these fractures occurred at death or over the next 5,300 years. Doctors also noted several healed fractures on the left side of Ötzi's rib cage, perfectly aligned, which he had probably lived with for some time.

Also, thanks to the dehydrated state of Ötzi's remains, computerized tomography (CT) scans had limited use in analyzing his corpse (Fowler, 2000). Many of Ötzi's internal organs were dried and shriveled, showing up as nothing more than wisps on CT films. Even the brain was nothing more than a fragile ball, bouncing around inside the cranium. However, CT scans did provide researchers a good idea of the age of Ötzi when he died. Due to the slow rate of fusion of the cranial-plate sutures, researchers noticed that, while these sutures were closed, they were still slightly visible, leading them to believe Ötzi was between 25 and 30 years of age. The aorta could also still be analyzed on CT films and showed some signs of arteriosclerosis—surprising for a man of his young age. The use of CT scans also revealed some arthropathies, most notably osteoarthritis. While this was again a surprising find for his age, researchers believe it was the difficult lifestyle of the Iceman that seemed to hasten the onset of these degenerative diseases.

Since full autopsies would have completely jeopardized the longevity of Ötzi's preservation, tissue samples were carefully taken to be analyzed. Extractions from his gastrointestinal tract found the presence of *Trichuris trichiura*, a type of whipworm (Dickson, Oeggl, & Handly, 2003). Although Ötzi showed none of these signs, severe infections of this parasite can result in diarrhea, blood loss, and even rectal prolapse. Ötzi also had 3 Beau's lines on his one remaining fingernail, an indication of three recent illnesses at least 6 months before death. It is believed that Beau's lines form after cellular division stops in the nail bed, creating distinct horizontal lines across the nail. This

can be caused by systemic illnesses, such as infections, poison ingestions, and severe traumas resulting in shock.

While most paleopathologists deal with cases that are no longer of any forensic significance, Ötzi again provided a new challenge in determining the cause of death. Many initially assumed he froze to death in the cold glacial region, exhausted and looking for refuge from the inhospitable environment. In fact, researchers published a report in *Science* that, although speculative, made more sense of death by freezing (Seidler, 1992). Konrad Spindler had another theory. In 1993, he proposed that Ötzi may have actually been fleeing for his life. Based on the unfinished condition of his weapons and the signs of injury throughout his body, Spindler believed that Ötzi may have been fleeing his village from a massacre, which was documented as common in the Copper Age (Spindler, 1994). However, many felt that this story was stretched so that Spindler could reach higher sales for his *Iceman* book, which was to be released that year. Because of this, for many years, his theory was dismissed by his peers, despite being very well liked in the "popular imagination" (Fowler, 2000). However, a high resolution CT scan in 2001 revealed an arrowhead lodged in his shoulder (Dickson et al., 2003). Now realizing foul play was a legitimate factor, anthropologists took a closer look at the body, finding more and more signs of trauma in the hands, wrist, chest, and head, all of which showed no signs of healing. While it is possible that he bled to death from the arrowhead lodged in his shoulder, most anthropologists have now come to the conclusion that he was killed from a blow to the head, whether by an attacker or by falling from blood loss.

Mummies

When people think of mummies, many think of the cloth-wrapped mummies of Egypt, which have long been of interest to archaeologists and anthropologists. Part of a very unique culture and way of life, Egyptian mummies and tombs have been studied and researched a great deal since the early 1900s. However, mummies as a class have a much broader definition that includes many other specimens found outside of Egypt. The process of *mummification* "involves the transformation of once-living body or tissue into a state of arrested decay" (Aufderheide, 2003, p. 41). Thus, by this basic definition, we can broaden our view of mummies beyond Egypt, and in fact, mummies have been found throughout Europe in Spain, France, Germany, Austria, Italy (including the Iceman); throughout South America in Peru, Chile, and Argentina; throughout Africa and Asia; and even in the United States. Because the mummies found in each individual region have their own unique properties and cultural relevance, these are of much more interest to the cultural anthropologists, while paleopathologists are much more interested in the diseases that plagued these individuals.

To understand how paleopathologists study mummies, it is important to first understand how they are preserved. Decomposition occurs in several phases (Aufderheide, 2003). The first is the release of normally regulated digestive enzymes within the cells, which begin non-specifically digesting cellular structures. Bacteria then begin to further digest body tissues, aided by larger organisms, such as maggots and scavengers. Thus, mummification must somehow block these processes in order to preserve the integrity of the body. Since enzymes must operate in an aqueous environment, the drying out of a body, or desiccation, is one of the most common methods employed in the mummification process. This, unsurprisingly, occurs in dry arid regions, such as the deserts of Egypt, the Gobi desert of Mongolia, and the dry regions of Peru and Chile. This is not to say that heat is the only method employed when drying a body. Freeze-drying techniques used by mountainous peoples, such as the Incas of the Andes (Schobinger, 1991), are also used. With this technique, water slowly leaves frozen body tissue via sublimation, a process in which the ice passes directly to water vapor, bypassing the liquid phase. The Iceman was so well preserved by this method. These cold temperatures can also block enzymatic action, which requires a narrow optimal temperature range for functioning. Most bacteria can only thrive in a narrow temperature range, and thus, frozen specimens tend to be very well preserved. A third method, although less common, uses honey or other concentrated solutions to coat the body. Due to osmosis, the water will leave the body to enter the more concentrated solution. Furthermore, honey has been found to have antimicrobial properties, furthering the preservation of a body (Aufderheide, 2003). Heavy metals, such as arsenic, copper, mercury, and lead, can also block the activity of many of these enzymes by binding them and changing their structure, thereby rendering them useless. An example of this is the “Copper Man” mummy from CE 1000, found in a copper mine in Northern Chile (Bird, 1979). This mummy is remarkably intact, which many attribute to the copper found throughout the viscera. However, many point to the dry conditions of the mine and region as the true reason for his excellent condition (Preston, 1980).

The dry conditions of these tissues have given paleopathologists difficulty in diagnosing any illness beyond the skeletal structure, which is otherwise usually still quite reliable. Many organs are desiccated or degenerated to a point beyond recognition, and even the anatomical position is not an entirely reliable marker in organ identification (Aufderheide, 2003). Despite these limitations, many techniques used in autopsies of the recently deceased can be employed in the study of mummies. For example, mummies can be systematically dissected; this enables examining of overall morphological changes to various organs, looking for any telltale signs of disease. Histological sections for microscopic analysis can also be taken,

employing a variety of stains to analyze various cellular structures. In mummies, where structural integrity must be absolutely preserved and dissection is not an option, radiographic methods may be employed. While this may include simple X-rays to look at bone changes, CT scans can also be used to create three-dimensional reconstructions. Magnetic resonance imaging (MRIs) are rarely used as the desiccated remains do not respond well to this imaging technique thereby providing little additional resolution over cheaper and faster CT scans. Endoscopy, in which a flexible camera is sent into the body for pictures of biopsy retrieval, is also used in the study of mummy pathology. This is again used to preserve the integrity of the remains, limiting gross mutilation while still allowing researchers to take samples of various organs for histological or chemical analysis, which can include DNA composition and amino acid racemization.

Due to the mummification process, gross anatomical changes in the organs are not reliable markers of disease. Histological techniques are a paleopathologist’s best chance at identifying an infectious disease in mummies (Aufderheide, 2003). For example, tissue samples from the spinal cord may show dried pus and the presence of small bacilli, leading many to the diagnosis of meningitis. Similar samples can show a myriad of other infectious diseases throughout the body, including trachoma in the eye, caused by *Chlamydia trachomatis*; *Mucocutaneous leishmaniasis*, a parasitic infection of the mucous membranes; myocardial infections; and various pulmonary infections. Paleopathologists must also rely on histological techniques when identifying neoplasms. Again, since gross anatomical changes of various organs cannot be markers for disease, histological sections must be examined for the presence of cancerous cells, which have a characteristic appearance in comparison with normal differentiated cells. DNA analysis for the presence of genetic abnormalities is also slowly starting to come into use and is certainly an area of further research. For example, Huntington’s chorea, a neurodegenerative disorder that is inherited in a dominant fashion, would only be able to be detected by these means, as the brain is almost always atrophied beyond normal analytical means.

Areas for Further Research

With the possibility of the discovery of significant archaeological finds on any given day, paleopathologists will certainly have ample specimens to analyze for years to come. This can include unique case studies like Ötzi the Iceman, Egyptian kings, or the bog people. Alternatively, paleopathologists can concentrate on more “normal” findings, providing a much better picture of the daily activities of an ancient population. It was earlier discussed that epidemiological studies must continue looking at the incidence of leprosy and tuberculosis over time. These studies

can and have been applied to the incidence of any of the aforementioned diseases, and this is always an area that can be expanded on as more skeletal fossils are recovered from the fossil record.

One of the most exciting new areas in paleopathological research is the emergence of a chemical analysis of skeletal remains. Many papers have already been written that looked at the presence of heavy metals, most notably lead, in skeletal remains (Waldron, 1983). The composition of other elements can also be examined, although they must be present in high enough quantities in the diet and bone (Ezzo, 1994). As technology advances, new extraction techniques will be employed, allowing paleopathologists access to proteins in the fossilized bone for analysis. For example, if paleopathologists can find molecular factors for a disease, such as the rheumatoid factor, then they can confidently make the diagnosis for this illness and many others.

With the completion of the human genome project, the ability to extract aDNA has even more relevance than ever. Although using aDNA as a focus for experiments does pose a challenge due to the general poor quality of most samples and large missing segments, it does show a great deal of potential for future research (Cano, 1996). By examining very specific gene fragments, researchers can watch the evolution on a genotypic level of our own species over time in the fossil record. Gene studies can also be made to look at migration patterns, as highly conserved genes unique to individual populations are tracked over time in the fossil record. Never before have paleopathologists had access to such detailed information, and the potential in this new field is quite limitless as technology continues to advance in genetics.

Conclusion

The field of paleopathology will continue to provide answers for anthropologists, while introducing even more questions about our past. As new technologies are used in the interpretation of skeletal remains, we can expect to gain a great deal of insight about not only the diseases that affected us but also the story of our species and our evolution over time. But why search for the answers to these questions? The famed paleopathologist Calvin Wells (1964) put it well when he said,

Disease and injury mirror more faithfully the haps and mishaps imposed by the vagaries of life and struggle to survive. If we seek the genetic affinities of an individual or group, details of normal anatomy and physiology are usually our most rewarding study; for the more intimate knowledge of how people have responded to the aggression of their environment pathology is a surer guide . . . The intricate relationship between a people's way of life and the diseases they endure is the chief reason for the study of paleopathology. (pp. 17–18)

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MEDICAL ANTHROPOLOGY

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Medical anthropology is the discipline in anthropology that addresses disease and the health care systems developed to cope with disease. Medical anthropologists study the spectrum of cultural and biological factors that have contributed to health, disease, and health care systems throughout human experience from cross-cultural, historical, and evolutionary points of view. They address a wide variety of health and health care issues including cultural barriers to therapeutic and preventive health care; issues of bioethics; the effect of pandemics, epidemics, and natural disasters; the impact of public policy on health care, practitioner-patient communication in hospitals, clinics, private, and ethnomedical practices; nutrition; perceived etiologies and their effect on therapeutic approaches to healing; differences in the cultures of biomedical, ethnomedical, and other alternative health care systems; ethnographic studies of healers, their patients and families, and their support systems; different types of practitioners (biomedical, alternative, ethnomedical, religious) and the science and technology and medicines used in their practices as well as how cross-cultural and societal differences shape biological and psychological reactions to suffering. Medical anthropology is highly interdisciplinary lending itself to ecology, geography, economics, linguistics, medical sociology, biochemistry, genetics, serology, anatomy,

paleopathology, epidemiology, medicine, nursing, and public health, among other disciplines.

Medical anthropology is distinct from other social sciences in three ways: (1) It covers a wider temporal and geographic scope of the experience of human health from paleontological and archaeological research through the ethnographic studies of modern day health care systems. (2) It attempts to identify and understand both the socio-cultural and bioecological factors that define and characterize health, illness, and disease. (3) It uses an extensive combination of both qualitative and quantitative methods. Quantitative methods help identify disease patterns, standard patterns of social behavior, and social and economic factors that affect disease and health. Qualitative methods help ascertain the fundamental, unspoken cultural ways of life and values that form the foundation of a society's health care system and help decipher the relationship between a society's normative, or ideal culture (what people say things ought to be), versus real culture (what people actually do) (Joralemon, 1999, p. 13).

History of Medical Anthropology

Four contributing sources to the foundation of medical anthropology have been (1) biological anthropology,

(2) ethnographic studies of health care systems, (3) the culture and personality movement of the 1930s and 1940s, and (4) the post–World War II international public health movement, which has led to a global consciousness of the effect of disease on societies.

Early Studies

The Exotic

The early pre–World War II ethnographic studies of medical traditions and health care practices of non-Western societies focused on the magico-religious beliefs (magic, sorcery, witchcraft, and religion) in relation to health and sickness, underlying perceived causes of illness (natural, spiritual, or occult), types of practitioners, and the corresponding healing practices. E. E. Evans-Pritchard's *Witchcraft, Oracles, and Magic Among the Azande* (1937) is a classic example from this era. His and other studies of the time provided insight into the underlying cultural premises of medical knowledge, procedures, customs, rituals, and roles of the different types of practitioners (natural, spiritual, and occult) as well as the relationship between the environment, how people made a living, the political and social organizations in a society, and perceived causes of illness and disease.

William H. R. Rivers (1924), a British physician and experimental psychologist; Erwin H. Forrest Clements (1932), an anthropologist; and Ackerknecht (1942, 1971), a physician and anthropologist, are three well-known scholars who made significant contributions to the early studies of health care. They were influenced by historical diffusion and functional theory, the dominant approaches used by anthropologists in the early 20th century. Diffusionists attempted to establish classification systems for given cultural domains (e.g., etiology of illness) and the subtypes within that domain (e.g., natural, spiritual, and occult). Once a domain and its subtypes were determined, they were used to identify the cultural domains in other societies and trace their diffusion from geographic centers. Functional theory treated cultures as a whole made up of parts with each part contributing to the maintenance of the society as a whole.

William H. R. Rivers (1924) was the first to attempt to systematically relate the practice of medicine to other characteristics of culture and social organization. In a series of lectures at the Royal College of Physicians (1915–1916), he presented a classification of the cultural domain of etiology of illness. The model was based on early 20th-century attempts to classify discernable explanations of disease causation in traditional, or *primitive*, medicine as being either magical or religious. He identified three types of disease causation: (1) those caused by human agents through the use of magic and sorcery; (2) those caused by a spiritual or supernatural agency, such as deities, spirits, or breaking of taboos; and (3) those that result from a natural agency or

natural processes. He also related perceived disease etiology to type of curer or practitioner sought out for treatment.

Rivers's (1924) findings were based on two basic propositions. First, that medical practices in primitive medicine are not random, meaningless, and disconnected customs but rather that they are based on “definite ideas concerning the causation of disease . . . [and are] both logical and systematic and in some respects more rational than our own” (pp. 51–52). Second, that traditional primitive medical practices and beliefs comprise a social institution, “a social process, subject to the same laws, and to be studied by the same methods as other social processes” (p. 55). Despite these revelations, which ran contrary to the scientific view at the time, primitive medicine continued to be treated as being unscientific due in part to the magico-religious nature of the perceived etiologies and treatments (see Foster & Anderson, 1978; Good, 1994). Rivers saw primitive medicine and modern medicine as two separate, incompatible entities of study in which magico-religious beliefs and practices of primitive medicine could not be considered in the same realm as naturalistic-scientific modern medicine (Wellin, 1977).

Anthropologist Forest Clements's work “Primitive Concepts of Disease” (1932) undertook a systematic diffusionist “culture-trait” approach to the analysis of non-Western medical beliefs and practices. He identified five etiological categories: sorcery, breach of tabu, object intrusion, spirit intrusion, and soul loss. The distribution of these traits was then mapped on a worldwide basis and the chronological sequences, pathways of diffusion, and geographic centers for each of the traits were postulated. Clements's work added credence to the concept that all cultures develop systems of health care that define disease (see Wellin, 1977).

Erwin Ackerknecht (1942) is attributed with being the first to establish medical anthropology as a subfield of anthropology. He applied functional theory to the ethnographic study of medical beliefs and practices of non-Western cultures. He was influenced by British functionalists, the French sociologist Marcel Mauss, Boasian tradition, and in particular Ruth Benedict at Columbia University. Many of the essays Ackerknecht wrote during the 1940s and 1950s are included in *Medicine and Ethnology: Selected Essays* (1971). He explored from a cultural relativistic perspective how the perceived cause of a disease reflected lines of social tension in a society and how the threat of being accused of causing an illness by witchcraft or sorcery could operate as a powerful sanction to maintain the status quo by preventing deviation from social norms.

Ackerknecht (1942) was among the first to argue that disease concepts were culturally constructed: “What is disease is, in the last instance, not a biological fact but a decision of society” (p. 167). He differed from Clements in that he focused on the total cultural configuration of a society, not individual cultural traits. He also did not see

primitive medicine as a single entity but rather that each culture had its own system. A medical system was viewed as an integral part of a society as a whole but varied from society to society in how it was interrelated to other parts of a society. Disease in non-Western cultures was seen to be an artifact of customs and beliefs and divorced from the nature and distribution of disease and adaptation to the environment. He also saw primitive medicine as a totally separate entity from Western “scientific-based” medicine (see Wellin, 1977).

Physical (Biological) Anthropology

Physical (biological) anthropologists have contributed to the understanding of how human evolution and cultural factors influence disease and human health. The biological approach examines morphological, physiological, and genetic variation among people living in different kinds of conditions. Their interest in human biology, human growth and development, genetics, and serology parallels areas of interests of biomedicine. Biological anthropologists share common interests with medical anthropologists in their study of “the distribution of disease, physiological adaptations to disease and social factors related to health status” (Brown, 1998, p. 2). Evolutionary theory concerns understanding disease in the past and understanding what past diseases may tell us about contemporary health issues. The second biological approach concerns morphological, physiological, and genetic variation among people living in different kinds of conditions.

Culture and Personality

The culture and personality movement of the 1930s and 1940s brought anthropologists and psychiatrists together to study how personality and the sociocultural environment are interrelated. A wide range of topics were investigated during this time: (a) the nature/nurture debate, (b) sibling rivalry, (c) instinct, (d) aggression, (e) culture-bound syndromes, (f) the cross-cultural applicability of Freud’s theory to mental illness, and (g) the universality of biomedical-psychiatric categories (see Pool & Geissler, 2005).

Studies during this period were primarily theoretically oriented but others focused on how to improve health care. Ruth Benedict’s (1934) *Patterns of Culture* is a seminal theoretical work of the period. According to Benedict, each culture selects a few personality traits from the pool of characteristics of “human potentialities” that become the unique personality of a culture that in turn influence the personality traits of people living in that culture. Representative studies that focused on improving health care included the Leighton’s (1941) study of introducing modern health care to the Navahos, the Devereaux’s (1940) study of therapeutic fitness on a schizophrenic ward, and Joseph’s (1942) description of how cultural differences about the roles of biomedical

physicians and Indian patients in Southwest America hampered therapeutic interaction.

International Public Health Movement: Post–World War II

Anthropologists began work in the international public health field in the 1930s and 1940s. In 1942, the United States partnered with several Latin American countries to address public health concerns. But it was the international public health movement after World War II that helped to crystallize the role of anthropology in the study of disease and medical health care systems. Applied medical projects during this period attempted to solve health problems in particular cultures. Among the early backers of public health projects was the Rockefeller Foundation sponsoring applied projects, such as Philips (1955) hookworm campaign in Ceylon. After World War II, the applied roots of medical anthropology were extended through cooperative foreign aid programs initiated in countries in Asia and Africa. The early programs were administered through the International Cooperation Administration and later through the United States Agency for International Development and the United Nations World Health Organization (WHO). The primary goals of the programs were to stamp out epidemics, improve water supplies, and identify factors that hindered and/or facilitated the carrying out of and success of the aid programs. It was also during the 1950s that anthropologists were first assigned to official positions in international health organizations: Cora DuBois at WHO, Benjamin Paul at the Harvard School of Public Health, and George Foster at the Institute for Inter-American Affairs, among others (see Baer, Singer, & Susser, 1997).

Among the most influential works of the post–World War II movement was Benjamin Paul’s edited work *Health, Culture and Community: Case Studies of Public Reactions to Health Programs* (1955). This work was a major contribution to the field of applied anthropology and public health. The focus of this work was to investigate “the immediate situation where medicine and community meet” (p. 4). He introduced social science methodology into the study of medical health care systems. His work revealed that in order for Western-based medical intervention programs to be successful it was necessary to take into account local beliefs about how health and illness are defined and manifested and the perceived causes of and treatments for illnesses. He was concerned with examining how a traditional medical system reacted to the introduction of new health-related practices and how traditional practices in turn influenced the contributing medical system. Other works during this period that contributed to the development of the field of medical anthropology were Caudill’s (1953) survey of anthropological studies in the field of health care in “Applied Anthropology in Medicine” and Scotch’s (1963) general literature review of medical anthropology.

As a result of the work of medical anthropologists in the international public health arena, several universals of medical systems were identified: (a) Every culture has a medical system; (b) disease is pathologically defined, but illness is culturally defined; (c) medical systems have both preventive and therapeutic sides; (d) medical systems provide the etiology of an illness and the appropriate treatments; (e) a disease theory system answers the question, Why did this happen to me; (f) medical systems play important roles in approving of and supporting social and moral cultural norms including the control of aggression; (g) disease theory systems play a role in the conservation of medical practices; and (h) traditional medical systems often play an important role in national identity and pride (Foster & Anderson, 1978, pp. 38–47).

Society for Medical Anthropology

The brief history of the Society for Medical Anthropology is found on two Web sites: the Society for Applied Anthropology Web site (www.sfaa.com) and the Medical Anthropology Web site (www.medanthro.net). While the beginning of medical anthropology can be traced back to the turn of the 20th century, it was not until the 1960s that a more formal organization began to take shape and is known today as the Society for Medical Anthropology. The earliest origins of the Society for Medical Anthropology are traced to the Roster of Anthropologists, Physicians and Others Who Have Special Interests in Medical Anthropology—the name of the organization at the time. The group changed its name to the Organization of Medical Anthropology (OMA) in 1967. At the 1968 annual meetings of the American Anthropological Association (AAA), the OMA offered its first workshop and changed its name to the Group of Medical Anthropology. At the 1970 American Anthropological Association (henceforth AAA) Annual Meetings, the OMA was renamed the Society for Medical Anthropology (SMA) and adopted its constitution and officially became a section of the AAA. Today, the SMA is one of the largest sections in the AAA.

The major journals affiliated with the SMA include *Medical Anthropology Quarterly*, *Medical Anthropology, Culture, Medicine and Psychiatry*, *Social Science and Medicine*, and *Ethnomedizin*. The SMA has close ties with the Society for Applied Anthropology; the Association for Anthropology and Gerontology; the Society for the Anthropology of Food and Nutrition; Medical Anthropology Students' Association; AIDS and Anthropology Research Group; Alcohol, Drug, and Tobacco Study Group; Bioethics Interest Group; Clinically Applied Medical Anthropology; Complementary and Alternative Medicine (CAM); Integrative Medicine Group (IM); Council on Anthropology and Reproduction; Council on Infant and Child Health and Welfare; Council on Nursing and Anthropology; Critical Anthropology of Global Health Study Group; Disability Research Interest Group; Global Health and Emerging Diseases Study Group; Pharmaceutical

Studies Group; and Science, Technology, and Medicine (STM) Group (www.medanthro.net).

Today: Global Health

The works of medical anthropologists have contributed to both the theoretical and empirical understanding of the relationship between culture, medical knowledge, and practice. Several basic themes and questions addressed by medical anthropologists today are (a) the development of systems of medical knowledge and health care; (b) the roles of healers in the well-being of societies through the study of patient-practitioner relationships and the relationships between different types of health practitioners; (c) the integration of alternative and complementary medical systems in culturally diverse environments; (d) the interactions among and impact of biological, environmental, and social factors on health and illness at both individual and community levels; (e) the impact of general political and economic forces on the health of individuals and communities and the interplay between social structures (e.g., political and economic arrangements), ecological settings, and disease-causing agents; and (f) the effects of biomedicine and biomedical technologies (www.en.wikipedia.org/wiki/medical_anthropology).

Basic Concepts and Terms

As in any discipline, the jargon used has specific definitions that often vary from the lay definition of those terms. Baer et al. (1997, pp. 4–12) discussed several basic concepts and terms used in medical anthropology in the study of health care systems and issues related to health, disease, and illness: health, disease, illness, curer/practitioner, medical system, medical pluralism, biomedicine, and ethnomedicine. The basic definition for each term is given below.

In 1978, WHO defined *health* as “not merely the absence of disease and infirmity but complete physical, mental and social well-being” (Baer et al., 1997, p. 4). The limits of this definition have come under question by critical medical anthropologists who argue that the definition should be expanded to include “access to and control over the basic material and nonmaterial resources that sustain and promote life at a high level of satisfaction” (p. 4).

Medical anthropologists differentiate between *disease*, which is generally defined as a pathological or physiological disorder, infection, or malfunction of the body, and *illness* (*sufferer experience*), which is defined as a culturally constructed concept of how people conceive of a particular physical state as being deviant from the normal state (Baer et al., 1997, pp. 6–7). Brown (1998, pp. 8–9) summarized the conceptual significance of the distinction of disease/illness in the study of the social construction of illness behavior including the sick role, medical decision making,

seeking of treatment, and the social production of health (see Weller & Romney, 1988; Young, 1980).

Foster and Anderson (1978, pp. 148–153) identified six social roles of illness: (1) Illness provides release from unbearable pressure, (2) illness helps account for personal failure, (3) illness may be used to gain attention, (4) hospitalization may be a vacation, (5) illness may be used as a social control device, (6) illness may be a device to expiate sin.

In reaction to the existence of threats posed by disease, each culture develops a *medical system* that consists of culturally based learned behaviors and beliefs that include a theory of disease causation and treatment. *Curers* or *practitioners* are specific people with special knowledge who know how to diagnose and treat sickness. *Medical pluralism* is the coexistence of different medical systems within one society (Baer et al., 1997, pp. 7–11).

Biomedicine, also referred to as scientific, allopathic, Western, or cosmopolitan medicine, among other terms, focuses on the pathology and external causes of disease (e.g., germs, viruses, bacteria) and symptoms while emphasizing treatment of disease more than prevention (Baer et al., 1997, pp. 11–13). *Ethnomedicine* refers to the culturally constructed health care systems of any society. Other terms associated with ethnomedicine are terms such as *folk medicine* or *popular medicine*. Until the turn of the 21st century, biomedicine and ethnomedicine were treated as separate systems with the scientific-biomedical approach seen as uniform, objective, and not culturally constructed. Lynn Payer's (1988) study of biomedicine in England, Germany, France, and the United States clearly demonstrated that biomedicine is not a uniform medical system but is also a culturally constructed system of medical care that varies from one culture to another.

Approaches

Brown (1998, p. 2) gave an overview of the two basic approaches used by medical anthropologists to address questions related to disease and health care—the biocultural and cultural approaches. He points out that variation in theoretical orientations and application of different methods for research and analysis exist within each of these approaches.

Biocultural Approach

The biocultural approach examines the ways in which people adapt to their environment and how the changes they make in their environment improve or worsen their health conditions. Topics investigated from a biocultural approach include disease in human evolution, health and medicine, human biological variation, human growth and development, paleopathology, bioarchaeology, and the history of health and culture and political ecologies of diseases.

Cultural Approach

The cultural approach examines the underlying ideas, beliefs, and values used in the classification of illness and medical systems developed for the treatment of illness. Topics investigated include belief and ethnomedical systems, the social construction of illness and the social production of health, healers in cross-cultural perspective, culture, illness and mental health, and critical medical anthropology.

Applied Approaches

Applied medical anthropologists apply anthropological theory and method to specific medical problems. The two main areas of application in medical anthropology are clinical studies and public health. Clinical studies have focused attention on understanding the differences between patient- and doctor-explanatory models in an effort to improve communication and health outcomes. The public health area of application focuses on public health policy making, program development, and interventions that are culturally sensitive, address local needs, and secure support of local communities (Brown, 1998, pp. 16–17).

Pool and Geissler (2005) pointed out that “applied medical anthropology is aimed at solving health problems in particular settings. . . . Theoretical medical anthropology is aimed at understanding the functioning of medical systems as cultural phenomena and develop more general theories about underlying processes” (p. 31).

Theoretical Approaches

The classification of theoretical perspectives in the research of medical anthropologists varies. For example, Byron Good (1994) in *Medicine, Rationality, and Experience: An Anthropological Perspective* discussed four theoretical approaches: (1) the empiricist paradigm, (2) the cognitive paradigm, (3) the meaning-centered paradigm, and (4) the critical paradigm. Ann McElroy and Patricia Townsend (2009) in *Medical Anthropology in Ecological Perspective* discussed four theoretical approaches: (1) medical ecological theories, (2) interpretive theories, (3) political economy or critical theories, and (4) political ecological theories. Joralemon (1999) identified the cultural constructivist or interpretive approach, the ecological or ecological/evolutionary approach, the critical medical approach, and the applied medical approach. The following section summarizes the basic tenets of the primary theoretical approaches used by medical anthropologists.

Ecological/Evolutionary Theoretical Medical Approach

Until the 1960s, the theoretical orientation of studies in medical anthropology was based primarily on a sociocultural

approach. In the 1960s, the theoretical orientation shifted to a more biological approach. The ecological/evolutionary approach is a biocultural approach to the study of disease that applies the concept of human adaptation to the dimensions of disease. Examining the interaction among a population's ecological system, its health conditions, and its forms of adaptation provides ways to examine how humans adapt to different environments and social and cultural changes.

Alexander Alland (1970), one of the first proponents of the approach, argued that humans either do or do not adapt to environmental challenges by genetic, physiological, or cultural changes. Three basic premises underlying the medical ecological approach are (1) environmental adaptation is a measure of health while disease indicates disequilibrium, (2) disease mirrors human biological and cultural evolution, and (3) biomedical disease categories are universal. McElroy and Townsend's *Medical Anthropology in Ecological Perspective* (1979) is a work built on Alland's model extending the approach to include a more political-ecological orientation. This approach is closely associated with that of medical epidemiologists, ecologists, and medical geographers (p. 3).

The ecological model has been criticized for not recognizing the effect of the structure of social relationships on influencing which cultural constructions rise to power. Critical medical anthropologists raise two basic questions: (1) Whose social realities and interests are expressed in specific cultural constructs? (2) What were the historical realities that gave rise to them? They also criticize the ecological approach for considering only the external reality of nature and not the evolutionary history of hierarchical social structures that result in the evolution of the political economy of human society (Baer et al., 1997, p. 23).

Cognitive Theoretical Medical Approach

Farmer and Good (Pool & Geissler, 2005, pp. 34–35) define that the focus of the cognitive theoretical approach is to reveal and describe the underlying cultural conventions and ideas that structure people's interpretations of illness. This approach examines how societal and individual variations in the cognitive processing vary from one culture to another. Early studies focused on the classifications of symptoms of illness, diseases, causes of illness, and types of healers and how they are organized in relation to each other including patterns of health care seeking. Cognitive anthropologists examine cultural models of particular disorders, their cross-cultural variation, and the levels of consensus about them among individuals. Some focus on illness narratives, their cultural shaping, and the cultural models that underlie their production. They look for the relation of formal properties of illness models to the natural discourse, context, and performance characteristics of illness representations.

Criticism leveled at the cognitive approach focuses on illness representations being simply abstracted

“mentalistic terms” that do not take into account the social and historical factors that have contributed to the illness meanings. They admonish cognitive anthropologists for paying little attention to the pragmatic and performative dimensions of the illness models that are presented in formal, semantic terms. They also note that the methods used to elicit the cognitive models may, in fact, be an artifact of the methods themselves and the mode of elicitation (Farmer & Good, 1991).

Cultural Constructivist, Cultural Interpretive, Meaning-Centered Medical Approach

The cultural-interpretive theoretical approach to medical anthropology began in the 1970s when Arthur Kleinman (1978, 1980) argued that medical systems were cultural systems and that “explanatory models” could best explain how illnesses are understood by all those who participate in an illness experience—the individual, the family, the practitioners. Cultural-interpretive anthropologists explore the cultural construction of illnesses and the responses to disease. Explanatory models provide insight into perceptions held about etiology, diagnosis, pathology, physiology, possible consequences, and the appropriate treatments for an illness. An individual's construction of his or her explanatory model of an illness may differ from that of the practitioner as a result of cultural, ethnic, and social differences. The result is miscommunication between practitioners and patients. Kleinman advocated for medical anthropologists to work in clinical settings in order to elicit patient-explanatory models of illnesses and thereby facilitate doctor/patient relations and communication.

Good (1994) attributed the development of the cultural-interpretive approach as a direct response to the ecological/evolutionary approach. The underlying difference between the two approaches is that the ecological approach treats disease as part of nature and is therefore external to culture, while the cultural-interpretive approach sees disease as an explanatory model or cultural construction of human reality. Cultural-interpretive researchers work with patients and practitioners in clinical environments in their investigation of explanatory models. This differs from the methods used by researchers of the cognitive approach who used formal elicitation methods to determine the underlying codes and structure of people's interpretations of illness.

Byron Good and Mary-Jo Delvecchio Good developed the “meaning-centered approach” to the study of illness that builds on the basic suppositions of the interpretive approach (B. Good, 1977; Good & Good, 1980, 1982). “The meaning of illness for an individual is grounded in—though not reducible to—the network of meanings an illness has in a particular culture” (Good & Good, 1980, p. 176).

Critical medical anthropologists cite the interpretive and meaning-centered approaches for not paying attention

to the asymmetrical power relations in the clinical setting and how such imbalance in power contributes to the maintenance of social dominance (Baer et al., 1997, p. 25).

Critical Medical Theoretical Approach

The critical medical-anthropology approach combines Marxist theory and dependency theory to analyze the effect of the global political-economic systems on local and national health. Press (1990, p. 1001) listed three primary concerns of the critical medical anthropology approach: (1) How do capitalism, imperialism, and/or Western technology affect health care in third world nations? (2) What roles do logistics and availability of, allocation of, and access to biomedical resources play in both the non-Western and industrialized nations? (3) What is the role of biomedicine as a means of spreading world capitalism?

Critical medical anthropology addresses questions such as “(1) Who has power over agencies of biomedicine? (2) How and in what forms is this power delegated? (3) How is this power expressed in the social relations of the various groups and actors that comprise the health care system? (4) What are the principal contradictions of biomedicine and associated arenas of struggle and resistance that affect the character and functioning of the medical system and people’s experience of it?” (Baer et al., 1997, p. 27).

The critical medical approach focuses on practice rather than symbols and meaning and promotes experiential health versus the functional health associated with global political economies. Critical medical anthropology is concerned with how wealth, power, and socioeconomic status affect the patterns and distribution of disease and challenges the underlying suppositions of the biomedical disease model. It examines how the representations and misrepresentations of illness operate to strengthen the control of the wealthy and powerful as well as the forms of resistance by those who are suffering illness and distress. Critical medical anthropologists propose that an analysis of power relations in the delivery of health services should distinguish four major levels of analysis: (1) the macrosocial level, (2) the intermediate social level, (3) the microsocial level, and (4) the individual with a goal of synthesizing the macrolevel, the middle level, and the microlevel (Baer, 1990, pp. 1011–1012).

One problem Press (1990) cited for the critical approach is that it offers little insight into “on the ground medical organization, staff/patient interaction, and the culture of patienthood in specific cases of disease or illness” (p. 1001).

Critical Interpretive Approach

The critical-interpretive approach synthesizes the critical medical-anthropology approach and the explanatory model approach by incorporating a microlevel and macrolevel approach to understanding health care. The explanatory model provides insight at the microlevel into

patient beliefs, while critical medical anthropology reveals the social, economic, and political dimensions that influence health care. In the critical-interpretive approach, medical knowledge is not conceived of as an autonomous body but as rooted in and continually modified by practice and social and political change.

Nancy Scheper-Hughes and Margaret Lock (1987) challenged the nature of the biomedical separation of “mind from body, spirit from matter, and real from unreal” (p. 6) in their proposed critical-interpretive approach. Lock and Scheper-Hughes (1990) defined the task of critical-interpretive medical anthropology as first to “describe the culturally constructed variety of metaphorical conceptions (conscious and unconscious) about the body and associated narratives and then to show the social, political and individual uses to which these conceptions are applied in practice” (p. 44). They identify the body in three ways: (1) the individual body, or “body-self,” and the vulnerability of the body as it is experienced in health and sickness; (2) the social body represents the state of health of nature, society, and culture itself. If the body is healthy, then it is a model of “organic wholeness.” If it is sick, then it is a model of disharmony, conflict, and disintegration and vice versa; (3) the body politic represents the regulation, surveillance, and control of both the individual and collective body in “reproduction and sexuality, work, leisure and sickness” (Lock & Scheper-Hughes, 1990, pp. 45–70).

Methods

Most medical anthropologists are trained in cultural anthropology and use the cultural approach, theory, and research methods of anthropology in the study of health care, but they also draw on other social-behavioral sciences including biology, psychology, epidemiology, nutrition, clinical, and social sciences. Qualitative research uses a multimethod approach in data collection, also referred to as triangulation of data. Triangulation provides a method by which the researcher can arrive at an in-depth understanding of the phenomenon being studied by using a combination of multiple methodological practices, empirical materials, perspectives, and observers in a single study. This strategy adds rigor, breadth, complexity, richness, and depth to any research.

Among the traditional methods used by anthropologists in qualitative work are structured and unstructured interviewing, participant observation, direct observation, key consultant interviews, in-depth interviews, focus groups, life histories, systematic interviews, questionnaires, household and community surveys, mapping (physical and social), network analysis (clique and structural equivalency), decision modeling, and photography. Before the turn of the 21st century, new methods were being developed that allowed anthropologists to conduct rapid assessment of health care issues and concerns.

Trotter (1991) discussed the new methods developed for rapid assessment. Rapid methods are used “to identify key issues, cultural domains, health beliefs and sociocultural conditions that might act as either barriers to the success of the proposed health project, or to act as supporting mechanisms that would allow the project to succeed” (p. 187). The rapid-assessment techniques can be divided into three groups: (1) those that assist in determining the content and limits of cultural domains in the area of health care (e.g., free listings), (2) those used to determine the basic structural framework of cultural domains (e.g., triads, pile sorts, and scales), and (3) those that explore the consensual properties of a cultural domain (e.g., consensus theory approach) (Trotter, 1991, pp. 187–188; see also Bernard, 2002; Gladwin, 1989; Pelto & Pelto, 1996; Young, 1980).

Future Directions

Singer (1989) proposed that the four theoretical approaches used by medical anthropologists should be integrated to maximize their full potential in addressing health care issues. Baer et al. (1997) reported advances in the integration of three of the primary theoretical models. Medical ecologists moved toward a more political-ecological orientation. Interpretive medical anthropologists acknowledged, attempted, and produced work that took into account political and economic issues. Critical medical anthropologists became more sensitive to political ecology and the significance of political economy in the construction of meaning.

Integration of the different medical-anthropological theoretical approaches provides three major benefits to the study of health care and to the understanding of the factors that affect diseases, the effectiveness of treatments and health care delivery from local communities to the global community. Specifically, integration provides a means for medical anthropologists (1) to examine the ecological, biological, and cultural factors affecting diseases and their treatment; (2) to take into account the political and economic forces that have an effect on disease patterns and access to health care resources; and (3) to provide for the possibility of the needed health-based interventions (Joralemon, 1999, p. 12).

The 21st century offers multiple opportunities for interdisciplinary approaches to the study of health issues. Physician-anthropologist Cecil Helman (1994) called for future research to involve “adopting a much more global perspective—a holistic view of the complex interactions between cultures, economic systems, political organizations and ecology of the planet itself” (p. 338). But an interdisciplinary approach is equally important. Medical anthropology’s recognition of the interrelationship among disease patterns, a society’s belief and value system, and its socioeconomic structure lends a complementary approach to epidemiology’s study of the distribution and determinants of

disease (Trostle & Sommerfeld, 1996, p. 253; see also Glass & McAtee, 2006; Janes, Stall, & Gifford, 1986). Medical anthropology provides public health care programs with insights into local cultural beliefs and values. These insights help reduce barriers to interventions and foster an increase in cooperation between traditional and biomedical practitioners. Medical anthropologists working on the international projects provide insights into the culture of international health programs and policies and their effect on health care delivery. As the global community shrinks and epidemics and pandemics become more common, a fully integrated, interdisciplinary approach to health care will provide the most effective approach to meeting the challenges of global health care.

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INFECTIOUS DISEASES AND ANTHROPOLOGY

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Infectious diseases accompanied humanity throughout its existence and shaped history more profoundly than probably any other single biological factor. The epidemic from 165 to 180 BCE, referred to as the Antonine plague, or plague of Galen, is said to have caused 2,000 deaths per day and was considered the most decisive event in Roman history. The second bubonic plague pandemic from 14th-century Europe, also known as the black death, thought to be the deadliest pandemic in history, resulted in an estimated 50 million deaths and the loss of one third of the population in Europe and the Middle East. Smallpox caused 3.5 million deaths during a 1520 to 1521 outbreak, and the 1918 to 1919 Spanish flu claimed 50 to 100 million lives worldwide. Some investigators proposed that the extinction of the Neanderthals approximately 30,000 years ago was caused by a transmissible spongiform encephalopathy, resembling kuru and “mad cow disease.”

While infectious diseases existed in the hunter-and-gatherer populations, many pathogens currently infecting humans have emerged with the development of agriculture. Evolution of the benign *Yersinia pseudotuberculosis* into the pathogen *Yersinia pestis* from 1,500 to 20,000 years ago, shortly before the first known pandemics of human plague, coincided with the development of agriculture that provided an abundant food supply for rodent hosts.

Several emerging, reemerging, and deliberately emerging infectious diseases have marked the past decades. Since 1976, over 40 emerging infectious diseases were

reported by the World Health Organization, and recent predictions estimate that from 10 to 40 new viruses will emerge by 2020. Certain infectious diseases, once presumed eradicated, have reemerged while others, historically confined to specific geographical areas, are surfacing in new locations. This was facilitated by a complex interplay of biological, social, political, and economical factors that include microbial evolution and adaptation, global ecosystem changes, human behavior, poverty, war, extremism, and intent to harm.

Ecosystem perturbations resulting from human activities often have far-reaching effects. The 1998 emergence of malaria in the Bure district in northwestern Ethiopia, a region that has not been affected for decades despite the presence of the disease in other locations in the country, coincided with the replacement of more traditional crops with maize in this area. Maize pollen represents an important nutrient for the larvae of *Anopheles arabiensis*, the main mosquito vector for malaria in the country, and larval mosquitoes were shown to develop more rapidly and produce larger adults in villages where maize pollen is more abundant. Restricting the plantation of maize in the immediate vicinity of homes or using genetically modified plants were proposed as important measures to control malaria.

Certain human interventions, despite intending to limit an outbreak, may have unpredictable effects. *Yersinia pestis*, the etiologic agent of plague responsible for several

pandemics throughout history, is spread among rats, which constitute the main reservoir, and from rats to other species, including humans, by fleas. Campaigns to eradicate rats were often followed by human outbreaks. This was explained, in part, by the fact that decreasing rat populations required infected fleas to find other organisms to survive, and thus, they more often bit and infected humans. More recently, human interventions, such as deforestation and urbanization, together with the growth of cropland that provides abundant food resources for rodents in deforested areas, changed the interaction between rodent and human populations and facilitated new plague outbreaks.

Certain infectious diseases come from the most unusual sources. For example, discarded vehicle tires provide a habitat for several mosquito species. Female mosquitoes lay their eggs inside moist tires, and the accumulating rainwater allows the larvae to hatch and subsequently develop into adult mosquitoes. The used-tire trade, a very profitable business, was linked to the worldwide spread of *Aedes albopictus*, a mosquito that represents a vector for at least 22 viruses and from its southeastern Asian origin has spread to North America, Europe, Africa, and South America. A study that examined over 4,700 used tires collected from roadside locations in Vietnam reported that over half of them contained water and 34% of those harbored mosquitoes, the majority of which were vectors for the dengue virus.

One of the most significant risk factors for infectious disease is the use of unsafe injections. Approximately 1.3 million deaths annually are attributed to hepatitis B and C and HIV that are transmitted by unsafe injections administered globally. In a study examining health care injections that did not include the ones performed as part of illegal drug use, Y. J. F. Hutin and collaborators estimated that in 2000, approximately 6.7 billion injections administered in several locations worldwide were unsafe. In addition, many investigators pointed out that a large percentage of injections performed worldwide are unnecessary. To understand the effect of unsafe injections, it is important to remember that the 1976 Ebola virus outbreak from Zaire, which infected 318 individuals and caused 218 deaths, was linked to unsafe injections and traced back to a patient who received injectable medication for fever.

Human infectious diseases are increasingly caused by zoonotic pathogens. These are pathogens that normally infect animals but occasionally acquire the ability to cross species barriers and cause disease in the human population. A recent review estimated that of 1,407 infectious agents that infect humans, 58% are zoonotic. Several conditions have to be fulfilled to initiate a zoonotic outbreak in humans and usually combinations of factors are required, of which crossing the species barrier is only one requirement. HIV crossed several times from animals to humans before it emerged as a pandemic. Human T-cell leukemia viruses (HTLV 1–4) emerged from their counterparts infecting nonhuman primates, and foamy viruses

from the same family repeatedly entered the human population. Ample evidence reveals that these viruses were transmitted during hunting and butchering that are part of a vast bush meat market in several African countries. As part of these practices, it is estimated that over 500 million wild animals are caught annually in the Congo basin, ape populations in Gabon declined by more than half between 1983 and 2000, and several species in western Africa have disappeared or are on the verge of extinction. N. D. Wolfe and collaborators termed this repeated transmission from animals to humans *viral chatter* and proposed that at high rates it can increase the diversity of viruses that cross species, facilitating the emergence of strains adapted to humans. For HIV, we know that viral entry into the human population was decisive but not sufficient. Other factors, including the sharing of contaminated needles, human trafficking, commercial sexual work, powerlessness among at-risk women in many countries and cultures worldwide, misinformation, risky sexual behavior, and the expansion of global mobility all made important contributions to the worldwide emergence of the pandemic and provide important lessons for future pathogens.

Deforestation

Human-induced land changes represent a major force driving the emergence of infectious diseases. Deforestation, which has been increasing over the 20th century and annually affects 2% to 3% of the forests worldwide, caused some of the major transformations in the global ecosystem. Within half a century, tropical forests have shrunk by half, a loss of approximately 9 million km², and several pathogens were linked to landscape changes.

Lyme disease, a bacterial infection caused by *Borrelia burgdorferi*, is the most common vector-borne disease in North America and is transmitted by ticks of the family Ixodidae. The white-footed mouse, *Peromyscus leucopus*, is the main natural reservoir for the bacterium. Several deforested areas have seen changes in the species composition: While certain species cannot survive, the white-footed mouse, which has a broad habitat tolerance, is not affected to the same extent, and its relative abundance increases. The “dilution effect model,” proposed by R. S. Ostfeld and F. Keesing, predicts that high species diversity dilutes the natural reservoir and reduces the infection prevalence of ticks. Any factor that decreases the representation of the white-footed mice, relative to other hosts in the community, would reduce the proportion of ticks that are infected. Therefore, one mechanism to reduce the prevalence of the infection is to reduce the relative abundance of white-footed mice. This can be accomplished by increasing the number of alternative hosts, which often are incompetent reservoirs. In support of this model, extensive evidence indicates that reducing the composition and biodiversity of host communities

increases the risk of human exposure to several vector-borne diseases. For example, L. J. Dizney and L. A. Ruedas (2009) revealed that in several forest areas in and around Portland, Oregon, the prevalence of sin nombre virus infection in deer mice (*Peromyscus maniculatus*), which constitute the main reservoir for this frequently fatal pathogen, drastically increases in areas with low mammalian species diversity.

Deforestation was associated with increases in malaria incidence in Africa, Asia, and Latin America. Several studies conducted in Kenya reveal higher outdoor and indoor temperatures in deforested areas, which together with other factors led to the increased vectorial capacity of mosquitoes, shorter development times of the parasite *Plasmodium falciparum*, and increased risk for human infection. The biting rates of *Anopheles darlingi*, the most important malarial vector in the South American Amazon basin, were more than 200-fold higher in sites experiencing extensive deforestation.

A Nipah virus outbreak that occurred in Malaysia between September 1998 and April 1999 was intimately linked to deforestation. In September 1998, several individuals associated with pig farming in Perak state developed acute encephalitis with a high mortality rate, around 38.5%. This was preceded by respiratory infection outbreaks among pigs within the same area. The infection spread to several states and to Singapore where it infected abattoir workers who handled pigs imported from the affected regions in Malaysia. The Singapore outbreak ended when pig importation stopped, and the outbreak in Malaysia subsided when infection control measures, including the culling of a million pigs, were adopted. Fruit bats of the *Pteroid* species represent the natural reservoir of the Nipah virus, and several factors were proposed to have contributed to the outbreak. This included massive deforestations from 1997 to 1998, which destroyed the natural habitat of fruit bats that, lacking their food supply, migrated from forests to fruit orchards. Pigs living around those orchards ingested bat saliva from partially eaten fruit infected with the Nipah virus, and the virus spread to domestic pigs and ultimately to humans.

Deforestation is just one of many environmental disturbances with a profound impact on infectious diseases. Other human activities, including agriculture and irrigation, significantly change the ecosystem. In 1985, a barrage was constructed at Diama to prevent seawater from entering the Senegal River and to make the river more suitable for irrigation. However, this changed water salinity and pH, which became more permissive for the growth of freshwater snails, the natural host of *Schistosoma mansoni*, a parasite that caused massive schistosomiasis outbreaks among people in the area. In the Thar Desert in northwestern India, malaria outbreaks were linked to mismanaged canal-based irrigation related to agriculture. And in Ethiopia, the incidence of malaria in children living within

3 km from dams was shown to be 7 times higher compared with children living from 8 to 10 km away.

Kuru and Creutzfeldt-Jakob Disease

In 1957, scientists studying the Foré people living in Papua New Guinea described, for the first time, a fatal progressive “neurodegenerative condition” called *kuru*, which from the local dialect translates as “trembling with fear.” Several pieces of evidence, including geographical clustering, distribution in age and sex groups, and local rituals to dispose of the deceased, revealed that this initially mysterious condition was transmitted by *endocannibalism*, also termed *transumption*, a practice in which the body of the deceased was consumed by relatives as a sign of affection and an expression of grief.

In some villages, kuru became the predominant cause of death among women. One of the early observations was that the disease mostly occurred in women and children: Men represented only 2% of the diseased while women represented 60%, and the remaining were children. This was explained by the endocannibalistic rituals in which women and children were the ones to consume the internal organs, including the brain, which contained the most infectious agents, while men never consumed these parts.

The main pathogenic feature of kuru is that, unlike in many other infectious diseases, the transmissible agent is an infectious protein called *prion*, which was isolated from the brain tissue of the diseased individuals and was shown to cause disease in experimental animals. The prion hypothesis proposes that the protein can exist under two forms, a noninfectious one, PrP^C, which is encoded by the host and can spontaneously be converted into an infectious form, PrP^{Sc}, a highly aggregated detergent-insoluble form that was extracted from affected brains. Once the infectious form is produced, it can transform noninfectious molecules into the pathogenic form. It is thought that PrP^C constantly undergoes minor conformational changes, and one or a few of the misfolded prion protein forms can associate and generate seed PrP^{Sc} structures, which leads to the autocatalytic formation of more PrP^{Sc}.

Examining the *PRNP* locus that encodes the prion protein revealed a polymorphism at position 129, which can encode either methionine (M) or valine (V). Individuals can be homozygous for either allele if they carry both chromosomal copies encoding the same amino acid (MM or VV) or heterozygous if each chromosome encodes a different amino acid at this position (MV). A study that examined Foré women older than 50 years, who repeatedly participated in endocannibalistic behaviors, revealed a drastic overrepresentation of the frequency of heterozygotes (MV) in this group as compared to other populations, indicating that being heterozygous provides resistance to the disease and a clear survival advantage. This polymorphism has a powerful influence both on kuru susceptibility and

incubation time. It is proposed that the practice of endocannibalism could have represented a selective force to eliminate homozygotes and select for heterozygotes, which were more resistant to the disease. One hypothesis is that the worldwide distribution of this polymorphism could very likely be the result of a constant exposure in our evolutionary past to animals that were constantly a source of prion disease or represent a testimony of endocannibalism in ancient populations. The polymorphism at position 129 results in one amino acid change (M versus V) in the protein and is thought to make protein-protein interactions more difficult between proteins that harbor this discrete change than between homozygous proteins, which aggregate more easily, explaining the selective advantage of heterozygous individuals.

More recently, in March 1996, another prion, causing the variant Creutzfeldt-Jakob disease (vCJD), attracted worldwide interest when it was reported that the progressive spongiform encephalopathy outbreak, discovered in cattle several years before, had spread to 10 humans. About 210 clinical cases were reported by late 2008, but due to the long and variable incubation, it is unclear how many people were infected. Importantly, all individuals who developed the disease are homozygous for methionine at position 129 of PRNP, which is one of the genetic susceptibility factors described. This human epidemic occurred in the wake of the bovine spongiform encephalopathy, or “mad cow disease,” that started to be reported a few years earlier in the United Kingdom. In 1986, a previously unrecognized progressive neurological condition was reported in cattle in the United Kingdom, with spongiform lesions appearing in the brain of the affected animals. Early during the outbreak, which is thought to eventually have infected 2 million cows, epidemiological investigations revealed that cases were reported from throughout the country, indicating the likelihood of a common-source epidemic rather than one that is propagated. The cause was proposed to be the meat-and-bone meal, a dietary supplement that was prepared from carcasses of sheep affected by scrapie and fed to cattle. *Scrapie*, a fatal neurodegenerative disease caused by a prion, has been recognized in sheep for about 250 years. This supplement was fed to dairy herds more often than to beef herds, and dairy herds exhibited a much higher incidence of the clinical manifestations during the “mad cow disease” outbreak. Feed manufacturers in the United Kingdom started introducing the meat-and-bone meal in the diet of dairy calves in the 1970s, a practice that was less prevalent or nonexistent in other countries. One step during the manufacturing process involved treatment with an organic solvent at 70 °C for 8 hours to extract fat. In the early 1980s, as many manufacturing plants reduced the use of organic solvents in this process, the fat content of the meat and bone meal increased significantly and is thought to have allowed prions, which are resistant to heat but can be inactivated by lipid solvents to maintain their infectivity. It is believed that prions have always been present in the

meat-and-bone meal, but were inactivated by the solvent treatment step, and changes in the manufacturing process made inactivation less effective, allowing it to cause disease. A ban on ruminant protein supplements, introduced in the United Kingdom in July 1988, led to the decline of the outbreak and confirmed the origin of the outbreak.

HIV and HTLV

For certain infectious diseases, it became clear that a multitude of factors facilitated the emergence and worldwide spread of these pathogens, and the HIV/AIDS pandemic provides an important example. Since 1981, HIV has caused an estimated 25 million deaths worldwide and was most recently implicated in 2.7 million new infections annually, becoming probably the most studied virus in history. Over 15% of the adult population is infected in Zambia, and as a result of the pandemic, life expectancy in Botswana decreased from 59 years in 1990 to around 44 years in 2003.

The mortality caused by the HIV/AIDS pandemic profoundly affected all aspects of biomedical and social sciences and even required that the validity of certain approaches that have classically been used in population studies be revisited. For example, since the infection often affects couples, mortality rates, usually determined from the number of deaths reported within a household, could be underestimated due to the disappearance of entire households, opening the need for implementing new demographic tools.

Two HIV types are currently known, and they differ in biology, epidemiology, transmission, and clinical progression of the disease. HIV-1 is distributed worldwide and responsible for the majority of disease, whereas HIV-2 is found mostly in Africa and India and is transmitted less efficiently. Extensive evidence, including molecular phylogenetic analyses, supports the view that HIV emerged from simian immunodeficiency viruses (SIV), their counterparts found in several species of nonhuman primates. HIV-1 originated from SIV_{CPZ}, a virus that infects chimpanzees (*Pan troglodytes troglodytes*) in western Central Africa and was introduced into the human population on at least three separate occasions, giving rise to the three phylogenetically distinct HIV-1 lineages, M, N, and O, present in the human population. HIV-2 was shown to have originated from SIV_{SM}, which infects sooty mangabeys (*Cercocebus torquatus atys*) and entered the human population on at least four different occasions. Most recently, a new HIV-1 strain, closely related to a virus that infects wild-living gorillas, SIV_{gor}, was described in a Cameroon woman and proposed to be designated group P. Chimpanzees and sooty mangabeys are hunted for food and kept as pets. Exposure to infected animal blood and tissues during hunting and butchering, animal bites, and the consumption of uncooked, contaminated meat were all proposed to have facilitated the cross-species transmission of the virus and its emergence in humans.

Cross-species transmission explains the origins of HIV but was not sufficient to establish a pandemic. HIV existed in humans for several decades before it emerged worldwide. Testing plasma samples collected in 1959 revealed that a male member of the Bantu tribe, who lived in Kinshasa, the Democratic Republic of the Congo, had anti-HIV antibodies, and the polymerase chain reaction subsequently amplified a fragment of the viral genome, confirming the infection. Phylogenetic analyses, using viral DNA isolated from a paraffin-embedded lymph node biopsy, originating from a patient in 1960 in Kinshasa, indicated that HIV could have infected humans between the late 19th century and the early 20th century. A constellation of additional factors was instrumental for the global spread of the virus. Some of them such as the high HIV mutation and recombination rates, compounded by its fast replication, are inherent to the biology of virus and make it one of the fastest evolving pathogens currently known. Most important, a complex interplay of cultural, social, economical, and political factors was instrumental in facilitating and fueling the pandemic. One of these factors, the high prevalence of other sexually transmitted diseases, particularly ulcerative ones, increased susceptibility to infection and continues to play an important role in HIV transmission worldwide. For example, gonorrhea and herpes infections both increase HIV transmission. Resistance to using condoms is often rooted in social and economic causes or in the advice of religious leaders with substantial influence in the respective communities and represents an important contributor to the pandemic. Several interview-based studies talk about the often-reported concern that requesting sexual partners to use condoms would bring distrust into the relationship. An established risk factor for HIV is the widespread use, in several African countries, of vaginal herbs that dry, contract, and heat the vagina to increase sexual pleasure but also create lacerations that increase susceptibility to infection. The worldwide crisis, created by an estimated 800,000 annual victims of human trafficking, 80% of whom are forced into becoming sexual workers, is compounded by the powerlessness of female sex workers in many countries and cultures. As biological, social, and economical factors made women in many countries more susceptible to infection, HIV incidence rates were reported to increase faster in females than in males in many locations worldwide. E. Esu-Williams (2000) described a "gender paradox" in relationship to HIV in Africa, pointing out that despite men often being the ones more likely to have multiple sexual partners, community stigma is directed toward women, who are blamed even when their young adult children become infected. The global mobility that made it possible to reach remote parts of the world within hours is another factor that greatly contributed to the HIV/AIDS pandemic. Due to the multitude of factors involved, it is becoming increasingly clear that medical and public health approaches are insufficient to address the pandemic, and adopting a combined perspective,

including cultural, social, and political interventions, is vital in managing the pandemic.

Contacts between humans and nonhuman primates were implicated in the emergence of another retrovirus, human T-cell leukemia virus (HTLV), with four representatives identified in humans. These viruses, together with their simian counterparts, STLV-1, -2 and -3, belong to the group of primate T-cell lymphotropic viruses (PTLV). HTLV seroprevalence varies worldwide. Over 10% of some populations in southern Japan and up to 5% in sub-Saharan Africa and several Caribbean and South American countries are infected. Infection rates are from 0.01% to 0.03% in the United States and Canada and even lower in Europe, with higher prevalence among immigrants from endemic areas and their families, intravenous drug users, and multiple-transfusions recipients.

HTLV-1, which was more intensively studied, is estimated to infect approximately 15 to 20 million people worldwide. While most infected people are asymptomatic, from 1% to 5% develop adult T-cell leukemia from 20 to 30 years after the initial infection, and others develop a progressive inflammatory neurological condition or rheumatoid arthritis. HTLV-2 is less pathogenic and was linked to neurological manifestations. It is unclear why certain individuals develop these severe medical conditions, while the majority of those infected remain asymptomatic. Transmission occurs by sexual activity, blood transfusion, contaminated needles, and from mother to child during breast-feeding and pregnancy.

Over 10% of the free-ranging primates in the rainforests of Cameroon harbor a variety of STLV strains, which were also identified in pet primates and in bush meat sold for human consumption. In fact, Africa is the only continent where all four viruses infecting humans, HTLV-1, -2, -3, and -4 and all three known simian counterparts, STLV-1, -2 and -3, were found.

Human HTLV infections emerged independently by the cross-species transmission, on several occasions, of their simian counterparts. N. D. Wolfe and collaborators reported that HTLV-1 strains, isolated from local villagers from Cameroon who hunted for primates, exhibited from over 97% to 98% identity at the nucleotide sequence level with STLV-1 isolates infecting free-ranging monkeys in the region. Bites and contact with the blood and body fluids of primates, during hunting and butchering, represent major risk factors that facilitate the cross-species infection of humans.

In addition to implications for human health, HTLV emerges as an important instrument in dissecting human history. In 1999, an HTLV-1 provirus was identified in a 1,500-year-old Andean mummy from northern Chile, and comparisons between several nucleotide regions of this virus and strains infecting present-day Japanese populations helped in understanding human migration from Asia to South America and reopened many questions, some of which are still controversial and insufficiently understood.

Influenza

Among microorganisms that reemerged periodically through history, an important representative is the influenza virus. In addition to annual outbreaks known as seasonal flu, which usually affect mostly the very young, the elderly, and individuals with underlying medical conditions, influenza regularly emerges in the form of pandemics that spread over extensive geographical areas and cause extensive morbidity and mortality in all segments of the population. The first influenza pandemic on which all authors agree occurred in 1580 and three pandemics, the 1918 to 1919 Spanish flu, the 1957 to 1958 Asian flu, and the 1968 to 1969 Hong Kong flu, occurred in the 20th century.

Three types of influenza viruses, A, B, and C, were described in humans. The single-stranded RNA viral genome contains 8 segments for types A and B and 7 for type C viruses, all required for infectivity. Two viral genes encode hemagglutinin and neuraminidase, the proteins that decorate the viral surface as “spikes” visible by electron microscopy. Hemagglutinin is crucial for viral attachment to host cell receptors during the initial stages of the infection, and neuraminidase facilitates the subsequent cell-to-cell spread of the virus. There are 16 hemagglutinin and 9 neuraminidase subtypes that represent one of the bases for classifying influenza viruses.

Two characteristics of the influenza virus are central to its ability to regularly cause disease. One of them, common for RNA viruses, is the high rate of errors during replication as compared to DNA viruses. The progressive accumulation of small errors in the influenza virus genome introduces subtle changes in the resulting proteins, a process that is known as *antigenic drift*, and occurs constantly in all three types of influenza viruses. As a result of these small changes, influenza viruses constantly gain the ability to reinfect individuals who already were infected during previous flu seasons.

A second type of change, called *antigenic shift*, that occurs more rarely, was described only in type A viruses and has by far more devastating consequences. The segmented influenza virus genome enables two viruses that coinfect the same cell to exchange one or more of their genes and create new viruses, a process known as *reassortment*. The 8 segments of two viruses can rearrange in 256 possible combinations, providing a great source of genetic diversity that confers new properties to the resulting strain. D. M. Morens and collaborators recently pointed out that it is more meaningful to think about influenza A viruses not as distinct entities but as “gene teams” that sometimes trade away one gene and gain new ones and acquire unique skills as a result.

The 1918 to 1919 Spanish flu infected 25% to 30% of the world’s population and caused an estimated 50 to 100 million deaths. Its origins are debated, but the virus was shown to harbor several segments originating from avian-like viruses. The virus responsible for the 1957 to 1958

Asian flu acquired three of its genes from viruses infecting wild ducks, and the strain that caused the 1968 to 1969 Hong Kong flu had two genes of avian origin.

The ability of influenza viruses from different species to undergo reassortment requires them to cross species boundaries. Despite widely held beliefs, human influenza viruses do not replicate easily in avian species, and avian viruses do not easily cause infection in humans. The biological basis of this host restriction is explained by the specificity of the interaction between *hemagglutinin*, which is the viral protein responsible for attachment, and *sialic acid*, which represents the influenza virus receptor on the surface of host respiratory epithelial cells. It was known for a long time that several types of sialic acids exist across species, but the significance of this phenomenon was not completely understood.

Human influenza viruses recognize sialic acid, which contain galactose bound by an α -2,6 linkage, and these receptors are found on human cells. Avian viruses have a predilection for sialic acid linked to galactose by α -2,3 linkages, and these receptors are mostly found on avian respiratory epithelia. This interaction is one factor that restricts influenza viruses to their respective species. However, sialic acid from pig tracheal-epithelial cells contains both types of linkages, and this explains their susceptibility to infection with both avian and human influenza viruses. Pigs are often described as “mixing vessels” that facilitate the reassortment of influenza viruses to generate new strains that infect other species.

Avian species represent the natural reservoir for type A influenza viruses. Both low- and high-pathogenicity viruses exist in birds, and mutations can convert low-pathogenicity strains into highly pathogenic ones. Ito and collaborators demonstrated that consecutive passages of an avirulent virus infecting wild birds can generate highly pathogenic strains with high lethality in chickens, accompanied by the progressive accumulation of basic amino acids at the hemagglutinin cleavage site, a widely reported feature of virulent viruses from several outbreaks.

Several influenza virus subtypes were documented in migratory waterfowl, particularly in wild ducks. In April 2005, an H5N1 influenza virus outbreak was detected among wild birds from the Qinghai Lake in western China, a major breeding site for migratory bird populations. Over 6,000 dead birds were found in this area over a 2-month period, and of several viruses that were isolated, all were lethal to chickens and most were highly lethal to mice. Moreover, between February and June 2006 over 2,400 dead birds were found in the region of Lake Constance, an important wetland habitat at the border between Germany, Austria, and Switzerland, and many tested positive for influenza A viruses. Several avian species exist at this location throughout the year, and many more migratory birds pass between October and March. Wild ducks infected with influenza viruses are often asymptomatic and were recently referred to as the “Trojan Horse” of H5N1 influenza.

In addition, Sharp and colleagues (1997) revealed that ducks can be co-infected with several subtypes of influenza A viruses, facilitating reassortment. Migratory birds should become a cardinal component of the global influenza virus surveillance. Wild birds can infect poultry and other domestic animal species, including pigs. This process is facilitated by habitat overlap, particularly in several Asian countries, where pigs and ducks are often raised in close proximity, and both are close to humans, facilitating reassortment and infection. Another practice that facilitates reassortment is the integrated pig-hen-fish farming where to reuse waste, pigs consume the feces of hens located in cages above them, and subsequently, pig manure is released into ponds situated below the pigsties. In this system, excess food from pigs and hens becomes available for the fish, and at the same time, their feces are used as pond fertilizers.

Several populations are at particular risk for influenza virus infections. These include individuals occupationally exposed to live poultry, swine farmers, and meat processing workers, who can be infected by the respective species and subsequently introduce the viruses in the community, exposing people who did not have direct animal contact. Surveillance, conducted at poultry markets in several countries, revealed that influenza viruses are present in live birds and/or meat products, and several studies that examined poultry and swine workers revealed that they have higher levels of antibodies against influenza viruses, indicating the potential to become occupationally infected.

Several reports described avian influenza virus infections in individuals who did not raise poultry and were not exposed in their neighborhood, and the only epidemiology-relevant events were visits to live bird markets within the days or weeks preceding the disease. Therefore, it appears that visits to poultry or animal markets are sometimes sufficient to become infected. In this respect, it is important to remember the role of feathers as a potential route of infection. Yamamoto and collaborators reported that viruses were able to replicate in the feather-epithelial cells of domestic poultry infected with H5N1 viruses, even in asymptomatic birds, opening the possibility that feathers can represent a source of infection. In fact, Marek's disease virus, a herpes virus that infects chickens, was previously shown to exist in high concentrations in many feather-follicle-epithelial cells, from sites where they can be shed into the environment. Certain human behaviors, such as increasing numbers of poultry kept in the vicinity of wild waterfowl, and extensive contacts between animal and bird species, and humans in and around the household and in wet markets, represent important risk factors facilitating influenza virus infections in animals and humans. Wet markets are live animal markets that sell poultry, mammals, and fish and animals reside in close proximity to each other and to humans, for days and sometimes weeks.

SARS

The first outbreak to attract global attention during the 21st century was the 2002 to 2003 severe acute respiratory syndrome (SARS) pandemic that infected over 8,000 people and claimed over 700 lives worldwide. The outbreak was caused by SARS coronavirus (SARS-CoV), a member of the coronaviruses, which includes representatives previously implicated only in mild respiratory infections.

The outbreak started in the Guangdong province in China, and the observation that many of the first patients in China were chefs or animal handlers raised the possibility that the outbreak involved zoonotic exposure. The initial investigation of animals from a market in Guangdong detected SARS-CoV-like viruses in several species, including palm civets, a raccoon dog, and a Chinese ferret badger. In addition, animal traders and workers involved in slaughtering animals at the same market had significantly more antibodies to the virus than did vegetable traders. The genomic sequence of two viruses isolated from palm civets had over 99% homology with viruses isolated from humans, revealing the possibility that market animals represent the source of human infections. Importantly, during the winter of 2003 to 2004, after the SARS outbreak ended, 4 new human cases were reported from the same province. Epidemiologic investigations linked two of the patients to a restaurant that served palm civets. One patient was a waitress who worked close to the animal cages located within the restaurant, and the other was a guest whose dining table was close to the civet cages. All six palm civets from the same restaurant tested positive for SARS; sequencing of the *S gene*, which encodes the "spike" protein that helps the virus attach to the surface of target cells on human or animal hosts, revealed that these civets were the source of the outbreak, as opposed to the continued circulation of SARS in the population. Civet cats thus emerged as a potential source that contributed to the SARS outbreak. Civets represent a culinary delicacy in southern China and this explains why food handlers, caterers, and chefs were overrepresented several-fold among the first victims during the outbreak.

However, while several subsequent studies confirmed that civets from animal markets harbor the virus, others failed to reach the same conclusion and reported that civets, particularly the ones growing on farms, were not infected. This pointed to the possibility that even though palm civets can harbor the virus, additional species could be involved. Taking into account that approximately 66 virus species were isolated from or detected in bats, the bat population was examined as a potential source of SARS. Two independent virological surveillance studies revealed that several species of horseshoe bats from China have high seroprevalence for a coronavirus that was called bat-SARS-CoV. Bats were able to support viral replication without becoming sick, indicating that they may represent the natural reservoir for the virus; sequence analysis of

several bat viruses revealed that they are closely related to viruses isolated from humans and civets. Subsequently, SARS-like coronaviruses were documented in bats from Europe, North America, and Africa. From bats, the virus can be directly transmitted to humans or first infect other species that subsequently infect humans.

The slaughtering of bats and the consumption of bat meat represent possible pathways for infection. Bat meat is considered a delicacy in Southern China and is believed to cure various ailments such as asthma, kidney conditions, and general malaise. Bat feces are sometimes used in traditional medicine in Asia. In many locations from southern China, such as the Guangdong province, considered to be the epicenter of the SARS outbreak, eating a wide range of wild animals, including civets and bats, is considered beneficial for general health and sexual performance. In many countries that have a centralized slaughtering system, contacts between the general population and animals are limited, and zoonoses usually emerge either occupationally among individuals who handle animals or recreationally among people who come in contact with animals in the wild. However, in other countries where people live close to the animal supply or regularly visit wet markets where several live species are sold and sacrificed in close proximity to humans, much larger segments of the population are exposed to the risk of zoonotic infections.

Foamy Viruses

Retroviruses, the same family that includes HIV, have a unique replication strategy as their distinguishing feature. These viruses harbor reverse transcriptase, an enzyme that uses the viral RNA genome to generate a double-stranded DNA molecule that becomes integrated into the host genome and subsequently replicates together with the host. Two retrovirus subfamilies exist: the Orthoretroviridae, comprising six genera and the Spumaretrovirinae, comprising one genus, the *Spumavirus*, or foamy viruses. *Foamy viruses* infect a broad range of mammals, including non-human primates, horses, cows, and cats. The highly vacuolated appearance of infected cells provided the name for these viruses.

Despite being discovered over 40 years ago, foamy viruses are still among the least characterized retroviruses. Of the seven known retrovirus genera, foamy viruses appear to represent the only exception to pathogenicity, and it is unclear whether this might change as new findings become available. The most studied representatives are simian foamy viruses, which infect nonhuman primate hosts and are thought to have coevolved with them for over 30 million years.

The first report of a foamy virus infection in humans was in 1971 when it was isolated from a Kenyan patient with nasopharyngeal carcinoma. The high amino acid similarity between this virus and a strain infecting

chimpanzees pointed toward its animal origin. High prevalence of foamy virus infection was reported among non-human primates, including rhesus macaques, African green monkeys, baboons, and chimpanzees. In all species, infection rates are higher among captive than free-ranging animals and in adults as compared to juveniles. Bovine foamy virus infections were reported in cows, and feline foamy viruses infect wild and domestic cats.

Animal-to-human transmission of foamy viruses can occur in two broad settings, occupational and recreational. Populations at risk for occupational transmission include zoo workers, veterinarians and laboratory workers in contact with primates, individuals involved in hunting primates, and employees in monkey temples. Owning primate pets, close contact with performance monkeys, ecotourism, and visiting monkey temples represent some of the routes facilitating recreational exposure. Calattini and colleagues reported that 1.8% of adults living in primate habitats from southern Cameroon had serological evidence of exposure, and N. D. Wolfe and collaborators found that 1% of individuals residing around primate habitats from southern Cameroon had antibodies against simian foamy viruses. W. M. Switzer and collaborators tested 187 lab and zoo workers recruited from five different institutions and revealed that 10 were infected.

Visiting monkey temples provides, worldwide, more human-primate contact opportunities than any other setting and increasingly emerges as a significant risk factor for infection. Taking into account that 700,000 tourists visit the four main monkey forests in Bali annually, M. Schillaci et al. estimated that approximately 2,100 visitors would become seropositive, and assuming that only 10% of them originate from North America and only 1% to 2% donate blood, they predicted 2 to 4 infected individuals would contribute to the North American blood supply at least once a year. These predictions were modeled based on only the four main monkey temples in Bali and did not take into account other sites on the island or in several other Asian and African countries.

Blood transfusion and organ transplantation represent potential transmission routes, but the risks are still unclear. A recent study reported that blood products transfused from an individual, confirmed retrospectively to be infected, did not infect any of the four recipients. Transplantation becomes relevant under two circumstances: Tissue and organ donors infected with foamy viruses could transmit the virus to recipients, and baboons used for liver transplantation could infect humans. In two human recipients of baboon liver transplants, simian viruses were identified in several tissues in the recipients. It is unclear whether human-to-human transmission can occur. Foamy viruses were not identified in blood samples collected from infected individuals' spouses, but very few individuals were examined so far.

The involvement of foamy viruses in human disease is controversial and unclear, and this, too, is partly due to the small number of reports. There is a contrast between the

in vitro ability of foamy viruses to induce rapid cytopathic effects in several cell types, and their apparent lack of pathogenic effects in infected individuals. While some studies implicated foamy viruses in Graves' disease, de Quervain thyroiditis, multiple sclerosis, amyotrophic lateral sclerosis, and myasthenia gravis, other reports did not replicate these associations, and many authors reported nonspecific or age-related symptoms among foamy virus-infected individuals. However, mice infected with various combinations of foamy virus genes were reported to develop neurodegenerative conditions.

It will be important to understand whether foamy viruses are linked to medical conditions in humans or whether they persist in the genome without causing disease. A third scenario, which deserves serious consideration, is also possible and becomes relevant, particularly when considering the recent report of the first two human co-infections with HIV-1 and simian foamy viruses in a blood donor from Cameroon and a commercial sex worker from the Democratic Republic of the Congo. Foamy viruses could shape other viral infections. Reports showing that foamy viruses make human T-cells become more permissive for HIV-1 binding and cell-to-cell transmission, together with mouse models indicating that foamy virus transcription factors can activate HIV in certain tissues, strongly support this possibility. Under this third scenario, even if foamy viruses turn out not to cause disease on their own, they could well become the pandemic that shapes another pandemic.

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PART VI

METHODOLOGY

DATING TECHNIQUES

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Situating things in time and space is critical for archaeology and paleoanthropology. Knowing when something happened helps us to understand how humans and cultures evolved. From John Lightfoot and Bishop James Ussher, who calculated the age of the earth using genealogies in the Bible, to Willard Libby, who developed radiocarbon dating and beyond, researchers have been working to establish a chronology of the past.

Absolute, or chronometric, dating techniques provide us with measurable dates—day, year, millennia, for example. Relative techniques provide a basic order to material recovered from a site; they give us an idea of its age—how old something is in comparison to something else. This chapter will cover a few of the techniques from each category. It is not meant to be a comprehensive overview of all dating techniques nor provide an in-depth discussion of the techniques. It is meant to be an introduction to some of the dating techniques available to archaeologists and paleoanthropologists.

Relative Dating Techniques

Relative dating techniques provide the researcher with an order of occurrence but not an absolute date—it is an age in relation to something else. Even though it does not provide a calendar date, it does not mean that the techniques are not important or useful. For sites where it is impossible

to recover the appropriate material for absolute dating techniques, relative dating is critical. It can also be used to make connections between sites and artifacts across time and space, as well as to examine site formation processes. Stratigraphy and the index fossil concept are the cornerstones of relative dating, providing a foundation for subsequently developed relative methods.

Stratigraphy

In geology, *stratigraphy* deals with the classification and mapping of observable units that form the earth's crust, using rock description, classification, and interpretation. Archaeologists use stratigraphy to establish relationships in time between artifacts and features. As such, stratigraphy is the cornerstone of archaeology.

Stratigraphy, or stratigraphic dating, is based on the assumption of the law of superposition. First noted by Nicolas Steno (1638–1686), the law of superposition states that geologic strata are progressively older the deeper one goes. Steno observed a layer of shell beneath ancient Rome and posited that it must be older than the ancient city since it was beneath the city. He reasoned that particles in a fluid would be laid down in distinct horizontal layers (strata), an effect he called the principle of original horizontality. For example, let us say that a layer of sediment, or strata, heavy in clay content is laid down (Strata 1). Perhaps through a flood, a layer of organically rich sediment with pebbles is laid

down on top of it (Strata 2), and then perhaps another layer of sediment (Strata 3) is laid down, and so on. In this example, Strata 1 is the oldest, Strata 2 is younger than Strata 1 but older than Strata 3, and so on. This may seem common sense to us today; however, it was a new idea in the 1600s.

The principles of stratigraphy established by Steno provided the first relative dating technique. Using the earth's own strata, it became possible to place things in the order they were deposited. Early attempts at establishing stratigraphic chronologies centered on stratigraphic observation—the noting of artifacts in relation to strata. John Frere (1740–1807) used the method to order stone tools found with extinct animal fossils, and Christian Thomsen (1788–1865) developed the three age system for Stone Age Europe. Boucher de Perthe (1788–1868) was the first archaeologist to employ stratigraphic observation in conjunction with archaeological excavations, ensuring stratigraphy's vital role in archaeology.

Stratigraphic observation and stratigraphic excavation differ in that stratigraphic observation is simply noting the occurrence of artifacts within geologic strata. Stratigraphic excavation requires the archaeologist to excavate a site using stratigraphic levels. This can be done in two ways: (1) arbitrary levels and (2) natural levels. An archaeologist may excavate a site in arbitrary levels: 10-cm- or 20-cm-deep levels, for example. Once sterile soil, or a level without artifacts, is reached, archaeologists note the various stratigraphic levels on the wall(s) of the excavated unit, generally in the form of a profile. A profile is created by drawing the observed strata using a line level and tape measure. Excavation using natural levels can be accomplished in a couple of ways. One way is to dig until you hit a change in the soil type. The other way is to divide the excavation unit into smaller segments—in half or quarters, for example. One segment is excavated using arbitrary levels. The next segment is excavated using natural strata based on the profile exposed when digging by arbitrary levels.

Archaeologists generally use basic stratigraphic methods: the observation and recording of the various strata, particularly noting soil composition and color as well as artifact content. Recently, some archaeologists have employed specialized stratigraphic measures developed by geoscientists in order to create deeper analyses: lithostratigraphy, which examines the composition of strata; biostratigraphy, which examines the fossils contained within strata; and chronostratigraphy, which looks at the age of rocks. Geoarchaeologists suggest a new unit of study: ethnostratigraphy, which is similar to the biostratigraphic unit but is focused on cultural artifacts instead of fossils. Ethnostratigraphy is not widely used because there is no standard of classification as there is with fossils.

Index Fossil Concept/Time Markers

William Smith (1769–1839), a British geologist, observed that fossils found in various strata indicate that

life forms changed over time. He demonstrated that by using these differing life forms, it was possible to associate strata from different places with one another. If the same life forms were found in the strata at two different places, then the assumption is that the strata were laid down at the same time. Smith's ideas are now known as the *index fossil concept*.

This concept was successfully adapted to archaeology by substituting artifacts for fossils. These artifacts, known as *time markers*, represent particular time periods. Oscar Montelius (1843–1921), Flinders Petrie (1853–1942), and Nels Nelson (1975–1964) used the principles established by Smith to date a variety of sites in Europe, Greece, and the North American Southwest. Montelius, a Swedish archaeologist, used the method to establish time markers for Neolithic, Bronze, and Iron Age Europe. Petrie used time markers from Egypt on Heinrich Schliemann's Mycenaean sites in Greece to establish dates. Nelson applied the methodology to pottery found at the San Cristobal site in New Mexico, establishing a master sequence that was used later by Alfred Kidder (1876–1960) in his development of a culture history for the North American Southwest. Nelson's work is especially important, as he carefully excavated a portion of the site, combining stratigraphic excavation with the time marker concept to create a relative order of occurrence for the pottery. This enabled archaeologists to track culture change over time.

The index fossil concept has become important for paleoanthropology, specifically for sites where no material exists for radiometric dating. In southern Africa and Chad, fossils are compared to fossils from sites in eastern Africa where radiometric dates were acquired.

Seriation

The index fossil concept is the basis for *seriation*. Popular in the mid-20th century, today seriation is used when chronometric techniques are not applicable. It is like the index fossil concept in that it uses time markers to establish chronological sequences; however, it differs in that it not only traces stylistic change over time but also examines the frequency of occurrence of the artifacts in question. It can be used on any type of artifact, but it is most commonly used on pottery and ceramics, as those artifacts are ubiquitous in the archaeological record.

Seriation is based on the assumption that cultural styles change over time. A master sequence of the frequency of use can be established to correlate sites with one another. This allows archaeologists to compare occupation sequences among sites in a region and track the popularity of styles across time. The frequency of occurrence, or popularity curve, is charted, creating a graphic representation that resembles the plan of a battleship. These curves are then compared to establish relationships between sites.

The methodology became progressively more quantitative in nature over time, where statistical measures were

used to track changing artifact attributes (characteristics), helping to refine seriation sequences. Seriation becomes a particularly robust technique when correlated with chronometric dates. In the North American Southwest, ceramic sequences have been correlated with tree-ring dating, which validates the seriation sequences established.

Amino Acid Racemization

Amino acid racemization was first observed in 1884; however, it was not until the 1950s that the process was recognized as a potential dating technique for fossils. In the 1970s, the technique was applied to archaeological artifacts, such as bone, mollusk shell, teeth, and avian eggs. At first glance, it would appear that amino acid racemization should be a chronometric technique, but for reasons outlined below, it is included with relative dating techniques.

Proteins are formed from amino acids that occur in one of two molecular patterns: L-enantiomer (L-types) and D-enantiomer (D-types). In living organisms, the L-type pattern is the most common, almost to the exclusion of the D-type pattern. This means that the organism is optically active (during the interaction of the amino acid with polarized light, the organism will rotate in the direction in which the light is vibrating as it passes through them) for the L-type molecules. Having only one type is thermodynamically unstable, so over time the amino acids will change until they are optically inactive, which means that the ratios of L-types and D-types reach an equilibrium, a process known as *racemization*. The rate at which the amino acids become optically inactive can be used to calculate an age for the artifact up to several million years. However, calculating an age is dependent on the rate of racemization, which in turn is affected by a number of factors, the most prevalent being the environment. If the temperature history of a site is unknown, then ages cannot be calculated. If items are from the same site, then one can assume that they share a temperature history and can be relatively dated with one another using the degree of racemization. Since it is difficult to determine the temperature history of an item, the relative technique is usually employed.

Fluorine Dating

Fluorine is a reactive chemical found in several elements, most importantly in ground water for archaeological and paleoanthropological purposes. As ground water leaches into materials, especially siliceous rock, bone, and teeth, fluorine ions replace calcium-based minerals. Fluorine ions are extremely reactive with other materials. This means that once it replaces minerals in an object, it is fixed in the material and begins to accumulate over time. The rate of fluorine accumulation can be measured and compared to objects from similar environments to construct a relative chronology.

Fluorine dating is dependent on the amount of fluorine in ground water supplies; therefore, the artifacts being dated must be from similar environments, if not the same, to establish an accurate chronology. The density of the material can also affect fluorine dating. Dense material absorbs fluorine ions more slowly than porous or spongy material. This can be corrected for by comparing the fluorine content to the phosphate content of the object.

Uranium (U) and nitrogen (N) testing can be done in conjunction with fluorine (F) dating to further refine the chronology. This technique, *F-U-N dating*, was used successfully to identify the Piltdown skull as a hoax. In 1911, fragments of a hominid skull and other vertebrate bones were found in England. Subsequent excavations recovered pieces of a human skull that had both modern and apelike characteristics. Fluorine analysis was applied to the skull bone, as well as to some of the vertebrate bones found associated with the human bone. These tests indicated that the cranial bones were much older than the jaw bones.

Patination

Rocks such as flint, basalt, andesite, and other fine-grained rocks that are exposed to moisture will develop a *weathering rind*, or *patina*. Over time, the rind pushes itself into the unweathered rock. Where the weathering processes are known, the rind may be used to calculate a sequence for a site, from as few as a couple of years up to around 500,000 years. For this method to work accurately, only rocks that have been exposed to the same environmental conditions should be compared. Since this can be difficult to determine, sequences should be verified using another dating technique if possible. In some cases, the patination can be used to calculate an absolute date—for example, obsidian hydration dating (see below for discussion).

Rock varnish is formed when clay elements bond with manganese and/or iron oxides on rock surfaces. The layers of varnish provide environmental information and can be used to estimate when the rock surface was first exposed to weathering. Many different patination techniques have been developed, including trace element trends, metal scavenging, and orange bottom varnish growth; however, they have not been used with much success. The cation-ratio (CR) dating method, on the other hand, has yielded some relative chronologies for rock—stone tools from sites in semiarid and arid conditions, for example.

Cations are positive ions that are impacted by various leaching processes. Cation-carrying clay materials are blown onto the rock surfaces where they chemically react with minerals of varying mobility to form a patina or varnish. It is known that cations of potassium + calcium/titanium decrease with age; hence, a relative chronology can be established by comparing the ratio of mobile cations to immobile cations. This method cannot provide a manufacturing date for a stone tool; it only tells us about how

long ago the rock varnish began to accumulate. CR chronologies need to be calibrated by using absolute dating methods, such as potassium-argon dating or radiocarbon dating. Once a chronology is established for a site, it can be used as a master sequence for relative dating purposes.

Palynology

Pollen analysis, or *palynology*, is another relative dating technique, as well as a method of environmental reconstruction. Developed in 1916, pollens found in lake sediments and ice cores can be used for cross-site comparisons to establish a chronology. When comparing two sites, if layers in the pollen diagram are similar, then we can infer that the sites were occupied at the same time. Concomitantly, we can reconstruct what types of plants were available in the local environment as well as develop a picture of the climate. For example, if there is a plethora of tree pollen, then the climate was warm. Pollen analysis is in effect a form of biostratigraphy.

Varve Analysis

Varves are annual series of sediments deposited in still bodies of water—a glacial lake, for example. Varves form seasonally. In winter, when glacial meltwater is reduced or stopped altogether, clay material slowly settles to the bottom of the lake, and during spring and summer, silt and sand are deposited, creating a series of dark (clay) and light (silt and sand) layers. This layering effect is sometimes referred to as laminated sediment. A chronology can be established by counting the varves and then correlating the thickness of varves across sites. Long chronologies can be established by following the tract of retreating glacial ice. Varves closest to the glacier are younger than those farther away.

Over the past century, scientists have found that one of the main problems with varve analysis is that it is possible that years can go missing due to natural processes. Therefore, it is necessary to recognize that the dates calculated using this methodology are minimum ages and whenever possible should be correlated with absolute techniques, such as dendrochronology. In addition to chronology building, varve analysis is useful for environmental reconstruction.

Chronometric Techniques

Since the 1940s, a plethora of *chronometric*, or *absolute*, dating techniques have been developed; these techniques are increasingly more accurate and help us to refine the chronological sequence of the past. In this section, we will look at several different types of chronometric techniques: natural rhythmic and chemical change, radiometric, and trapped charge dating.

Natural Rhythmic and Chemical Change Techniques

As the name implies, *natural rhythmic* and *chemical change techniques* measure either an inherent chemical change in an object or natural cycle. It neither relies on radioactive decay, as do several other prominent chronometric techniques, nor does it rely on energy emission. In this section, we will look at astronomical dating, dendrochronology, obsidian hydration, and archaeomagnetic dating techniques.

Archaeomagnetic Dating

Archaeomagnetism, a subfield of paleomagnetism, is both a chronometric dating technique and a relative dating technique. It is predicated on the fact that the earth's magnetic field changes periodically. Archaeomagnetism, which can date sites up to 100,000 years, can be used on baked clay, geological sediments, and igneous rocks. Appropriate samples are the key to getting a good archaeomagnetic date. *In situ* features must be used—kilns and hearths, for example—and the orientation retained. This is accomplished by establishing the orientation with a compass or transit, and then encasing the sample in plaster or fastening it to a plastic disk. Once the qualities of the natural remanent (permanent) magnetization are known, the direction of the ancient magnetic field can be determined.

About every 250,000 years, the polarity of the magnetic field flips or reverses. This reversal lasts approximately 10,000 years. In between the times of reversals, magnetic fields change approximately 1° every couple of decades at any given point on earth, with a maximum variation of roughly 20° (as it moves around the geographical north pole). This is called *secular variation*. This information coupled with the knowledge that some minerals (e.g., ferromagnetic minerals) have a remanent magnetization allows archaeologists and geologists to date sites.

Astronomical Dating

Archaeological data suggest that many ancient societies tracked the movement of the stars—for example, the Maya—and aligned structures with significant events, such as solstices and equinoxes at Stonehenge. Sometimes these data can be used to date buildings. Ancient Egyptian texts, for example, mention astronomical events, enabling Egyptologists to correlate historical events with calculable astronomical events. Based on information in Middle Kingdom and New Kingdom texts, archaeologists have been able to determine that the Egyptian calendar was based on 3 seasons, each consisting of 4, 31-day months, with 5 days left over. These months were anchored to astronomical events, such as when Sirius becomes visible above the eastern horizon, an event known as a heliacal rising, which happens to coincide roughly with the annual flooding of the

Nile in July. This event heralded the Egyptian New Year. Using information from Roman histories, we know that the Egyptian New Year and the heliacal rising of Sirius occurred in CE 139. Because we know the length of the period between heliacal risings and how it relates to the Egyptian calendar, it is possible to correlate a date mentioned in an ancient text with a date that is understandable to the modern archaeologist.

But what if no such texts exist, as is the case for the Old Kingdom? A relatively new method of dating, *precession dating*, has been used to date Old Kingdom features, such as the pyramids of Giza. To understand what precession is, think of a spinning top—If it is spinning fast enough, then it will not fall over and the tip stays in one spot. As it begins to slow down, the tip no longer stays in one spot; it begins to loop outward in a somewhat horizontal circle; that motion, the path of the tip, is called the precession.

How does this work for archaeology? Earth's precession can be traced over time. We know that currently the earth's axis is centered on a celestial pole around the star Polaris. We also know that the celestial pole itself moves around a pole centered in the Draco constellation and approximately how long it takes for this move to occur. Since these are known quantities, it is possible to calculate where the celestial pole was relative to stars at any given time in the past. Using this information, the changes in the alignment of the pyramids of Giza have been correlated with the earth's precession.

The pyramids at Giza as well as Snofru's pyramids at Meidum and Dashur are all aligned with the cardinal directions, each with an error of approximately < 1 degree off the previously built pyramid. For example, the Bent pyramid at Dashur, which was built after the pyramid at Meidum, has an alignment that is < 1 degree off of the Meidum pyramid, and so on. Since the Turin papyrus informs us as to how long various kings ruled, it is possible to estimate the duration of the construction of each pyramid, giving us a relative chronology for the pyramids. However, when this information is combined with information on the earth's precession, it is possible to assign calendar years to the construction of each pyramid.

While more testing is needed to see if other Egyptian pyramids conform to the pattern established by the aforementioned pyramids, the methodology does offer the prospect of dating archaeological deposits for which ancient texts do not provide the necessary information.

Dendrochronology

The science of tree-ring dating, or *dendrochronology*, was developed by Andrew Ellicott Douglass in the early 20th century. Douglass discovered that the ring-width patterns of different ponderosa pines were identical. To build a chronology for the North American Southwest, stretching from prehistory to modern times, he compared remains of ponderosa pines across sites based on the assumption that

tree rings of the same width were formed in the same year. Counting the number of tree rings provided the number of years that had passed since a tree was cut down. Today, dendrochronological sequences exist for other regions, including the southeastern and temperate United States, Western Europe, the Mediterranean, Australia, New Zealand, parts of Asia, southern Africa, Tasmania, and southern South America.

Dendrochronologists use cross-dating and chronology building. Cross-dating is the process of matching the ring pattern variability between samples. The process of building the dated ring sequences from the samples is called chronology building. Dendrochronology works by using a sample from a living tree and then working backward, overlapping samples until reaching the desired sample, often a piece of dead wood. Then, it is a matter of counting rings to determine the number of years that have passed.

Dendrochronologists use width and density of the rings as well as fire rings and frost rings to cross-date the samples. Dendrochronology has many applications and is useful in multiple disciplines, including oceanography, art history, and botany, to name a few. It has become a staple dating technique in archaeology; however, it is applicable only in areas where appropriate trees are available. Archaeologists also use tree rings to examine human behavior—tree use and environmental reconstruction, for example.

Obsidian Hydration Dating

From the moment it is formed, obsidian, a volcanic glass, will begin to absorb water from the atmosphere. A rind, or adherent hydrated layer, is formed and thickens over time. The density and refractive index of the rind is higher than the original glass, making it easily discernable from the original. The amount of time needed to create the rind's thickness is calculated using information on the chemical composition of the glass, as well as the relative humidity and temperature of the environment. Because a rind can form in only a few hundred years, *obsidian hydration* can be used on relatively young samples, as well as samples around one million years old. Thus, we can use the method to determine when an artifact was manufactured.

Errors in the measurement of the rind and determining the rate of hydration can cause errors in age determination. If the relative humidity of the environment of the site where the artifact was found is significantly less than 100%, then an additional correction must be made to calculate a date. This can be done in a couple of ways: (1) Use the rind thickness in conjunction with an artifact dated by using another technique such as radiocarbon dating, and (2) induce hydration experimentally. Most researchers use obsidian hydration and a second or third or more dating method to determine the accuracy of the obsidian hydration dates.

Obsidian hydration can also be used as a relative dating technique if only the chemical composition of the sample

is known. The chemical composition can be compared to samples found on other sites in order to determine occupation contemporaneity.

Radiometric Techniques

Radiometric techniques rely on the fact that unstable, radioactive isotopes decay over time into a different isotope. Through experimentation, the half-life, or the amount of time it takes for half of the original radioactive isotope to turn into a different isotope, of these unstable isotopes is known and can be used to calculate the age of the material. There are a variety of radiometric techniques; however, we will focus on those commonly used in archaeology and paleoanthropology: radiocarbon dating, fission track dating, potassium-argon/argon-argon dating, and uranium-series dating.

Radiocarbon Dating

Radiocarbon dating (^{14}C) is the backbone of chronometric archaeological dating. Developed by Willard Libby and a team of scientists at the University of Chicago in the mid-1940s, ^{14}C can be used to date organic material up to around 45,000 years. It provides a date for when something died and stopped taking in carbon.

Carbon-14 is created when cosmic radiation in the upper atmosphere produces a neutron that replaces a nitrogen-14 (^{14}N) proton. From there, ^{14}C is oxidized, which means it is attached to oxygen, to form carbon dioxide, which eventually makes its way into the earth's oceans and plants. When herbivores or omnivores eat plants, they take in ^{14}C . Carnivores and omnivores also take in ^{14}C when they eat herbivores. Once something dies, it stops taking in carbon and ^{14}C decays back into ^{14}N . Based on Libby and others' work, we know that the half-life of ^{14}C is 5,730 years.

The amount of ^{14}C in a sample is estimated by the amounts of the stable carbon isotopes, carbon-12 (^{12}C) and carbon-13 (^{13}C). A carbon molecule is comprised of around 99% ^{12}C and 1% ^{13}C . Only one in a million million atoms are ^{14}C . Once this estimation is made, we can measure the amount of ^{14}C in the sample and determine how much ^{14}C has decayed and how long it took.

When a date comes back from the lab, it tells us how many radiocarbon years old the sample is in relation to 1950 (the year the method was invented). The date returned is associated with a \pm number, which is the standard deviation for the number of times the lab ran the tests. For example, if the lab returned a date of $4,110 \pm 50$ BP (before present or rather before 1950), then we would say the sample stopped taking in ^{14}C between 4,160 and 4,060 radiocarbon years BP.

There are a few problems associated with ^{14}C dating. Carbon from the surrounding soil matrix can leach into organic material such as bone, obfuscating the correct date. A second problem involves the reservoir effect. The

reservoir effect refers to the problem of samples from aquatic sources, for example, mollusk shells. Radiocarbon dating was developed using atmospheric carbon; in water, carbon disseminates much more slowly, so it builds up in the material (a reservoir of carbon). For marine samples, that means the ^{14}C date could be hundreds of years too young. What the reservoir effect is for riverine samples is as yet unknown. A side effect of the reservoir effect is that dates for the bones of peoples who relied on marine and riverine resources for their primary subsistence could be off. Context of the sample then becomes important. If the lab is acquainted with the context of the sample and any other pertinent background information, then the reservoir effect can be corrected.

Another problem is that organic material takes in carbon in different manners. Not all plants take in carbon in the same way. Plants that live in arid and semiarid regions, with the exception of succulents, convert carbon dioxide into a 4-carbon compound. This means that these C_4 plants take in more oxygen than all other types of plants. If plant remains are not identified, then radiocarbon labs cannot make the appropriate corrections, and the plants will appear younger than they really are.

Radiocarbon dating was made more accurate through tree-ring studies where it was noted that ^{14}C dates and dendrochronological dates did not match. It was discovered that one of Libby's assumptions was wrong, ^{14}C production was not constant. Studies of bristlecone pine indicated that there were over a dozen changes in ^{14}C production over the past 10,000 years, most likely due to sunspot flare-ups. Corrections can now be made for this phenomenon known as the de Vries effect.

Accelerator mass spectrometry (AMS) links two technologies, particle acceleration and mass spectrometry, to push the date range of ^{14}C back to 55,000 years. This method directly counts carbon ions. One of the primary advantages of AMS over standard ^{14}C -dating techniques is that a much smaller sample can be used, thereby destroying a lesser amount of the artifact. Additionally, testing does not take as long as standard ^{14}C tests. While it was hoped that AMS would extend radiocarbon dating to around 100,000 years, the ability to prepare the samples without contamination from modern carbon still prohibits calculation of such a date.

Fission Track Dating

Fission track dating was developed in the 1950s and is based on the fact that as uranium 238 decays, it fissions and leaves tracks as the fragments move through parent material. The track density along with the amount of uranium present in the sample enables an age to be calculated. Thousands of tracks are counted; therefore, a large amount of ^{238}U is needed. The best materials for fission track dating are igneous materials, such as natural glass—obsidian and zircon.

One problem associated with fission track dating is that if the material is heated to a sufficiently high temperature, then the fission tracks can fade, making the sample appear too young; however, separating the sample into aliquots (equal parts of the original sample), and inducing fission tracks in one of the samples, creates a comparative method that allows fading to be corrected for. The step-heating plateau method is another way to correct for fading. Experiments have demonstrated that the density of tracks in an area (areal track density) of a natural sample is proportional to the track density in its irradiated aliquot. When both a natural sample and its irradiated aliquot are heated to a temperature where the areal track density of the samples reaches a plateau, the ratio value between the two samples increases until it reaches a plateau. The value of the ratio at the plateau can be used to correct for track fading. Similarly, the isothermal plateau technique, whereby a sample is heated at a constant temperature for a long period of time, allows for the correction of track fading.

Potassium-Argon Dating and Argon-Argon Dating

While first used to date hominin fossil deposits, *potassium-argon (K-Ar)* and *argon 39-argon 40 (Ar-Ar)* are now used in the natural sciences to date events back to the Precambrian era. K-Ar dating measures the buildup of decay of radioactive potassium 40 (^{40}K) into argon 40 (^{40}Ar) in volcanic and metamorphic rock. Potassium 40 is an unstable isotope. During the decaying process, one of its protons converts to a neutron. This process produces a ^{40}Ar atom, the quantity of which can be measured and a date calculated for when the rock cooled. Radioactive ^{40}K has a half-life of 1.28 billion years, making it more useful to paleoanthropology than radiocarbon dating with its limited dating range; however, K-Ar dating loses accuracy the younger the material. Radiocarbon dating can fill that gap.

Argon 40 is a noble gas, which means that no chemical bonds are formed when it comes in contact with other elements. Since noble gasses can escape from molten lava, it is assumed that when the rock cools, there is no ^{40}Ar left. Any ^{40}Ar present in the sample must then have formed after the rock cooled and became trapped. There are some conditions that can affect the accuracy of the date. Argon-40 could be trapped in the lava flow in unmelted rock. It is also possible that the rock was reheated, allowing ^{40}Ar to escape. Both of these instances would cause the date to be inaccurate.

Argon 39-argon 40 (Ar-Ar) dating can be used to date the same types of material as K-Ar dating. In this method, the measurement of ^{39}Ar is substituted for potassium. The primary difference is that the sample is irradiated at a nuclear reactor, which produces ^{39}Ar , an isotope not produced in nature. The irradiation processes cause ^{40}Ar and ^{39}Ar to be released from the rock sample. The quantity is then measured using mass spectrometry. Ages are calculated by comparing the ratio of $^{40}\text{Ar}/^{39}\text{Ar}$ to a standard ratio of a known age that is irradiated at the same time as the sample.

The advantage of Ar-Ar is that it does not have to rely on a separate K measurement; it measures Ar in a single sample. Additionally, a smaller sample can be used. It is more precise because the release of Ar is controlled through the application of increasingly higher temperatures.

Uranium Series Dating

Using the known half-life of several uranium isotopes, the ages of archaeological sites can be determined using the *uranium series (U-series) method*. Since uranium occurs naturally in material such as marl, caliche, carbonates, speleothems (e.g., stalactites and stalagmites), travertine, mollusk shells, eggshells, bones, teeth, and other materials, the technique is useful for archaeologists, especially for sites older than the upper range of radiocarbon dating.

There are three series of decay associated with U-series dating, only two of which are appropriate for archaeological purposes: (1) uranium series, ^{238}U with its decay products, and (2) actinium series, ^{235}U with its decay products. The third series, thorium, or ^{232}Th , and its decay products, is useful for dating geological events. The basic principle of U-series dating is that there is a decay chain that eventually ends in a stable isotope, lead 206, which is associated with ^{238}U , and lead 207, which is associated with ^{235}U . While the length of time that it takes for uranium to decay into lead is longer than the time frame for human evolution, the length of time for some of the decay products does fall within that time frame, thereby making the dating method useful for anthropology.

U-series dates for archaeological sites are determined in a couple of ways. At some cave sites, for instance, the archaeological material itself is not datable using the U-series method; however, speleothems in the cave are datable. Archaeologists can create an age range for the cultural material by dating speleothems above and below the deposit. Another way is to date the artifact itself such as bone or teeth. One problem with the latter is that bones and teeth not only absorb uranium during their formation but also can absorb uranium from the deposition environment, skewing its age. Reconstructing the U-uptake history of the artifact can mitigate errors that might occur because of the deposition environment.

Trapped Charge Dating

Trapped charge dating involves methodologies that measure trapped charges in a mineral such as feldspar or quartz. Background radiation causes the electrons of some atoms to change in a manner that causes them to become trapped in the flaws of the crystalline structure of minerals. The amount of trapped electrons increases over time and can be used to estimate the radiation dose of the object, which can then be divided by the annual dose of radiation to determine the specimen's age. In this section, we will

examine the three types of trapped charge dating used in archaeology: thermoluminescence, optically stimulated dating, and electron spin resonance.

Luminescence

Luminescence dating techniques, thermoluminescence (TL dating) and optically stimulated dating (OSL dating), measure the changes to the structure of crystals contained in minerals caused by exposure to natural background radiation. Developed during the late 1960s and 1970s, luminescence dating provides a way for archaeologists to date sites that radiocarbon dating cannot, as it is accurate up to 100,000 years, and perhaps as much as 300,000 years.

TL dating can be used on material that contains minerals such as feldspar and quartz that emit a light when heated quickly to 500° C—pottery, bricks, burned stone, flint, and so on. As an artifact is “exposed” to natural background radiation, electrons are released from the crystalline structure and caught in flawed parts of the structure, sometimes referred to as trapping sites or lattice deficiencies. This accumulation of background radiation in natural material must be zeroed for it to be useful for archaeological dating. Zeroing occurs when the natural material is fired. This releases the electrons that had already accumulated in the materials used to construct the object, for instance, a clay pot, so that when the firing is completed light-emitting electrons have been released. Over time, these electrons will begin to accumulate again as the pot is exposed to natural background radiation. When heated in a laboratory, the released electrons emit light that can be measured to calculate when the material was last heated to 500° C. Because the method measures the last time an object was at 500° C, context becomes critical to differentiate between the time of manufacture and possible refiring events.

OSL dating differs from TL dating in that it is used on soil, not fired artifacts. The same types of materials that TL dating relies on—for example, quartz and feldspar—are also used in OSL dating. When these materials are exposed to sunlight, their luminescence clock is zeroed, which is referred to as bleaching. When buried, the material begins to accumulate trapped electrons, which, like TL dating, can be measured. Unlike TL dating, OSL dating uses light, not heating, to release electrons. To arrive at a date, a light of a specific wavelength is passed through a sample. The trapped electrons are released and emit light. To ensure the accuracy of dates, the standard for OSL dating is to date the soil grain-by-grain.

Electron Spin Resonance

Developed for the earth sciences in the mid-1970s, *electron spin resonance (ESR) dating* is used in archaeology for dating tooth enamel, shell, and burned stone tools, although it is usable on other materials such as speleothems

and spring-deposited travertine. Accurate from 10,000 to 100,000 years, ESR dates the time when the artifact was buried. Like the other trapped-charge methods, context is critical.

ESR measures the quantity of trapped charges in an artifact. With this method, a sample is ground up and exposed to electromagnetic radiation. During the process, the sample is exposed to an external magnetic field. At a particular moment in the process, the trapped electron, or paramagnetic center, aligns itself parallel with the external magnetic field. When microwave radiation is introduced into the process, the paramagnetic center absorbs the radiation and flips its magnetic field to the opposite direction. The amount of radiation that is absorbed is proportional to the number of paramagnetic centers, which is proportional to the amount of radiation absorbed in the past. In the 1980s and 1990s, the ESR method was revamped to measure uranium (U) uptake.

Conclusion

The development of accurate dating methods is critical to understanding the evolution of humans, both biologically and culturally. Over the past century, newer and more accurate chronometric methods have been developed—radiocarbon dating, potassium-argon dating, obsidian hydration, and so on. Ideally, multiple dating techniques, including both relative and chronometric, would be employed for any one site, thereby cross-checking dates for accuracy. While many of the chronometric techniques are costly, continued improvements of the methods may help to make dating sites more cost-effective. New methods are also developed and employed in the effort to reconstruct our past.

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INTERPRETING EVIDENCE

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The Copernican revolution, which had its beginning in 1543, represents a case study of how intuitive knowledge is ultimately replaced by scientific empiricism to produce a new theory of nature. From the time of Ptolemy, observations that planets, stars, sun, and moon traverse the day and night skies led to the misconception that these heavenly bodies circled a stationary earth. However, planetary orbits tabulated by Copernicus indicated that in actuality planets revolved around the sun. Known as the *solar system*, this understanding of nature was resisted for over a century as astronomers grappled with a succession of empirical observations by Tycho Brahe (1577), Galileo (1610), Newton (1687), and others who ultimately established the solar system as scientific fact.

The curious match between North and South America's continental outline and that of Europe and Africa caused comparable conflicting conclusions. A 1915 textbook written by Alfred Wegener examined fossil strata and living species on both sides of the Atlantic. Noting the strong similarities between them, he proposed a compelling view of geology called *continental drift* suggesting that these continents were adjoined in the distant past. Prominent geologists of the time argued that a geologic force capable of heaving about huge land masses did not exist. They brushed off the outlines' similarities as mere coincidence. These scientists hypothesized that in the past continents were linked

together by long land bridges that allowed species to march across oceans and populate distant shores.

A half-century later, global seafloor maps revealed a striking pattern. New crust was forming and causing the seafloor to spread; the continents were in motion. In the mid-Atlantic, for example, the continental plates that once joined North and South America to Europe and Africa were being pushed apart. When these moving plates collided with other plates, at subduction zones, one slid under the other to form high-mountain ridges like the Andes and the Himalayas. Patterns frozen in the earth's crust established the science of *plate tectonics*.

Why would the Copernican revolution and plate tectonics be relevant to the field of anthropology? These scientific advances are a result of empirical data that challenged and replaced the intuitive views of nature espoused by older theories. Paleoanthropology, the field devoted to understanding the process of human evolution, is based on the intuitive assumption that human intelligence and the relatively large human brain are the result of evolutionary activities that took place at the ground. This article compares the terrestrial view with a new empirical interpretation of fossil, behavioral, anatomical, and archaeological evidence that indicates climbing activities must have had a profound influence on the evolutionary increase in human-brain size.

Terrestrial Theory

A century and a half ago, Charles Darwin (1871) developed the terrestrial theory of human evolution in his book, *The Descent of Man and Selection in Relation to Sex*. He summarized his theory as follows:

The ancestors of man were no doubt, inferior in intellect, and probably in social disposition, to the lowest existing savages; but it is quite conceivable that they might have existed, or even flourished, if they had advanced in intellect, whilst gradually losing their brute-like powers, such as that of climbing trees. (p. 151)

Darwin noted that individuals from regions where tree climbing was practiced had a smaller brain size than Europeans who did not often climb in trees. Darwin postulated that it was our unique way of life at the ground rather than activities in trees that stimulated the evolutionary increase in our brain size.

This terrestrial theory about the origin of human intelligence has great intuitive appeal. After all, apes climb trees, have a smaller brain, and do not make sophisticated tools or speak. Stephen J. Gould (1981) examined 19th- and early 20th-century brain-size data in his book, *The Mismeasure of Man*, and showed that Darwin's conception of brain-size differences between forest and urban people was racially biased. Small forest people that regularly climb will naturally have a smaller average-brain size than large-bodied northern Europeans. Small-body size, not an ability to climb, explains the brain size of climbing cultures. Yet Darwin's observation was the primary support for the idea that climbing hindered human-brain evolution. Even though no new data has filled this void, the intuitive appeal of linking human-brain size and intelligence to evolution at the ground remains.

Given the importance of understanding the origin of intelligence, why is the intuitive terrestrial theory still embraced? As Thomas Kuhn (1962) pointed out in his book, *The Structure of Scientific Revolutions*, an accepted view is tenacious. Theories are erected to fill vacuums in our worldviews. If the terrestrial theory were abandoned, what would replace it? No other theory has come close to accounting adequately for the biological, fossil, behavioral, and archaeological evidence.

Canopy Signposts

Our general body plan, bipedal walking, long arms and fingers, and our reduced dependence on olfaction are a few of the numerous arboreal aspects of human nature. These attributes are well-known, accepted evidence of our arboreal-primate roots. But it is generally believed that we abandoned our canopy home deep in the distant past, so long ago that our arboreal life could not have had any influence on the brain's evolution.

However, an aspect of human physiology is incongruous with the idea that archaic humans were strictly terrestrial. Menstruation is a good example. No terrestrial species has a monthly period. A variety of grizzly predators, such as large felines, cave bears, and hyenas, roamed the ancient landscape, and they easily detected and tracked blood. This is why women who are menstruating are routinely taken on bear-hunting expeditions in Alaska. A species with females that lacked claws, fangs, speed, and strength while experiencing a heavy blood flow for up to 7 days every month is a truly unique terrestrial adaptation.

Infants, too, appear ill adapted to life at the ground. Terrestrial young steadfastly adhere to a tenet of behavior that can be called "silence is golden." After dropping from the womb, they often remain quietly huddled under shrubs or in clumps of grass. Only in dire circumstances would an unguarded juvenile attempt to summon a parent, for the cry of defenseless young is sweet music to predators' ears. Human infants, however, boldly shriek for absentee parents. They have not been encoded with this terrestrial rule of life.

One reflex might be considered an anomaly if it were not viewed in light of our treetop origins. The *parachuting reflex* takes control when a young child falls forward from a standing position. The arms are flung instantly out to the sides. If this reflex had been selected for as the result of terrestrial falls, the child's arms would move straightforward to protect the head from striking the ground. This reflex is perfectly suited for catching a vine or branch at the beginning of a fall from a high position.

The parachuting reflex is complemented by several other behaviors that appear to have originated with an arboreal way of life: Children learn to climb and walk simultaneously, a newborn infant can hold its entire body weight while hanging onto a bar, children love tree climbing and tree houses, and they prefer playgrounds that mimic the structure and motions of an arboreal world.

Perhaps the most enigmatic infant behavior is the *Moro reflex*. Physicians activate the reflex by placing a baby on a table covered with soft, spongy material, supporting its head in cupped hands, then allowing the head to drop slightly but suddenly while still being held. (Do not attempt this.) The baby's arms are flung out sideways, its whole body stiffens, and a few seconds later, the baby relaxes and begins to cry loudly. This reflex disappears after a few months. The Moro reflex can also be triggered by sudden, nearby movements or a loud noise, both of which would indicate potential, impending doom to a canopy resident. In the forest, booming thunder and limbs crashing down would have been familiar loud sounds that caused concern. If a platform was struck by a falling limb, a resting infant could easily bounce off the platform's edge. Heavy selection would account for the sideways arm extension of the Moro reflex, along with a stiff body to minimize rolling and stabilize an infant. The startle reflex, as it is also called, makes little sense as an adaptation for terrestrial young.

Although the retention of active arboreal reflexes in infants strongly suggests that our ancestor's full-time terrestrial status must be a recent event, these behaviors and adaptations are sometimes dismissed as "evolutionary baggage" left over from an ancient era when protohuman ancestors were active tree climbers. But the evolutionary-baggage explanation does not square with the biological purpose of innate infant reflexes. These are potent genetic programs that ensure survival in the specific habitat where a newborn will grow and develop.

Scansorial Humans

The *Cambridge Encyclopedia of Human Evolution* (Jones, Martin, & Pilbeam, 1992) states that humans no longer use their arms for locomotion. It describes our upright posture and states that we are bipedal, walking and running on two legs. This definition claims that, unlike apes, we are 100% terrestrial.

In contrast, the zoological definition of human locomotion takes into account our full locomotor capabilities. Species that travel at the ground and climb in trees are known zoologically as *scansorial*. This form of locomotion is shared by bears, squirrels, raccoons, and humans. The word *scansorial* does not appear in the index of the *Cambridge Encyclopedia of Human Evolution*. Expunging the role of our arms in locomotion nullifies the entire spectrum of our scansorial nature, reflexes, behavior, and body form. For paleoanthropologists, the only habitat remaining where our relatively large brain could have originated is the ground. Likewise the structure of our foot is seen as 100% terrestrial, a view that even Charles Darwin would probably have found odd. Darwin (1871) was an astute observer and well aware that the human foot and hand are scansorial. He stated, "With some savages, however, the foot has not altogether lost its prehensile [grasping] power, as shewn (sic) by their manner of climbing trees" (p. 136). The human foot's prehensile ability is inborn. This ability is prominently displayed by people who have lost the use of their arms as children. They can use their feet like hands to open jars, write, and drive. Functionally, the human foot is still a scansorial appendage.

What would a fully terrestrial foot look like? Nonclimbing, terrestrial feet are often rigid, raised up on the tips of elongated toes and capped by a hoof, as in horses and deer, or the last digit of each toe is bent and padded, like those of dogs and cats. Our feet lack this rigidity. With their ability to help secure us to a tree trunk and grip branches, our feet retain the arboreal competency that allowed our evolving ancestors to harvest canopy foods and climb to safety efficiently.

One arena in particular highlights human-scansorial status. We are unique in our ability to climb a 1,000-foot-high rock face without the safety of direct aid or ropes. No ape can climb this way. They lack both the balance and the

purpose. We are one of the most advanced climbing machines in evolutionary history. There is a fundamental difference between apes and humans in our body design and climbing technique—human hands, fingers, toes, and body shape have been integrated over evolutionary time with highly advanced cognitive abilities. Humans and apes stand on equal but different evolutionary-climbing peaks in that we think our way up vertical surfaces, a form of locomotion called by some "cerebral-climbing." Since this is perhaps the newest primate-climbing method, it cannot be brushed off as evolutionary baggage.

Encephalization in the Canopy

Which was most important in the evolutionary expansion of the human brain, the treetops or the ground? An evolutionary biologist explores this quandary by examining the fossil and living record of other tetrapods (four-legged vertebrates). Over a 200-million-year span of evolution from the diminutive brain cavity of bulky dinosaurs to the optical bulges of bird skulls and pteranodons to the elaborate olfactory apparatus of mammals to the highbrowed primate foreheads, the largest relative brain sizes occurred only in species that once climbed trees.

The canopy habitat has been recognized as the premiere factory of brain evolution for well over a century. Harry Jerison (1973), of the department of Psychiatry and Biobehavioral Sciences at UCLA, formalized this broad understanding of brain evolution with equations (subsequently refined by others) that quantified the canopy's influence on the ballooning brain. There are many exceptions such as the opossum, which is an animal that has climbed for tens of millions of years without ever experiencing significant brain expansion. Nonetheless, relatively large-brained species have never sprung from the terrestrial habitat. The scientific implication of this remarkable observation is not found in theories of human-brain evolution.

One reason for this is that for over a century the evolution of human intelligence has been inseparably linked to bipedal posture. Darwin's claim that walking upright on the ground freed our hands and allowed for the subsequent manipulation and invention of tools was accepted for a long time. But there was evidence to the contrary. Kangaroos, kangaroo rats, bipedal dinosaurs, and prosimians stood up and walked or hopped on two feet. But rather than master the art of toolmaking, the hands and arms of these animals shrank in size while relative brain size remained the same. So evidence derived from nonhuman species does not support the view that walking upright and having free hands leads to encephalization.

Unlike the above groups, humans are unique in standing fully erect. Perhaps posture was the main ingredient in stimulating our brain expansion. Millions of years ago there existed at least two human genera, *Australopithecus* and *Paranthropus*, that also stood perfectly upright on

two legs with free hands. Based on measured genetic distances between apes and humans, these early ancestors were at least 99% identical to living humans. Yet the fossil record shows that after millions of years of trudging around on the ground, their relative brain size stagnated, and they did not leave behind evidence of significant tool use. Neither standing perfectly upright nor a virtually identical genome promoted brain evolution. A critical evolutionary ingredient was still missing.

That ingredient was met by a species that followed australopithecines in the fossil record. *Homo habilis*, or handy man (a taxon that may represent several similar species), stood perfectly upright. It was during his tenure that the evolving human brain underwent its most rapid expansion. Something freed him from the stagnant mental plane of our ape forebears to embark on a revolutionary, intellectual path.

Initially *H. habilis* was considered 100% terrestrial, which conformed to the view that human-brain evolution took place at the ground. But this view flipped when it was discovered that *H. habilis* had long arms relative to modern humans as well as long, curved fingers. Most paleoanthropologists now accept that *H. habilis* regularly climbed trees, yet they have ignored the tight zoological link between climbing and encephalization.

Opposable Big Toe and Encephalization

It is a possibility that the rapid expansion of *H. habilis*'s brain was accompanied by a radical change in foot morphology. The australopithecines, considered to be *H. habilis*'s predecessors, had an opposable big toe. Even though they walked perfectly upright, their feet would have functioned like hands. The big toe was like a thumb that could grasp branches while climbing trees. They were climbing trees as apes would, and they had a relative brain size comparable to apes. Although they still climbed, limited evidence suggests that *H. habilis* may have been the first human taxon to lose an opposable big toe. This would mean they were the first primate to climb with opposable first digits limited exclusively to the hands. *H. habilis* had entered a much more stringent evolutionary-selective environment than all prior primates.

The loss of an opposable big toe as a potential stimulus for encephalization has not been considered adequately. Imagine how risk escalated when the number of appendages capable of grasping was reduced from four to two. This was a dramatic reduction in climbing equipment. To continue climbing with just two hands would require evolutionary compensation, and that compensation could not compromise safety. The enlarging brain, along with the loss of opposable big toes, functioned to integrate cognitive action with climbing. The combination initiated a unique intellectual safety net. From an evolutionary perspective, this was the dawn of cerebral climbing.

There is a lengthy list of selective forces that may have existed within evolving climbing culture that links neurological evolution with the origins of speech, advanced toolmaking, knot tying, social structure, advanced rock throwing, stone-tipped spear making, wooden-shelter construction, and rafting to name a few. Many of these speculative scansorial explanations for human-mental origins are found in the online book, *The Descent: The Untold Story of Human Origins* (Perry & Halsey, 2008).

Archaic Climbers

In numerous journal articles, paleoanthropologists judge the potential tree-climbing capability of possible human ancestors based on a dichotomy similar to those used in plant and animal keys. The reasoning goes something like this:

- If the fossil suggests modern-human skeletal anatomy, then the ancestor was not a climber.
- If the fossil suggests ape skeletal anatomy, such as long arms and curved fingers and toes, then it was a climber.

The long, apelike arms and curved fingers of *H. habilis* led anthropologists to conclude that these ancestors spent considerable time in trees. But as the successor to *H. habilis* in the paleontological record, *Homo erectus* (another taxon that may represent several species) was different. Its more humanlike body proportions inspired paleoanthropologists to christen this taxon as the first 100% terrestrial human. One glitch remains: *H. erectus*'s hands and feet have not yet been found. Alan Walker and Richard Leakey (1993) presumed that these will prove to be humanlike, but as the fossil history of *H. habilis* amply demonstrates, surprises lurk in the fossil record. Apelike hands cannot be ruled out. So it is merely assumed that *H. erectus* did not frequently climb trees.

Even if *H. erectus* had shorter, humanlike fingers, would this indicate it was not an active climber? Baboons have humanlike fingers and hands, and they are active climbers. Dyak tribesmen climb barehanded over 100 feet above ground to collect honey and other products from the canopy. Strength is the essential ingredient that determines climbing prowess. Since archaic humans were much stronger than Dyaks, they would have had virtually unlimited access to the canopy. Ian Tattersall of the American Museum of Natural History, as well as other experts, conclude that before about 40,000 years ago, most of our potential predecessors had what are called *robust* skeletons. This has been interpreted to mean that they were as much as 2 to 3 times stronger than modern humans. There is no doubt that our archaic ancestors had the strength to be astounding climbers.

Understanding the climbing potential of robust human skeletons throws a different light on *H. erectus*'s probable

way of life. Although it is claimed that *H. erectus* was 100% terrestrial, investigators report apelike strength in the shoulder girdle and arms. M. F. Gengo (2009) of the University at Buffalo stated in a recent article that “[the] shape of the chest put the shoulders of *H. erectus* in a position adapted more for tree-dwelling than balanced bipedal walking” (p. 451). Also, its spine was weak, more like that of an ape. The spine may have been too weak for certain human activities that put tremendous pressure on the spine, such as fast running and jumping. Therefore, the evidence indicates that *H. erectus* may have been as proficient at climbing as walking.

Water Holes?

There has been endless speculation concerning the function of one of the most common artifacts of the Paleolithic period, the *hand axe*. The most widely accepted idea is that it was a multipurpose tool, but the hand axe lacks any obvious multipurpose use. Earlier varieties were too heavy to be thrown effectively, and hand-holding the stone to strike prey or aggressors or to dig roots would have produced lacerated hands. The tool has even been classified as an ancient religious object.

Several sites contain a preponderance of these tools such as Olorgesaillie, Africa, where hundreds of hand axes lie together at the bottom of a large mud hole in an ancient streambed. A prominent terrestrial assumption is that these human-made deposits represent caches in what are thought to have been dry watercourses. But a more likely assumption is that those streambeds were flowing with water during the hand-axe era. In that case, rather than a tool-storage site, the mud hole would have served the same function as today. Mud holes are often excellent fishing/hunting locations.

This would explain the peculiar design of the hand axe. Early hand axes that weighed several pounds and possessed a sharp-edged perimeter were perfect weapons that could be dropped on prey from a high perch. The hand axe’s fusiform profile (in contrast to rounded stones) may well represent the first high-powered projectile that could enter the water with the killing force of a rifle bullet. The perimeter’s cutting edge maximized the possibility of killing or maiming surface-feeding fish and other prey. Even large prey that visited water holes to drink could have been overcome by the massive hand axes that have occasionally been discovered. No other plausible explanation has accounted for the purpose of these large stones. After the tools were dropped, some inevitably became lost in the mud, or if large reptiles were lurking about, it may have been too dangerous to retrieve them.

The terrestrial theorist, Milford Wolpoff, a professor of anthropology at the University of Michigan, believes this function is implausible since he has had personal and unsuccessful experience in throwing stones at fish. He feels that a hand axe used as a dropstone would be ineffective as

an arboreal-hunting weapon. But further consideration reveals that high-velocity rock throwing involves rapid movements of the body and arms that are guaranteed to frighten fish. In comparison, the use of dropstones is somewhat like hunting with a bow and arrow. The hunter would have been silent, hidden, and motionless up to and including the moment of the stone’s impact. Since streams were usually embedded in forest in ancient times, trees would have been present to support this form of canopy fishing/hunting.

The dropstone’s ability to kill or maim prey combined with the robust bodies of our ancestors (presumably *H. erectus*) represent an exciting new interpretation of life during the Paleolithic period. The perception of an early human-canopy hunter contrasts vividly with the popular notion of an ancestor who scavenged food from predator kill sites due to a lack of effective weaponry.

Tree Houses

Many researchers have noted that predation was a frequent and serious threat in ancient times, which brings up the question of where our ancestors slept. Before around 40,000 years ago there is little evidence of fire use and virtually no evidence of fortified terrestrial shelters that would have provided protection from large predators.

Heading back in time, it turns out that caves were used less and less frequently. Several categories of evidence are found in cave deposits. Prior to 40,000 years ago, evidence of cave use by human ancestors is minimal. Some evidence indicates ritual burial rather than occupation. Other evidence reveals that early humans were dragged into caves and eaten by predators. Stratigraphic analysis of the infrequent cave that indicates genuine occupation, such as Combe-Grenal in Europe, suggests that caves were occupied only a few days per year. Some caves hold only animal remains; others are empty. Overall, this apparent lack of evidence has led many, including Ian Tattersall as well as Jeffrey Schwartz, of the University of Pennsylvania at Pittsburgh, to conclude that Neanderthals were not cavemen.

If these archaic humans were not living in caves, then they were living either in terrestrial shelters or tree houses. Although the archaeological record has been extensively examined for evidence of human-made terrestrial shelters for over a century, few have been found that are older than 40,000 years. Paleoanthropologists have never examined the archaeological record for tree-house remains. Of course one wouldn’t expect to find evidence of a prehistoric, wooden tree house, while the crumbled walls of stout, terrestrial rock shelters should be ubiquitous. Serious consideration should be given to canopy sleeping shelters.

Claims that early humans preferred sleeping on the ground or in caves assume they had given up their great-ape heritage of building tree platforms, often called *nests*.

Platforms are built by all great apes, with the exception of gorilla males, which become too large to sleep in trees. Yet gorilla females and young still sleep on tree platforms to escape predation. Early humans were small and never approached gorilla size, so comparative evidence leans toward the enhanced safety of sleeping above ground.

Actually, ancient tree-house locations may have already been discovered. There are several sites where tools and debris from human activities have been found in streambeds. While a dry, sandy streambed would be a comfortable location to work and camp, it would not be as safe as a tree platform. When one assumes that streams were flowing with water, the debris is best explained as having fallen off an aerial platform or dropped from a limb.

Cracking the Human Evolutionary Code

If *Homo sapiens* recently began to build shelters at the ground rather than in trees, the archaeological and fossil record should reveal the timing of this event. An increase in terrestrial shelters and sweeping skeletal changes in evolving humans would be two types of evidence to look for. The latter would be caused by a dramatic drop in mechanical loading as a result of less climbing. Both types of evidence are prominent features of a cultural event known as the *creative explosion* that began around 40,000 years ago.

The present interpretation of this evidence is that the increase in terrestrial shelters was due to a population increase and/or migration into Europe, while the dramatic decrease in body strength of the evolving human skeleton is seen as evidence of a “less arduous” life. But these explanations are illogical. A move from southern, more hospitable climates into colder, northern zones (the generally accepted direction of this migration) would undoubtedly have led to a greater workload and a more arduous way of life. Preparations for winter would have required months of strenuous effort. Materials would have to be gathered to reinforce terrestrial shelters, animal carcasses would have to be dragged in and stowed, and greater amounts of firewood would have to be gathered. Except for the paradoxical weakening of the skeleton, there is no evidence to suggest that our ancestors’ lifestyle had become less arduous. So why would the evolving human skeleton become dramatically weaker as terrestrial shelters were increasing in number and daily life was becoming increasingly arduous?

J. Lee Kavanau, of the University of California, Los Angeles, thinks much more attention needs to be given to zoological factors that cause changes in body form of evolving species. A good primer is Gregory Paul’s (2002) book, *Dinosaurs of the Air: The Evolution and Loss of Flight in Dinosaurs and Birds*, which helps resolve this paradox. Paul painstakingly describes the skeletal changes expected when dinosaur species gave up using their arms for climbing and spent more time walking upright at the

ground. In such an event, mechanical loading shifts away from the upper torso, hands, arms, and shoulders, weakening all of them. Legs and feet adapt in ways that facilitate travel on the ground. Paul’s observations may be generalized to include all species, including human, that have undergone a similar change in mechanical loading. This evolutionary change can be called an *arbo-terrestrial transformation*.

An examination of this transformation in our lineage begins with thighbone cross sections from Neanderthals. (There is ongoing debate about whether or not Neanderthals were direct ancestors of modern humans. However, most theorists believe that our direct archaic ancestors would have had Neanderthaloid skeletal structure.) Neanderthal leg bones have uniformly thick walls that have been compared to those of apes. Climbing produces this type of leg-bone architecture.

Terrestrial theorists struggle ineffectually to explain the apelike, leg-bone structure of Neanderthals. One attempt claims that Neanderthals ran up and down mountain slopes and jumped between large rocks. But this lifestyle is comparable to modern humans who live in mountainous regions, and no data demonstrates that they have Neanderthal-like, leg-bone structure.

Neanderthals had exceptional strength from head to toe, not just the legs. The fingertips had broad apical tufts, fingers and hands were very strong, and the arms and shoulder girdle possessed tremendous strength. Long spines on the vertebrae indicate a powerful neck and the specialized shoulder blade sports a unique bony ridge.

From a zoological perspective, it is unsound to attempt to explain the strength of the legs, or any other parts, in isolation from the rest of the body. The bony ridge found on the Neanderthal scapula, for example, is explained as an adaptation to allow for a forceful, downward spear thrust. But what form of hunting would require that behavior? The principal location where a strong, downward spear thrust might be advantageous would be hunting from on top of a tree limb. However, this entails climbing, which would make climbing the preferred evolutionary explanation for Neanderthal upper-body strength and shoulder blade structure.

A related anomaly of Neanderthal skeletons is that they have many broken bones. These are similar to fractures found in ape skeletons, which strongly suggests that Neanderthal bone fractures were caused by falls from trees. But because discussions of an apelike, climbing, human ancestor are taboo, more fanciful explanations that suit our postape status are proposed. Rodeo contestants suffer bone breaks that resemble those of Neanderthals, so one explanation claims that Neanderthal body and hand strength were adaptations for riding bareback on wild animals. It is extremely difficult to imagine that an early human would be able to mount a wild animal and harder still to imagine that the enraged animal could be killed.

The temptation to provide independent terrestrial explanations for evolving human features has been taken to an

extreme. It has been widely reported, for example, that the reduction in the strength of the smaller toes around 26,000 years ago was the evolutionary result of wearing shoes. Wearing shoes, however, would not result in weakened toes. This is a Lamarckian explanation, since it implies that acquired characteristics are inherited. A genetic change could result only if shoes had killed strong-toed people before they reproduced. In any case, archaeological evidence of shoes has not been found from that era. Footprints dated to that time have been found embedded in mud on cave floors. They are always barefooted. A more pervasive evolutionary-selective force than shoes was afoot.

Evolutionary change swept over the evolving human body to reduce its many climbing adaptations. The hip joint of archaic humans allowed the legs to spread laterally. They had a humanlike foot with strong, smaller toes for gripping tree bark and small branches; extremely strong legs with pivoting ankles that allowed the feet to clamp against vertical surfaces; a muscular upper torso with powerful arms; broad hands and strong fingers with large apical tufts for bearing climbing forces at the fingertips; a sturdy neck with enlarged vertebral spines; and a powerful shoulder blade. This suite of interdependent adaptations, along with overall greater strength and appendicular mobility, confirms that archaic humans were excellent climbers.

The shift to a nearly full-time life at the ground set in motion extensive change in the archaic body. The strength needed for the rigorous demands of rapid climbing was excessively overpowered for a terrestrial existence. It became reoptimized for much less arduous activities, including fast, terrestrial locomotion. During this optimization, as much as 60% of the strength for rapid climbing was shed in an overall weakening of the shoulders, arms, hands, fingers, neck, torso, and smaller toes. Yet the skeleton maintained strength in the big toes and legs as the modern-human skeleton became a leaner, faster terrestrial machine.

Cro-Magnons, the first postarchaic humans, were more terrestrial than Neanderthals. This is demonstrated by their thighbone cross sections, which resemble those of modern humans. They traveled farther than archaic humans, such as Neanderthals, because their increased leg length allowed a longer stride. This is demonstrated by the fact that Cro-Magnons traveled long distances to collect stone for tool manufacture, whereas the origin of raw stone for Neanderthal tools was local.

Because Cro-Magnon populations increased while those of Neanderthals decreased, it is sometimes suggested that Cro-Magnons exterminated Neanderthals. But extensive studies show that around the time Neanderthals disappeared, average annual European temperatures were dropping, and forests were receding dramatically in response to the latest Ice Age. By 14,000 years ago, forests had almost completely disappeared from Europe, and as would be expected, the forest-dependent, Neanderthal body form vanished as well.

Korowai

Many doubt the intelligence of Neanderthals, though their brains were larger than those of modern humans. This is due to the Neanderthal archaeological record, which shows little inventive headway for over 150,000 years. There are those who feel that a few types of stone points and scrapers expressing little variation in design indicate intellectual stagnation and stupidity.

The Korowai, a tribe of modern-day humans that live in Irian Jaya, Papua New Guinea, cast doubt on that view. These forest dwellers live in tree houses that are marvels of invention and engineering. Some are built as high as 150 feet above ground. But the bare-bones existence of the Korowai depends only on the bow and arrow, a few trinkets, and a couple of stone tools.

Einstein resorted to thought experiments because it is difficult to test ideas about time, the speed of light, and gravitational fields. Thought experiments can be used in anthropology as well. Imagine that an anthropologist who is an advocate of the terrestrial view has just been catapulted 10,000 years to the archaeological site of a Korowai tree house. Assume that this person knows nothing about the Korowai.

Because the marvelous tree house and even the tree itself would have long since decomposed, the investigator sifts through a scattering of refuse at the ground. This reveals a meager distribution of simple tools and bone. No defined sleeping or living areas can be found, and there is little indication of how the people lived. Due to the paucity of tool types and a lack of inventive design, the scientist assumes the people are of low intelligence, nearly on a par with Neanderthals. The scattering of tools and bones are considered proof that the Korowai lived in modest shelters at the ground or were nomadic. Nearby, a full skeleton is found. The anthropologist classifies the Korowai's modern-human skeleton as 100% terrestrial with complete confidence, adding that perhaps they may have climbed trees, but trees played little role in their culture.

The terrestrial view fails dismally at reconstructing the Korowai way of life; therefore, it cannot be used to reconstruct our ancestors' more scansorial way of life.

Conclusion

Just as geologic patterns in the seafloor established unequivocal evidence of continental drift, the pattern of change in the evolving human skeleton confirms that robust humans spent a considerable amount of time climbing trees. By around 40,000 years ago, our ancestors began to spend much more time at the ground. This altered the mechanical loading on the evolving human skeleton resulting in a specific pattern called an arbo-terrestrial transformation. The upper torso weakened by as much as 60% as a rigorous climbing lifestyle employing the arms, hands,

shoulders, legs, feet, and toes was nearly abandoned. Meanwhile, leg length increased in correlation with time spent walking on the ground. As a result, the evolution of *Homo sapiens* produced a much weaker species.

Canopy theory unites behavioral, fossil, and archaeological data into a coherent framework about human physical origins that identifies the habitat of human-brain evolution. The living and fossil records from dinosaurs to primates, including humans, indicate that only climbing species have attained a relatively large brain. Empirical evidence indicates that climbing in trees, not walking at the ground, set the stage for modern-human intelligence.

Future Directions

Tree House Locations

Existing data from certain *open air* sites might represent debris that fell off ancient aerial platforms. To determine the pattern of dispersion of fallen objects, platforms of various sizes placed at various heights could be built. Objects would be dropped or thrown from these platforms and the resulting dispersal patterns measured and then compared to that of open air sites. Existing Korowai tree houses could be studied for the patterns of dispersion of items lost and buried in the muddy earth below to see if the pattern of their fallout is similar to open-air sites.

Dropstones

Hand axes can be tested to see whether they function as dropstones. Early, large, hand-axe sizes and shapes would be the size of choice. Platforms can be built in trees over a productive water hole. Hand axe replicas can be dropped from these platforms to determine the killing or maiming potential of these weapons on surface-feeding fish. Models of mammals could be used to demonstrate impact, strength, and potential to kill prey. It is possible that hand axes were also slipped into the ends of shafts, using the heavy end of the stone as the weapon. Dropped from above, these would have been deadly weaponry that could penetrate the hide and crack the skulls of large game.

Bone Piles and Scatters

The function of cobbles, early hominid tools, can also be tested for effectiveness as dropstones. Platforms can be built at various heights. A pile of bones taken from predator kill sites can be put under a platform to attract game. One can then determine if rodents and larger mammals that arrive to scavenge at the bone pile can be killed by falling cobbles. Targets and models that measure force may be used. If one can successfully hunt in this manner, then some ancient-bone piles and scatters might represent bait sites where hunting from platforms

took place. If so, then early humans had a potentially effective means of hunting.

Existence of Cavemen

Whether or not a population of archaic humans lived in caves prior to around 40,000 years ago has not been statistically demonstrated. It is probable that existing data may confirm that these humans must have been living someplace else. Data on number of available caves could be cross-correlated at the same stratigraphic time horizon. Categories of interest would be number of occupied caves and duration of occupation, number occupied by predators, number used by predators as places to feed on hominids, and number that represent burial sites. A reasonable population size based on population biology can be estimated and then this number compared to the above information.

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CROSS-CULTURAL STUDIES

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The effect of people moving from one location to another or the realization that heritage is a major determinant in all that we do provides the background for the explanation of why we view and analyze cross-cultural studies. Looking back to the beginning, humans vary in numerous ways. Anthropology seeks to answer these questions about *Homo sapiens*. Scientists have sought to discover where and why humans appeared on earth, why the changes occurred, and why humans vary in physical features throughout the world.

Cross-cultural studies are significant because the relationship between different cultures has an effect on all cultures. The history of the area in which people live affects their lives, their families, and the communities they inhabit. Understanding heritage and understanding expectations in one's environment allows people to view themselves in a hierarchical structure. All cultures are organized, from the smallest tribe to the largest groups, and everyone must have knowledge of their community. This knowledge must include language, social structure, political insight, and religion. Even before these areas are identified and labeled, they have existed in both modern society and in the early gatherings of humans. Inherent in the differences is the fact that there are similarities in all cultures as each one strives to maintain its existence. This existence is vital even before the group assimilates with the larger environment.

It is reported that the first anthropologist to conduct cross-cultural studies was Abu Rayhan Biruni. He conducted

research in the Mediterranean area, the Middle East, and India long before any other scientists. European scientists also administered various interviews and recorded the results of their research. As American scientists continued this research process, the need for identical methods of gathering information became evident. Cross-cultural studies use scientific methods to analyze data. Samples of a larger proportion are used to better clarify behavior, traits, and beliefs of various cultures. With the larger samples, researchers are able to apply findings to statistical surveys. Each culture has some differences that apply to only that individual group, so compiling this information has to be accurate and consistent. As this information is recorded accurately, the data can be analyzed scientifically. With greater reliability, other disciplines can use data collected internationally and cross-culturally.

The importance of collecting field data will be discussed in this chapter, along with the statistical methods used. As more scientific methods are used, the connections with various disciplines is more easily recognized and assessed.

Overview

George Peter Murdock is noted among the earliest anthropologists. In the late 1940s, Murdock and colleagues organized the Human Relations Area Files (HRAF). He

recognized the need to set a standard to evaluate and list all cultural groups, and to put this in writing. HRAF now consists of years of committed research recorded by approximately 400 different ethnographers. Well before Murdock, Lewis Henry Morgan conducted research with the Seneca Indians, collecting data from more than 70 Native American Indian tribes in unilineal evolution. This comparison of cultures using evolution as a basis for organization was first undertaken by Morgan and is still considered advanced today. Some of the first British social evolutionists were Herbert Spencer, Sir Edward Burnett Tylor, Sir James George Frazer, and Edward Westermarck.

In 1949, a nonprofit organization based at Yale University further organized the HRAF ethnographic data and later preserved this information on microfilm. Now the files are accessible by electronic databases as well. As we view scientific data today, the availability of research to be shared and analyzed expediently is of great value to scientists and researchers. The proliferation of methods to study cultures and peoples is extensive. The refining of these methods scientifically spearheads the reliability of anthropological research. In this chapter, the major researchers are highlighted as well as the different theories they believe lead us to better means and methods of analyzing cultures.

Cultures have some traits in common with each other within clusters of characteristic behavior. All societies progress through an identical series of distinct evolutionary stages, which Tylor proposed in his writings. Tylor (in Gillies, n.d.) stated that “human culture developed through three stages—that of savagery, barbarism and civilization” (p. 1). Morgan (1877) was one of the first to provide a written analysis by collecting questionnaires about Native Americans and other U.S. groups. These questionnaires provided a basis for Morgan to formulate additional ideas and theories on this subject. This type of research provided a framework for other anthropologists who followed Morgan and completed extensive documented research on individuals and their cultures.

As we take into account recent steps in understanding culture, there must also be a discussion of the role archaeology reveals. Archaeology is the systematic study of past cultures recognizing that the remains of a culture and their adaptations to that environment provide a look into what occurred previously. This type of research must be able to establish what happened, when it happened, and how these occurrences affect how the specific culture is evolving today. Of course, language or linguistics plays an integral part in anthropology. Record keeping and the ability to accurately document and explain data compiled during research are essential.

Spencer, a philosopher who lived in the 19th century, believed that society had strong and weak individuals. Spencer, an Englishman, followed the theories of social evolutionists in believing that the weaker characters in a society should not be included or considered a part of the

group. Frazer, an English anthropologist, also supported the social evolutionist movement and Spencer’s ideology. Frazer’s major work, for which he is widely known, is titled *The Golden Bough* (1890). This publication details the evolution of religion, and it was the first book to bring together as much information on this topic. The evolutionists thought that man’s social and cultural history could be arranged in a sequence of developments and that populations of people progressed at different rates.

This philosophy was disputed by the next generation of scientists in the 20th century, the followers of anthropologist Franz Boas:

Boas and his students tended to emphasize the variety of local cultural traditions and the accidental course of their development. Some of his most creative associates came to see cultural anthropology as one of the humanities, and this became the dominant cast of American cultural anthropology in the last decades of the twentieth century. (Kuper, 1996, p. 25)

In all corners of the world, studies involving different cultures affect research.

German and Russian anthropologists also provided valuable theories on cross-cultural analysis. As a society grows, the overlap in disciplines becomes more apparent. Cross-cultural studies detail the significance of compiling statistical data accurately. Only when an unbiased account of evaluating cultures worldwide is instituted can there be a true analysis of cultures and disciplines nationwide.

Theory

Tylor stated that culture is “that complex whole which includes knowledge, belief, art, morals, customs and any other capabilities and habits acquired by man as a member of society” (Lassiter, 2002, p. 42). In Tylor’s book *Primitive Culture* (1871), the author focuses on belief systems, which were frequently noted by writers during this period. However, Tylor believed that the development of culture is unilineal since the process was not instant but evolved over a longtime period. He continued to do research in England as other anthropologists formulated similar and other very different theories; he is attributed with conceptualizing a more advanced picture of the early hunters and gatherers. His three stages of evolution did contribute to the understanding of other cultural evolutionists.

Morgan presented a systematic way of analyzing cultures. He was the first to use a written discourse in the form of questionnaires. The questionnaires were used to collect data about kinship relationships of numerous American groups, such as Native Americans. This information helped to substantiate the intellect and strong sense of survival of the Native Americans.

Without substantial facts, the early evolutionists believed that the Europeans were the most advanced culture existing

in this world. Boas wrote from completely different viewpoint of the cultures and cultural traits. The historical particularists explained that a culture's traits had to be analyzed in terms of the society lived in. This approach proved significant as scientists continued to seek broader guidelines to measure similarities, differences, growth, and changes of numerous groups/cultures. Murdock developed a "measure of cultural complexity among ethnographically known cultures. The measure looks at 10 different features of the culture, including its technology, economy, political system and population density" (Ember, Ember, & Peregrine, 2002, p. 28).

Followers of Darwinism believed in the theory of natural selection whereby the frequency of human traits has evolved over time. Charles Darwin wrote in his publications, such as *The Descent of Man* (1871), that "every species is composed of a great variety of individuals some of which are better adapted to their environment than others. . . . Without variations, one kind of characteristic could not be favored over another" (Ember, 2002, p. 34). Darwin also believed in heritability recognizing that offspring inherit traits from their parents. Individuals that are better adapted in their environment produce more offspring year after year. The stronger individuals extend these traits to their offspring, and the results are stronger offspring and stronger generations of people in the family structure. A new species emerges when changes in traits or geographical barriers result in the reproductive isolation of a population.

Various scientists in the 1930s and 1940s added genetics as a factor in understanding culture. In 1972, Niles Eldredge and Stephen Jay Gould wrote that evolution moves quicker than scientists earlier believed. There are various schools of thought about evolution and these beliefs have affected how we presently study culture.

Anthropologists have discovered stone tools over 2 million years old in regions of East Africa. This discovery led scientists to develop certain timelines according to humankind's ability to control and survive in its surroundings. In this chapter on cross-cultural studies, it is necessary to discuss the beginning of culture. Culture is a set of learned behaviors. Adaptation and change are a part of culture: "Cultural change regularly occurs as new and beneficial means of adaptation are developed and shared" (Ember, 2002, p. 108).

The German-born anthropologist Boas did not accept the evolutionist theories. Rather, he challenged the beliefs that Western culture was considered a higher form than others. These anthropologists were in the forefront of cultural relativism, acknowledging that a society's customs and ideas should be explained within the context of that environment. Boas's work was viewed with significance by researchers.

William Graham Sumner, a sociologist and economist, was instrumental in introducing concepts of folkways and mores in *Folkways* (1906). Sumner was a follower of Darwinism, believing that most fit members of society survived; thus, the biologically strong lived longer. This belief supports the Darwinian theory of cultural evolution.

However, Sumner was an avid proponent of using ethnographic methodology in research.

Another anthropologist, Alfred Louis Kroeber, published numerous works on culture and culture growth. He was an American who early in his career studied the Native American Indians of California and believed in the study of human culture as a discipline in itself. Thereby, Kroeber helped to express the need for the emergence of anthropology as a necessary academic area to be studied.

These anthropologists advanced the major theories of cross-cultural studies. Morgan used interviews and questionnaires in his kinship research (1871). Tylor (1889) was the first to attempt statistical cross-cultural analysis. Murdock in his world-renown HRAF (1930s and 1940s) coded ethnographies of over 300 cultures. Levinson published *A Guide to Social Theory: World Wide Cross-Cultural Tests* (1977), and Murdock published *Atlas of World Cultures* (1980). These are a few of the major works that revealed the need and importance of taking an analytical look at methods of research and cultures.

Methods

Researchers have taken a more cautious look at methods of obtaining data in the social sciences. Anthropologists have especially noted that some past observations were not performed exactly accurately. Some processes now used by scientists include regional comparisons, holocultural analysis, controlled comparisons, and coding. The two major methods of research in this field of study are the comparative method using scientific principles, explicit theory and details, research and sampling procedures, and data and tests available for authentication. As scientists have experimented and been challenged in their research methods, a greater attempt to make this research accurate and consistent has emerged. The second major method of research is the use of the hypothesis. The hypothesis and the variations recorded must withstand testing. In hologetic research, information is based on firsthand, ideographic accounts of single populations. In Thompson's writings, he notes that the "modern cross-cultural survey method emphasizing deductive theory-testing represents a logical development. A leading proponent of this method notes that the main idea of holocultural study usually is to test an existing theory by means of worldwide correlations. The increasing use of computers has greatly facilitated cross-cultural comparisons in social anthropology, as well as in history, sociology and economics" (Thompson & Roper, 1980, pp. 907–908).

While, the holistic approach permits anthropologists to develop a complex understanding of entire societies, anthropology also adds another dimension of analysis through cross-cultural comparison. When examining any particular society, the anthropologist is interested in seeing how that society is similar to or differs from others. (Davis, n.d.)

Cognitive anthropology involves explaining the unique and meaningful features of a particular culture. Tylor stated that “it is assumed that each people has a unique system of perceiving and organizing material phenomena and the major task of cognitive anthropology is the empirical discovery and understanding of these organizing principles” (Thompson & Roper, 1980, p. 911). The use of the term *intercultural diversity* refers to developing decision models to ensure that all researchers prepare, organize, and record data the same. Researchers often have to study and spend time in the environment before they can accurately evaluate. This need evolves since all researchers have not elicited information the same way in all research, nor have informants always reported or perceived behavior the same in their analysis. Thus there is a problem of reporting data in a uniform manner. “Researchers use quantitative methods of research, such as survey research, secondary analysis, existing statistical analysis and experiments. Qualitative methods include field research, historical comparative research, and natural experiments” (Birx, 2006, pp. 2018–2019).

Sir Francis Galton disputed much of the research of Tylor and other anthropologists. He believed that the experimental design was flawed and not scientific.

When looking back to the period since the 16th century, Europeans had accumulated a considerable body of information on the peoples of Asia, the Americas, and Africa. These reports were unsystematic and unreliable. Throughout the 18th and 19th centuries, information was gathered on various cultures.

In the early twentieth century there was a shift to longer, more intensive field studies of particular cultures. Franz Boas made a long-term study of the native peoples of southern, coastal British Columbia, collecting a huge archive of vernacular texts from key informants. Russian scientists made intensive studies of the Siberian peoples, and European scholars began to publish studies of small societies in the tropical colonies. (Kuper, 1996, p. 23)

The ethnographies produced between 1920 and 1970 were holistic in nature. “From the 1960s, ethnographers increasingly began to develop historical perspectives, drawing on oral traditions as well as archival sources, particularly as more studies were undertaken in peasant societies in Europe and the Near and Far East” (Kuper, p. 24). The development of broadening research techniques has been beneficial for all the scientists, observers, and participants in these studies.

Practical Applications

Cultural anthropology, ethnography, ethnology, and archaeology are all processes to show how studies are used to advance the study of anthropology.

Cultural anthropology involves the description and comparisons made by human groups to the diverse ecosystems

of the earth. Adaptations are seen in the two traditional areas of focus that are referred to as ethnography and ethnology. Ethnography is the descriptive study of one’s culture, subculture, or microculture based on fieldwork, which takes many years to study. It is the genre of writing that presents varying degrees of qualitative and quantitative descriptions of human social phenomena based on fieldwork. Ethnology is the comparative study of culture or a specific attribute of that culture. Ethnology presents the results of a holistic research method founded on the idea that a system’s properties cannot stand alone without some interaction on another. Ethnography requires firsthand research seeking the local people in a village setting to converse and obtain information that cannot be taken only from written reports. It is this method that leads to more in-depth interpretation of data collected. “As projects are compared, our understanding of cause and effect increases. New generalizations about culture change are added to those that anthropology have discovered in traditional and ancient cultures” (Kottak, 2000, p. 358).

The term *applied anthropologist* is used when explaining the hands-on methods of gathering data from various cultures. The applied anthropologists, the forerunners of using fieldwork to answer cultural questions, are part of the following four disciplines: (1) The biological anthropologists are the groups that work in public health, nutrition, genetic counseling, substance abuse, epidemiology, aging, and mental illness. (2) The archaeologist and biological anthropologists are the groups that work alongside each other to determine how physical features play a significant role in determining the time period a human existed. (3) The linguistic anthropologist is the subdiscipline that studies languages of the present and makes inferences about those of the past. Linguistic techniques are useful to ethnographers because they permit rapid learning of unwritten language. Both linguistic and cultural anthropologists are interested in how language links up with other aspects of culture. Some argue that the linguistic categories people use produce distinctive psychological traits in different cultures. (4) The sociocultural anthropologists are the largest group of the disciplines in which social workers, businesses, media researchers, advertising professionals, factory workers, nurses, physicians, and school personnel participate. Each group requires information from the anthropologist to help assess how best to interact with others in their environment.

Practicing and applied anthropology are considered interchangeable yet the discipline of applied anthropology is concerned with producing knowledge that will be useful to others, while practicing work directly involves anthropologists intervening beyond social scientific inquiry, making their knowledge and skills useful and easily accessible. (Birx, 2006, p. 177)

None of these subdisciplines can exist without archaeology, the systematic study of past cultures reorganizing

the remains of a culture and its adaptations to that environment. It is that environment that provides a look into what occurred previously, as well as the language that evolved. In biological anthropology, *Homo sapiens* are studied as beings both in the present and the past. The evolution of our species is taken into account as scientists explain our relationship to other species. Some anthropologists view *Homo sapiens* in a holistic nature seeing the biological and cultural aspects of life being taken into account for every event that has happened during a lifetime. Each event further explains the evolution and adaptation of the human animal. The subdisciplines merge information to establish evidence of human activity before any written account existed.

Comparison (Global/Topical)

There are vast differences among cultures, yet there are similarities as well. In this section, a few cultures will be discussed, which allow researchers to begin analyzing each. The first example is that of the Native American Indian. Tribes have a government affiliation in the United States. Most prefer to be called Native Americans. Many tribes speak their own language, others have lost it, and some are relearning their native language. Tribes had lived in their own environment until the U.S. population grew and they were forced to move to different territories. Scientists would have to be aware of the changes in the tribes due to changing, geographical locations. In this cultural group, the women make up about 50% of the population. They are younger than the national average, undereducated, and have a median income of under \$20,000. The average life expectancy is 74.7 years, and unemployment in this group is 13.4%, more than twice the national average (St. Hill, 2003, p. 29). Some traditional families are reluctant for an infant to be born in the hospital, believing that the hospital is not a safe place. Many students leave school early and only 9% have a bachelor of science (BS) degree or higher compared with the national average of 20.3%. The teen pregnancy rate is the highest among all ethnic groups, with 45% of youth giving birth before the age of 20. Traditionally, young women are considered to be of marriage age by 14 (p. 32). The most frequent causes of death are heart disease and malignant neoplasms. Grieving, burial, and behavioral practices vary by tribe as do burial rituals. Not all tribes are eligible for health coverage (p. 44). Women older than child-bearing age believe that female exams are not needed. Family/relatives share medicines. The cultural view of health and illness is holistic, and health is associated with balancing physical, mental, spiritual, and kinship realms. In order to encourage healthy behavior, the tactics of talking to small groups using spiritualism and holistic behavior would probably get results. The researcher in the Native American population would have to be cognizant of these behaviors and design their research accordingly.

Arab Americans make up another cultural group. Approximately 5,000,000 Arab immigrants and their offspring currently live in the United States. More than half speak a language other than English at home, and 86% speak English as well. More than 50% have some higher education (St. Hill, 2003, p. 45). Higher education is expected, yet boys' education is given more attention. Arab cultures socialize women to be wives and mothers. Male circumcision is an Islamic practice followed throughout the Arab world and in Sudan and Egypt. Between 20% and 30% of Arab women marry by the age of 20, 80% by age 30. Arranged marriages are the norm; divorce is allowed but not expected (p. 50). Major illnesses experienced by the Arab American are hypertension, heart disease, cerebrovascular accidents, cancer, diabetes, renal disease, and anemia (p. 61). Obesity is prevalent in this culture.

Asian Americans make up another large population of people who settled in America:

The Chinese are the largest Asian subpopulation in the United States with more than 2.4 million persons of Chinese descent residing here in 2000. . . . The literacy rate is very high in China and education is compulsory. . . . Between 1970 and 1980, the number of Koreans in the United States increased from approximately 70,000 to 355,000. (St. Hill, 2003, pp. 93, 95, 202)

Getting settled in a new country causes loss of familiar work, caregiving activities, and lack of support in performing these roles. Many ethnic-minority women stand out because of clothes, accents, mannerisms, or responses. Often, they are reminded about their foreignness and lack of belonging, which tends to marginalize them and increase their vulnerability. Marginalized people react differently; their dress, language, religious practices, and food preferences vary from the norm. This group learns to be secretive and disclose personal information only to those they trust and feel safe around. Again, researchers have to take into account all of these factors when designing methods to discover information.

African Americans brought to America as slaves contribute now to the second-largest minority group in the United States. Currently, "54% live in the South, 19% in the Northeast, 19% in the Midwest, and 8% in the West totaling 36.4 million African Americans residing in the United States" (St. Hill, 2003, p. 12). Historically, African Americans in all areas of the United States have adapted to their environments and surroundings to survive. Family members look to other family members for guidance. High blood pressure, heart disease, and HIV/AIDS are dominant diseases, with lupus and breast cancer being prevalent in the female population as well. Due to previous injustices, some African Americans may not trust researchers. A degree of trust and respect would be necessary, as is the case for all groups researchers seek to study.

As several groups have been mentioned above, the area of health care is one that merits attention. For instance, the

way women interact in the health care system provides some insight into how a researcher would approach asking them questions. Existing models of women's health tend to neglect the integration between cultural values and norms that shape their responses and experiences. Various models exist, yet none are totally adequate. Both women and men are influenced by educational background, family, heritage, social class, economic factors, occupation and work, urban/rural origin, length of time in a new environment, and ethnic identity. People employ different cognitive styles, decision-making strategies, and health care providers. People who migrate from the same country share similar historical events, values, and norms based on their heritage. All of these factors are useful to assist researchers as they collect data on various subcultures and groups.

Comparison

Use in Cross-Cultural Disciplines

Whether researchers study individual cultures or evaluate changes in communities, the opportunity to study and analyze various populations is increasingly significant:

The applied anthropologist's effectiveness depends on his being able to obtain data from monitoring the adaptive changes taking place within the target population, and he must be able to model the relationships with the target population as it diverges from the larger community. Time sampling within the project, and between the project and the total community provide the applied anthropologist with the tools for the application of the comparative method to extract objective measures of change in both the project and its environment. (Hackenberg, 1985, pp. 218–219)

A new linkage of physical, biological and social science within the framework of a comprehensive theory of evolution is in the making. Specific hypotheses await the empirical testing at the sociocultural level, and the environment in which applied anthropologists are employed provides the opportunity. (Hackenberg, 1985, p. 222)

Structural changes are the essence of both economic and social development. (Higgins, 1977, pp. 121–122)

The real contradiction in anthropology is not concerning relevance—rather its relevance often serves the interest contrary to the people researchers are studying. Anthropological research in general is systematically shaped and utilized by the dominant interests in our society for ends which many anthropologist would oppose. (Stauder, 1974, p. 48)

Phenomenology is the study [of] independent existence through various participant observation-like methods, of the structures of the life-world, meaning the forms, structures or features that people take as objectively existing in the world as they shape their conduct upon the presumption of their prior independent existence. Phenomenology is the natural perspective for ethnographic research that would probe beneath the locally warranted definitions of a local culture to grasp the active foundations of its everyday reconstruction. (Katz & Csordas, 2003, p. 284)

In the discipline of history, Lepencies (1976) states that “more important than the emergence of new disciplines is the exchange of subdisciplines back and forth between established fields” (p. 287).

In the area of education, focus is given to anthropology and education, anthropology of education, anthropology in education, and the anthropology of education and social problems:

The ethnographer needs to be a sensitive and perspective observer, sympathetic, skeptical, objective, and inordinately curious. He needs to have substantial physical stamina, emotional stability, and personal flexibility. The ethnographer's approach should be holistic, meaning that one must take some view of the total situation, conceptualizing individuals in relationship to aspects of the physical environment, social organization, religion, world view, ideology, and evaluation. (Hill-Burnett, 1979, pp. 8–9)

Research is inductive, so ethnographers must be storytellers, keeping continuous diaries with consistent data collection procedures:

Key skills that are taught and refined in the study of anthropology are germane to the study of education. These include seeking multiple perspectives, rational speculation, dialogue, scientific inquiry, analytical reading, data collection, comparison and contrasting, testing hypotheses and applying theories. Attention is given to research methodology, logic and reasoning, detailed record keeping and clear thinking. Teaching of scientific inquiry therefore is significant when students learn to question circumstances and problems as they arise. Students need to learn that people and other ethnicities and cultures may bring different questions to a situation. (Birx, 2006, pp. 780–781)

John Dewey had a profound and lasting influence on the field of education: “Dewey favored practice over theory, based on his belief that learning best occurs when students are free to generate their own experiments, experiences, questions and creations” (Birx, 2006, p. 784). Emphasis on multiculturalism, hands-on learning, and participation in authentic learning experiences with real world audiences reflect the pedagogical contributions of Dewey. One of his most important works, *Human Nature and Conduct*, was published in 1922. According to Lev Vygotsky, a Russian psychologist,

Human intelligence is not a fixed characteristic, but instead it is a dynamic entity that can be enhanced by social interaction and collaborative work. He also believed that knowledge is not directly transferred from teacher to learner. Rather, through social interaction, the learner constructs his or her own meaning. (Birx, 2006, p. 784)

In the area of linguistics, Zetterberg (2006) has said that emic sentences are those that tell how the world is seen by particular people who live in it. Etic sentences contain additional information and sentences of an observer or

analyst rather than that of a mere participant. Etic observation may contradict truths believed by participants. Claude Lévi-Strauss commented that society was like language with structure.

Communicative actions such as descriptions, evaluations and prescriptions can be an initial phase of research. They can be used by biographers and psychologist, historians, sociologist or anthropologist. By a series of separate logical operations, the units of description, evaluation and prescription thus begin to define units of a society—not only attitudes, valuations, norms, but a host of other terms in the language of social science, such as positions, roles, organizations, networks, media, markets and firms. (Zetterberg, 2006, p. 250)

Thus, language helps to establish and stabilize any group of humans, community, or organization. On the human side, anthropologists were expected to learn the language of the people they studied rather than use interpreters.

In other areas of anthropology, Lévi-Strauss's program became the "normal science" for the discipline referred to as *structural anthropology*. He attempted to bring some order to the accumulated data on kinship relations in his 1949 text, *The Elementary Structures of Kinship*. Lévi-Strauss is remembered for his theory that "human culture is therefore like language in the sense that all human cultures satisfy the same basis needs, like eating or reproducing, but they do so in different ways" (Birx, 2006, p. 156). Structuralism purports that all human social behavior has symbolic meaning—not just at the superficial level of everyday appearance but at the deep level of underlying structure.

Clifford Geertz, the best-known theoretical anthropologist and ethnographer, has led discussions concerning objectivity in research and fieldwork. Geertz's book, *The Interpretation of Cultures*, is widely recognized as a major publication to consult on ethnographic research. "In anthropological discourse, the purpose of any given study is generally presented in the first paragraph, how that study plays itself out and proves or disproves its hypothesis is not" (Stockton, 2002, p. 1114).

An early contributor to the cross-cultural study of psychology was the anthropologist Bronislaw Malinowski, who did research in the South Pacific. Malinowski reached a conclusion that proved significant to other psychologists. His theory demonstrated that individual psychology depends on the sociocultural context in which it occurs. Yet anthropologists perform research in order to better analyze the actions of people in the larger community or society.

Previously, American anthropologists had used the term psychological to describe cultures considered synchronically rather than historically. After Sapir (1917), it became possible to think of cultures and person or dynamic psychologies together. As language differed, so did psychologies. It was Benjamin Lee Whorf who studied Edward

Sapir's theories and further developed these ideas. Sapir in his research was able to advance the goals of anthropology while instilling the connection with sociology and psychology. (Birx, 2006, p. 641)

Birx (2006) commented about economic anthropology, another of the cross-cultural disciplines:

[It] includes the examination of the economic relationships found among pre-capitalist societies (nonmarket economies) which includes band, village and peasant societies. This discipline studies the historical incorporation into the world market economy of state socialist economies of tribal peoples and peasant societies. Formal economics uses individual behaviors as its methodology. Cultural values are important in defining the standard of living. (p. 158)

The social interest of the whole must be used to justify the economy, including the systems of production, distribution, or exchange. All social relations within the economic system reflect a person's moral position within the community. Every step in the production process must meet some social claim to other members of the community. The social claims are the basis of the economic philosophy and the motivations around which people organize their labor. (p. 160)

Marxist and other substantivist anthropologists define economics as providing for the material necessities of life, while formal economics looks at economic choices in how societies and individuals invest their resources. Marxist economics concentrates on production, while formal and substantivist economics look at distribution as central to their studies. This allows a closer look at how anthropologists and economists can draw conclusions about people in different cultures based on respected economic theories:

In all material systems, humans face the practical choice between producing for the self and producing for the other. In the first case, material activities assume a reproductive pattern, and this supports group independence. In the second case, production is set within exchange: humans trade with others to secure needed and desired things. The first form may be termed community economy, the second is market economy. Real economies are complex, shifting combinations of the two, and humans often are pulled in both directions at once. (Kuper, 1996, p. 26)

Ethnographers have discovered that individuals trade within their communities based on their present need. As the need changes based on household, kinship, village, or other situations, the individuals adapts to the model that works for them and their families.

Cross-cultural studies have significant effects on the world of literature and humanities. Although the term *cross-cultural* was mostly used in the 1980s, there are writers that have used this concept in their works of earlier periods. When cross-cultural studies are used, the author is not merely writing about two different cultures. Cross-cultural

studies in literature are better understood when readers have some knowledge of the culture used:

In cross-cultural narratives, some elements that may be used are ethnographic description, travel writing, culture shock, acculturation and social obstacles such as discrimination, racism, prejudice, stereotypes and speech problems. The use of trickery, kindness, luck and hard work are all areas that might be included as the reader seeks to understand various characters in a discourse. (Glimpse Foundation, n.d.)

Future Directions

According to Hill-Burnett (1979), the future includes more global emphasis on research and development, development of a quantitative methodology to complement the qualitative methods. The future must address limits placed on educational process by political economy, dependency, and exploitation. The ethnography of communication provides bilingual and bicultural school programs when videotaping is used as a tool. This process provides a more exact means of collecting and evaluating data.

Great educators that look at all aspects of teaching in a critical manner help our students to understand different perspectives. As we continue to live on this earth, groups of people will combine ideas and principles. Educators will have to be ready to embrace and teach these changes:

An essential part of scientific procedure is the development of precisely defined concepts which together provide an internationally agreed upon frame of reference in terms of which the particular phenomena observed by different investigators may be described. Scientific progress is possible only because all the specialists in a given discipline use units of description that are commonly understood and have precisely defined meaning. (Leach, 1968, p. 339)

With the advent of professional associations to instill guidelines for the cross-cultural studies, researchers will more rapidly reach uniformity in methods of statistical analyses. Associations such as the Society for Cross-Cultural Research (www.sccr.org/description.html) can be consulted. That uniformity promotes acceptance of cultural research worldwide. Naroll, in a quality control study, listed the following six systematic biases. They are “scholarship of the ethnographer, native language familiarity, use of nonnative local resident helpers by ethnographers, the tendency of the ethnographer to make clear commitments, taking of ethnographic census by the ethnographer and ongoing ethnography as contrasted with its opposite, memory ethnography” (Thompson & Roper, 1980, p. 910). Overcoming obstacles such as poor sampling techniques and using multidimensional scales to test related hypotheses advances the future of cross-cultural studies.

Conclusion

A renewed look by societies and anthropologists has taken place. A greater understanding of using scientific methodologies to reach hypotheses and conclusions of cultures has surfaced in the dominant societies. Scientists in most disciplines will inordinately analyze information gathered on poor, indigent, primitive, preliterate, or just different groups of people in a more detailed and exact process.

Anthropological insights can be used to address numerous issues of today. Immigration, migration, education, ethnic relations, racism, and medical problems are better understood as scientists gather information on all cultures and make them accessible. From the earliest anthropologists to the contemporaries of today, the success of understanding and measuring the qualitative and quantitative differences and similarities of cultures all over the world are preeminent. Recognizing this need is paramount and continuous as our society expands.

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TWIN STUDIES

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Studying twins offers a unique opportunity to identify and differentiate physical and behavioral characteristics according to their origin. How much of who we are is genetically determined and how much is the result of our environment? By comparing the consistency of *phenotypes*, that is, observable physical and behavioral characteristics, in twins we can hypothesize about their heritability—whether or not a specific characteristic is genetically determined. Based on the assumption that all twins share their environment and that monozygotic twins also share genomes, phenotypes that vary between monozygotic twins must be the result of environmental factors, while those that are consistently the same must be genetic in origin.

Though they must be inextricably linked, there is a difference between research on twins and research that uses the twin studies method. The following chapter will follow both.

Sir Francis Galton: The Twin Study Method

Sir Francis Galton (1822–1911) was the first to articulate the value of twins to the nature-nurture debate. While his cousin, Charles Darwin, culminated his theory of natural selection in the 1850s, Galton was beginning to articulate his related theory of eugenics. By the beginning of the 20th century, eugenics was considered the new liberating science, promising to help control disease and improve the

quality of life. The reasoning was that if a species adapted through the process of natural selection, then it should be possible to control disease and other undesirable characteristics by intentional selection. Breeding in animals and plants had made successful contributions to agriculture; using carefully documented bloodlines among the nobility to identify marriage partners was an accepted cultural practice in Europe, the New World, and many other cultures. Deliberately manipulating reproduction was a recognizable and acceptable idea.

Galton argued that because of their observable similarities, twins were a primary source of data. In his 1876 article, “The History of Twins, as a Criterion of the Relative Powers of Nature and Nurture,” Galton pointed to the unique potential that twins offered to genetic research: “Their history affords means of distinguishing between the effects of tendencies received at birth, and of those that were imposed by the circumstances of their after lives; in other words, between the effects of nature and nurture” (p. 391). He coined the terms *identical* and *fraternal* to describe the degree of similarity between the twins.

Harris Hawthorne Wilder was the first to speculate that identical, fraternal, and conjoined twins originated at different points in the same process. Identical twins were the result of the egg splitting into two parts; fraternal twins were the result of fertilization of two separate eggs. Conjoined twins—unfortunately referred to as “double monsters” during that time—were part of the same process, but in those cases,

the splitting of the egg was incomplete (Wilder, 1904, p. 391). It was not until 1909, when Miguel Fernandez and in a separate study J. Thomas Patterson and H. H. Newman, that scientists were able to observe polyembryology in mammals—specifically armadillos—and to verify this developmental sequence from the point of conception to multiple fetuses to birth (Newman, 1941, pp. 102–103).

Research on Twins: Fetal Development

We now know that *monozygotic*, or identical, twins develop by the division of a single zygote over the first several weeks of pregnancy. *Dizygotic*, or fraternal, twins form at conception by the fertilization of two eggs by two sperm, so their genetic similarity to one another would be like that of any two singleton siblings. The rate of monozygotic twins is consistent, while dizygotic twins varies across ethnicities (Piontelli, 2002, pp. 14, 16). For example, 1 in 11 births in Nigeria are twins, but in Japan, the ratio is 1 for every 250 births (Hall, 2003, p. 735). Twin births are more likely in later pregnancies. Different cultural factors affect women's decisions to start their families later in life, but the trend is consistent across many countries and continents over the last century. In vitro fertilization and other fertility treatments have increased the incidence of twins as well as other multiples in populations where such technologies are used (Piontelli, 2002, p. 14). From 1980 to 2004, the twin birthrate rose by 70% (Martin et al., 2009, p. 2). In the United States in 2006, twins occurred with a frequency of 32 in every 1,000 live births. Almost all of the twins resulting from fertility treatments are dizygotic.

Medical research continues to illuminate the different phases of fetal development in twins and other multiples in order to anticipate attendant risks. In 1995 in the United States, the mortality rate of twins was 32 deaths for every 1,000 births; in the same year, the rate for singletons was 6 deaths for every 1,000 births (Parker, Schoendorf, & Kiely, 2001, p. 14). Approximately 8 out of 10 twin pregnancies are premature, and approximately half of all twins have a low birth weight—a major factor in infant mortality (Martin et al., 2009, pp. 10, 21). Some of these conditions further distinguish situational versus genetic factors, such as vulnerability to specific diseases, sleep-wake patterns in utero, and the complexities of twins and identity such as bonding and loss. Already, in the uterine environment, genetic predispositions and environmental chance begin to interweave.

Four major physiological considerations affect twin *parturition*: the time of division and the way that the amnion, chorion, and placenta are situated. There are four approximate phases over the first weeks of pregnancy that are significant: Days 1 through 4; 4 through 8; 8 through 14; and after the 14th day. The degree of genetic similarity, the particular risk factors, and the further development of the amnion, chorion, and placenta are determined by the day on which the zygote divides. The *amnion* is the inner

sac filled with fluid, which surrounds the fetus, protecting it and allowing movement. The *chorion* is a stronger sac that surrounds the amnion. The *placenta* is embedded in the uterus and is connected to the fetus via the umbilical cord and serves its circulatory system through the exchange of oxygen and carbon dioxide. It also provides nutrition and antibodies to the fetus from the mother. Dizygotic twins always have their own placentas, though sometimes monozygotic twins will share one.

Vanishing-Twin Syndrome

If division takes place during Days 1 through 4, then the two resulting fetuses will each develop its own amnion, chorion, and placenta. In Days 4 through 8, there is a higher likelihood that each twin will have a separate amnion and placenta but share one outer sac, the chorion. In these first two phases, the “vanishing twin” syndrome is possible in which one of the fetuses is absorbed by the mother, the uterus, or its twin. Researchers H. J. Landy and L. G. Keith (1998) estimated that approximately 30% of twin pregnancies are subject to the loss of one of the embryos, something scientists—and parents—weren't aware of until the 1980s when sonography made it possible to see them (pp. 181–182).

Twin-to-Twin Transfusion Syndrome

From Days 4 through 8, the probabilities lean toward two fetuses in one amnion, one chorion, and with one placenta. In Phases 2 through 3, twin-to-twin transfusion syndrome, or *fetofetal transfusion*, becomes a risk for monozygotic twins as the blood flow between the placenta and one twin affects the flow of those substances toward the other. As a result of this uneven flow of blood, oxygen, and nutrients, one twin may become anemic while the other becomes *polycythemic*—with too high a red blood cell count. There's also a danger that the one twin will be surrounded by too much amniotic fluid and the other not enough. The concern with *polyhydramnios*—too much amniotic fluid—is that the fetus has not absorbed enough. With *oligohydramnios*—too little—the fetus's kidneys may be adversely affected. Growth and development of the larger twin may continue to constrict in the available space of the smaller one, causing further developmental risks. Unless diagnosed within the first 15 weeks of pregnancy, mortality from fetofetal transfusion is approximately 80% to 100%. Also, twins who survive are at risk for immune problems. The more closely the twins are situated in one amnion or even one chorion, the more likely they are to be affected by each other's sleep-wake cycle and the subsequent separation after birth. The chance of tangling up in one another's umbilical cords and the developmental effects of constricted movement are also important factors.

Conjoined Twins

After Day 14, an incomplete division is probable—conjoined twins also share the uterine environment

completely. According to Lewis Spitz (2005), 60% of conjoined twins die during pregnancy or at birth; live births of conjoined twins approximate 1 for every 250,000 (p. 814). Most fetal deaths occur during the 1st trimester.

Such twins can be joined at a number of different locations. The most frequent fusions are *thoracopagus*, where the twins are joined at the chest, possibly sharing heart, liver, or intestines. Sharing the heart and cardiovascular system poses the greatest risk, which is why the mortality rate of thoracopagi is also highest. Other major organs can be shared. For example, the famous P. T. Barnum Siamese twins, Chang and Eng, were thoracopagus. After their deaths in 1874, it was discovered that they shared their liver. Though Eng was healthy, Chang's alcoholism contributed to his death. Additional complications occur when the thoracopagus are also *omphalopagus*—that is, joined at the umbilical region. Additional classifications in degree of frequency are *pygopagus*—joined at the surface close to the sacrum and coccyx either side by side or through the posterior. In those cases, the gastrointestinal and/or urinary tracts may be shared. Less frequent are *ischiopagus*, joined at the pelvis, and *craniopagus*, joined at the head.

Each pair of conjoined twins is fused in unique ways, sometimes symmetrically but not always. When the attachment has resulted in unequal fetal development, only one of the twins may survive birth or even the first days and weeks of life. In such cases, emergency separation surgery is required to rescue at least one but hopefully both of the twins. Such instances are not the only difficult decisions: Because the attachments are so unique, medical care, surgery, and survival must be determined individually. Fetal imaging makes early diagnosis possible. The sooner the degree and kind of fusions are determined, the more quickly decisions about abortion, separation, and medical care can be made.

Separation surgery excites the medical community, offering some of the most complicated surgical interventions, because there is relatively little similarity from one case to another. The different kinds of surgical interventions are common. The number of procedures strain the infants' bodies and the interdependence of biological systems that require the planning and performing of the surgery to be so exquisitely careful. In each case, a separate cadre of specialists are required. Each twin will need his or more frequently her (female conjoined twins have a frequency of 3 to 1 over male conjoined twins) own anesthesiologist and monitoring system. Former Surgeon General C. Everett Koop, famous for creating the first intensive-care pediatric-surgery unit, reported that it took 100 hours to plan, 4 hours of preoperative preparation, two surgical teams, 23 operating-room staff, and 10.5 hours of surgery to separate twins Clara and Alta at Children's Hospital of Philadelphia in 1974 (Children's Hospital of Philadelphia, 1974). The separation of Yurelia and Fiorella Rocha-Arias at Stanford University Hospital in 2007 took approximately 200 experts and cost between \$1 and \$2 million.

Separation surgery also excites a range of controversial ethical considerations. Alice Domurat Dreger (2004) argued that separation surgery is not always necessary but is chosen by the parents and doctors because they subscribe to socially defined expectations of normal appearance and identity (pp. 56–60). In contrast, in 2000, the parents of Maltese conjoined twins Jodie and Mary were ordered to submit their daughters to a sacrifice surgery. It was evident to physicians at St. Mary's Hospital in Manchester, England, that Mary was severely deformed and that she would prevent her sister's survival, as well as her own. As Roman Catholics, the parents believed that the death of the twins would be God's will. The High Court argued that Jodie's right to life was a higher consideration.

Theories in Twin Studies: An Overview

To understand the place of twin studies over time and across national and cultural boundaries, it helps to understand the philosophies driving the fashions in research focus and study design as well as the sociopolitical contexts that determined funding, support, and ethical standards of the research itself. What kind of research were twin studies used for? What are the experiences of twin studies' subjects in such research?

The theories that predominantly influenced twin studies during the 20th and the beginning of the 21st centuries are eugenics, phenogenetics, behaviorism, and genomics. A rough survey of their popularity breaks up into three time periods: from 1876, when Galton published his twin study method, to the end of World War I; from the end of World War I to the end of World War II; and from 1948, when B. F. Skinner published his theory of behaviorism, to 1985 when DNA "fingerprinting" made it possible to actually see twins' identical genomes.

Eugenics

Sir Francis Galton (1876) coined the term *eugenics*. It was his belief that scientists could breed a better kind of human, eliminating illness and disease by controlling reproduction. This required determining the heritability of specific characteristics. It would be over 100 years before this could be done by looking at the actual genome. Galton's solution to this mystery was to study the variability or consistency of characteristics in monozygotic and dizygotic twins and make generalizations based on statistical computations.

The eugenicist ambition troubles us today because of the corollary belief that there were inferior human "species" or races, a belief possible at a time when the mutability—the ability to change over generations—of all phenotypes was improperly understood. Human races were not really considered to be different species, but it was believed that they were differentiated by immutable characteristics, some of which were physically visible, such as skin color and hair

texture, while others such as moral propensities were not. The purpose of research was to determine how such characteristics were connected. For those who leaned heavily on nature as the determining influence in human destiny, the obvious step toward a new and “healthy” population was to control its evolution. Nationalism as a matter of collective identity would further magnify these theories in the social and political infrastructures of the early 20th century (Adams, Garland, & Weiss, 2005, p. 233). From today’s vantage, it can be surprising to see how pervasive and acceptable eugenics research, legislation, and mythology were in 20th-century life but then not so surprising that they came to be exploited.

The confusion about genetic versus environmental origins, which drove twin studies, had a long reach from science into politics even in the United States. The base for such research in the United States was the Eugenics Record Office (ERO) at Cold Spring Harbor, established in 1910. Charles B. Davenport created and then directed the ERO; his assistant, Harry H. Laughlin, a passionate leader in the eugenicist movement, initiated the Johnson-Reed Immigration Restriction Act, which was ratified in 1924. This federal legislation set quotas for “inferior” populations to control the number who entered the country, including people who were trying to escape the Holocaust during World War II (Adams et al., 2005, pp. 238–239). Sterilization of the “unfit” was common practice in the early 20th century in many countries, including Sweden, Norway, Canada, Denmark, and Germany. In the United States, the Supreme Court upheld the decision of *Buck v. Bell*, permitting the involuntary sterilization of Cary Buck in 1927. In the 1970s Iowa, North Carolina, and Oregon were still operating sterilization programs: “No revulsion against Nazi sterilization policy seems to have curtailed American sterilization programs” (Reilly, 1987, pp. 161, 167).

Phenogenetics

In Germany, as well as other countries, eugenics became institutionalized to a greater degree—resulting in the concept of *Rassenhygiene* or “racial hygiene,” that is, racial purity. Almost all of the political machinery during the Nazi era was tied up with this mission. The Kaiser Wilhelm Institute was established in Berlin in 1927, partly funded by the Rockefeller Foundation, which also supported the ERO in the United States. Among the many scientists, anthropologists, and researchers who worked there, Otmar Verschuer and Joseph Mengele were particular proponents of the twin study method for their research on heredity. Their object—and the object of most of the Nazi medical and biological scientists—was the opposite of Galton’s original idea. Instead of breeding out negative characteristics of a population through controlled reproduction, they wanted to identify and isolate specific, desirable “Aryan” phenotypes and breed them into the population. Increasing reproduction in the Aryan population

was a major effort of the Nazi regime. Phenogenetic research looked to link specific characteristics in physical appearance, intelligence, and abilities such as musical or mathematical talent to genetic material so that it could be manipulated. Most of this research was done in the concentration camps.

History’s description of Mengele is almost as disturbing for his reputed charm and popularity among the inmates as for his diabolical experiments. Mengele’s research used one twin as a control with the other as subject. His experiments included injecting bacteria, including typhus, into one twin while using the other as a control; injecting chemicals into subjects’ eyes to see if the color of the iris would change; surgically attaching (i.e., conjoining) identical twins to see if and how they would die (Lagnado & Dekel, 1992). Twin survivor Eva Mozez Kor describes entering Auschwitz-Birkenau at 10. She was injected with bacteria that made her so ill that Mengele refused her any medicine because he wanted her to die. Knowing that her twin Miriam would be put to death so that Mengele could compare their corpses, Eva focused on a determination to live (Hercules, Pugh, & Simpson, 2005). The experiments on Miriam Mozez affected the development of her kidneys and eventually caused her death—among the further difficulties of twins surviving Auschwitz-Birkenau was finding out what injections and substances they had been given. Much of the documentation was shoddy or lost. Because Mengele escaped before the doctor’s trial at Nuremberg, twin survivors of Mengele’s experiments finally gave public testimony at a substitute trial in 1985 at Yad Vashem, Israel’s memorial to the Holocaust.

Behaviorism

The tragedy of *entgrenzte Wissenschaft* or “morally transgressive science” continues to be the subject of historical research, anguished confession, and institutional and national reconciliation. Though the German phrase is generally associated with the Nazi era, scientific and moral transgressions continue to damage twin subjects—as with David Reimer, sexually reassigned as a girl, whereas his brother was raised as a boy.

The theory of behaviorism came almost like a backlash against eugenics. B. F. Skinner’s (1962) publication of *Walden Two* heralded a theory that attempted to liberate us from the hardwired-genetic preoccupation of scientists before and during World War II. Skinner was convinced that we developed our identity and much of our physical being in response to the environment; this argued that our development could be controlled by proper conditioning. Among the many mysteries of human experience, sexuality is also developed in a complex interrelationship between nature and nurture.

Its extreme was demonstrated by the tragic experience of David Reimer, a twin whose circumcision damaged his penis and whose parents were guided by Dr. John Money (1975),

a reputable sexologist at Johns Hopkins University. Money's research operated on the principle that gender and sexuality could be programmed. His advice was to have David sexually reassigned and raised as a girl while his brother continued his life as a boy (p. 66). Money's reasoning, like that of many physicians after him, was that the trauma of having a relatively small penis and of not being able to urinate standing up like other boys would be worse than the battery of surgeries, hormone injections, and behavioral modifications of transitioning into a girl. Ethicists like Dreger (2004), above, argue that this is a socially motivated decision based on rigid and unrealistic notions of "normal" genders. The similarity and contrast of the twins' experiences growing up rather proves that genes are fundamental to sexual identity, regardless of training, reinforcement, surgery, hormones, or therapy.

Money lost track of his subject after reporting that his transformation was a success (Colapinto, 1997; Money, 1975), and it was because of Money's reputed success that infant sexual reassignment became accepted practice throughout the 20th century. It was not until Drs. Milton Diamond and Kevin Sigmundson (1997) published their follow-up review that Money's fiasco became public. In the film, *Sex: Unknown* (2001), David Reimer begins to tear up as he says, "The medical community was under the impression that my case was a success story. And I was shocked when I heard that people thought that my case was a success story" (Cohen & Sweigart, 2001, film for television). This is an unusual example of the twin studies method since there are only two subjects—still, it proves the incontrovertible genetic factors that drive our gender identities and sexuality.

Genomics

The technology to "fingerprint" DNA was developed by 1985. Its effect on twin studies can be imagined as accessing the genetic material of subjects greatly amplifies the possibilities in nature-nurture research. How do researchers find twins for their studies? According to the journal *Twin Research and Human Genetics*, there are over 50 twin registries worldwide (Busjahn & Hur, 2006, p. 705). The Danish Twin Registry was established in 1954 and is the oldest national registry. In national twin registries, twins are identified through medical, school, and other available public documentation. In many other countries, for example, the United Kingdom, twins volunteer their participation in the registry.

An example of the kind of documentation now possible is the Biological Psychology Department of the Vrije Universiteit Amsterdam. The department has been maintaining a database of twins and their families, routinely collecting blood and urine samples over time and preserving the DNA in a biobank. Using both the kinship method and the ability to test hypotheses against biological samples from monozygotic and dizygotic twins, the scientists can track the genetic markers for phenotypes with far greater sophistication (Boomsma et al., 2006, p. 853).

Such studies, using registries all over the world, have illuminated the complex interactions of genetic and environmental factors in behavioral patterns, such as schizophrenia (Li, Sundquist, Hemminki, & Sundquist, 2009; Torrey, 1994), attention deficit disorder (Bennett et al., 2006), anxiety and depression (Hicks, DiRago, Iacono, & McGue, 2009; Wray et al., 2009), aggression (Brendgen et al., 2008), perfectionism and eating disorders (Tozzi et al., 2004) as well as drug use and alcoholism (Slutske et al., 2008; Whitfield et al., 2004). A cursory review of the medical literature proves the value of twin studies in determining heritability in a range of conditions including asthma (Thomsen, Ferreira, Kyvik, Fenger, & Backer, 2009), heart disease (Wienke, Holm, Skytthe, & Yashin, 2001; Zdravkovic et al., 2002), fertility (Kohler et al., 2006), osteoporosis (Tse, Macias, Meyer, & Hargens, 2009), obesity (Mustelin, Silventoinen, Pietilaenen, Rissanen, & Kaprio, 2009; Peeters et al., 2007), and immune function (de Craen et al., 2005). Infectious diseases are transmitted by germs in the environment, but susceptibility and the ability to heal also have genetic components (Jepson, 1998, p. 79). Longitudinal studies offer insight into physical and psychological development from infancy onward. As twin registries track the lives of their increasingly older subjects, we can identify and better understand the many factors that affect the health and happiness of the aged (Harvald et al., 2004, pp. 318–335).

Conclusion

In Plato's *Symposium*, several dinner guests are discussing love and its origins. When it is Aristophanes's turn to speak, he tells the story of how we were all originally made up of two heads, four legs, and four arms, each half facing outward. These were beings who created such havoc just trying to move around that Zeus lost his patience and cut them in half. This is why and how we love; each half-being is searching for his or her other, explained Aristophanes. Though Socrates naturally disabused him, Aristophanes's image may explain our fascination with duality, the "glamour" (as Alessandra Piontelli, 2002, described it) that twins so often carry with them as they move through their lives.

The whole of twins research and the twin studies method is centered on these mysteries of similarity and difference and by what magical combination of chance, genetic wiring, and nurturance they occur. By comparing these variations in large populations of twins, we can speculate and then prove whether a particular characteristic is genetic in origin. The twin studies method has untangled the biology and behavior of mental illnesses, such as schizophrenia, as well as pointed to the genes that may contribute to alcoholism, heart disease, or infectious diseases. As new technologies in fertility, cloning, and stem cell research develop, and as siblings become harvestable for

their cells and organs, the ethical conundrums identified in twins research may prompt the right kinds of questions about the experience of others in this new phase of science.

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PART VII

TEMPORAL FRAMEWORKS

GEOLOGY AND ANTHROPOLOGY

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Geology plays a key role in the study of humans, particularly in the subdisciplines of paleoanthropology and archaeology. Anthropologists work closely with geologists and employ geological tools in order to reconstruct aspects of past environmental and ecological contexts from the time of our earliest human ancestors to that of modern peoples.

Extrinsic selective pressures, or those that are derived from a human's surrounding environment, are revealed through the study of the earth sciences. Anthropologists place the human individual, community, and population back into the environment and attempt to understand how humans interacted with that environment. From the origins of hominins, humans' bipedal ancestors, to the ascendancy of modern peoples, anthropologists want to know about temperature, aridity and rainfall, landforms, hydrology, and vegetation cover, among many other factors. From these basic environmental indicators, they surmise the kinds of habitats that may have been available and exploited by humans. Geological tools have also been applied directly to human skeletal and artifactual material or associated sediments in modern and ancient settings to address life-ways and determine age of deposits. One of the subdisciplines of geology, paleontology, is concerned with ancient life. Contexts of early humans also include coeval animals occupying the same territories and habitats or exploited as food sources by humans (see Chapter 41, this volume, "Paleontology and Anthropology").

Some researchers within the two disciplines assert that the relationship between anthropology and geology is a one-way street; that is, anthropologists use geological tools to address questions of the human condition, but anthropology does not offer anything to the study of geology. In that thread, this chapter recognizes the many geological methods as applied to anthropological questions can be observed as indeed one-way. However, implied in this chapter is how anthropology provides relevance to geological data. Certainly, geologists would like to know the history and mechanisms of the earth, but those ideas do not stop there. Geologists also couch that information in the economic, political, (pre)historical, and cultural contexts of humans, all of which are the purview of anthropology and other social sciences.

This chapter is by no means an exhaustive review of geological theory, methods, and applications to the study of humans. Rather it serves as a discussion of some geological tools commonly used to investigate some anthropological questions and suggests further readings.

An Anthropologist's Use of Geological Theory

Largely credited to the work of James Hutton, the theory of uniformitarianism, also known as actualism, holds that observable earth processes, such as erosion and deposition,

occur throughout geological time and are responsible for the landscapes, among other earth forms, present today. That is to say, “the present is the key to the past.” For instance, wind action along a shoreline slowly weathers fine sand grains and transports and deposits the grains in another location. Eventually, a new landform, such as a dune field, is constructed. Uniformitarianism is simplistic in that it evokes the most parsimonious explanations for past geologic phenomena.

Anthropologists using geological methods to reconstruct human environments also follow the theory of uniformitarianism. Archaeological and human paleontological sites are formed by human induced and *natural*, or nonhuman induced, geological processes. Unraveling where the two meet is essential for understanding how each site formed and aids in the interpretation of what the original environment when humans inhabited the site would have looked like. For example, some of the earliest stone tool use has been documented on the shores of Lake Turkana at archaeological sites of Koobi Fora in northern Kenya. These Late Stone Age sites contain fossil hominins, cut-marked fossil fauna, and stone tools, most of which are deposited in ancient river and lake deposits. Early interpretations painted a picture of hominins living along the lake margin, butchering animal carcasses with stone tools. Anthropologists hypothesized about small groups of nomadic hunters and gatherers using home bases nearly 2 million years ago (mya). Actualistic studies of stone tool and fossil transport in fluvial deposits, largely conducted by Glynn Isaac and his students, shed new light on these early human sites. These researchers found that geological processes, such as erosion and deposition, are also responsible for creating accumulations of artifacts and fossils, and therefore, not all of the so-called sites are the result of humans using home bases and discarding artifacts. Isaac went further to compare the “scatter-between-the-patches” and delineated natural background distribution of broken stone pieces from these clusters of human-made stone artifact assemblages.

Uniformitarianism, however, is used not only by anthropologists to frame the geological aspects of human environments. Actualistic studies have been widely used to interpret the human-induced processes. Lewis Binford proposed the application of middle range theory, first developed by Robert Merton, to archaeological problems. Middle range theory explains patterns of material remains preserved in the past with observable processes performed by humans in the present. These studies encompass such subfields as experimental archaeology and ethnoarchaeology. In one of the earliest Paleolithic experimental studies, Francois Bordes began fashioning his own stone tools from the same raw materials used by Pleistocene humans. He reconstructed each blow to rough rock form and made inferences about the thought processes and foresight that went into making such artifacts by human ancestors. Thus, he employed the dictum “the present is the key to the past”

and made analogies from his own toolmaking skills to those of extinct humans. Although Binford disagreed with Bordes’ interpretations of Neanderthal societies based on these experiments and suggested that Bordes look at modern human populations to gain insight into tool function, both anthropologists found explanations in the modern world to make inferences about the past. Zooarchaeologists also use actualistic studies to further interpretations of past human behaviors and lifeways. Robert Blumenschine observed carnivore activity on the savanna grasslands of the Serengeti Plains in order to interpret patterns of Plio-Pleistocene carnivore tooth marks preserved on herbivore skeletal remains at the early human site of Olduvai Gorge in Tanzania. From observable sequences of carnivore carcass access, he refuted models of hunting by early members of genus *Homo* and instead demonstrated the capacity for intense scavenging. In sum, anthropologists have adopted geological theory to frame questions about the context of humans as well as human lifeways.

Geological Methods in Anthropological Contexts

Anthropologists borrow many tools from the earth sciences to use in reconstructing the contexts of humans. Three sub-disciplines presented here are sedimentology, stratigraphy and dating methods, and stable isotope geochemistry. Broadly, these contexts incorporate aspects of time and environment.

Sedimentology

The vast majority of modern and fossil human remains over the past 8 million years of evolutionary time are preserved in sedimentary rocks, and thus, anthropologists working with the rock record study sedimentology to understand past and present human contexts. At outcrops, sedimentologists record information about the characteristics of sediments and sedimentary layers. These characteristics either are formed during the initial formation of the layers or may be secondarily altered after deposition. From this information, depositional environments are inferred, such as those produced by river, lake, wind, or soil processes. Traces of human occupation and activity are found in primary deposits and altered sediments.

Primary Sediments and Sedimentary Structures

Primary data collection of sediments and sedimentary rocks is a hierarchical framework from small to large divisions describing individual grains, layers, members, formations, and groups. For anthropologists studying archaeological or human paleontological sites, the scale of the investigation varies with what context questions are

being addressed. An archaeologist excavating early human sites with evidence of controlled fire, for instance, may be concerned with the sediments of individual hearths in one layer but also with multiple hearths in many layers across landscapes and possibly through time. Characteristics of grains and layers are discussed.

Sediments and sedimentary rocks are formed from the erosion and deposition of other rocks (igneous, metamorphic, or sedimentary) and sediments. The process is a recycling of older materials into new rocks. Characteristics of sedimentary rocks indicate aspects of the recycling history and tell a story of formation. Sedimentologists use characteristics such as grain size, grain composition and mineralogy, and grain angularity and roundness. Grain size and shape are derived from the manner of weathering and transport. For instance, the larger the grain, the stronger the medium in which it was transported. Wind is capable of transporting relatively small grains compared with water. Moreover, fast-moving water can transport larger grains than slow-moving water. Grain shape indicates how long a grain has been in the transport system. A well-rounded grain has likely traveled a longer distance than an angular grain; its roundness reflects how many times it has struck another grain or rolled on a river bottom. Composition and mineralogy indicate source material from which the grain originated.

Comparable grains with similar histories are segregated into mappable units called layers, or strata. Layer characteristics include thickness, color, fabric and structure, and grain sorting. Layer thickness represents a depositional history and indicates a relative amount of time required to build. Fabric is the manner in which grains are orientated and packed within a layer and indicates water or wind flow (current) direction or lack thereof. Grain sorting is a measure of how similar in size each grain is: A well-sorted layer is composed of the same-sized grains; a poorly sorted layer has many different sized grains. Sorting indicates consistency of transport velocity. Sedimentary structures refer to large-scale features and bedforms that reflect aspects of the depositional environments. There are numerous structures, most of which can be classified as bedding, stratification, and bed-plane markings. Bedding and stratification describe the shape of one layer relative to another and include cross-beds deposited at angles from a horizontal plane, parallel beds deposited along a horizontal plane, and massive bedding lacking structure. Ripple marks, or wave-formed sands like those along a near-shore ocean floor, are examples of bedding structures. These examples are forms of sedimentary deposition; however, erosional processes also produce bedforms. Scour marks and channels are missing pieces of sediment, but preservation of these forms indicates the presence of past environments. Bed-plane markings are typically formed on contact surfaces between two layers. As a grain or rock hits the bottom of a river bed, it produces bounce, roll, or skip marks, which are in turn filled by the deposition of the next layer. A mudcrack formed in the sun-dried

surface of an ancient lake bottom is an example of a bed-plane mark. Bed-plane marks are also produced by biologic processes and result in trace fossils, or ichnofossils. These include footprints, tracks, burrows, rhizoliths (root casts), and leaf imprints. Layer color is derived from grain composition and mineralogy or may be the result of diagenesis, or secondary alteration to the sediments after initial deposition. If groundwater bathes a layer of sand permeating into the spaces between each grain, chemical reactions between the water and elements in the grains may occur. Oxidation of iron, for instance, produces a reddish color on the surface of each grain and results in a layer color different from that indicated by grain composition.

Depositional Environments

Descriptions of individual grains and layers are used to infer the past environments in which they were deposited or formed. These environments include the physical, chemical, and biological conditions present during initial sediment deposition as well as those conditions that produce postdepositional (diagenetic) alteration. Sedimentary environments are typically interpreted by a method known as facies analysis. Facies analysis makes use of the relationship between observable environmental processes and their resulting sedimentary responses. Processes can be static or dynamic but typically result in predictable outcomes. Facies are a combination of layers with distinct lithological, structural, and biological properties that represent a defined environment. Facies are usually constructed from known sedimentary environments, thus evoking uniformitarianism, but also can be used to theoretically model environments that cannot be observed or are unknown in the present. Depending on the scale of investigation, facies associations are used to interpret large-scale environments, such as fluvial (river) or lacustrine (lake), deltaic or beach, desert or glacial, or small-scale subenvironments within each environment. For instance, within the fluvial setting, facies are used to distinguish between meandering or braided river systems. Ancient soils, or paleosols, represent another identified facies produced from postdepositional alteration of sediments. Recognizing these facies is critical to determining ancient land surfaces that may have been used by humans.

Stratigraphy and Dating Methods

Stratigraphy describes the relationship between strata and is primarily concerned with providing a temporal framework for events in earth's history. These techniques are essential for understanding the evolution of human ancestors and for examining modern human populations through time. The manner and timing of the formation of sedimentary rocks is explained by a few key stratigraphic principles largely credited to Nicolas Steno in the 17th century. The principle

of original horizontality states that sediments are initially laid down horizontally due to gravity. The principle of superposition describes deposition of layers in an upward sequence and thus represents the relative age of one rock layer to another. For example, the rock layer on top of a succession is relatively younger than the one(s) below it. Applying the principle of lateral continuity, Steno observed that these horizontal layers are continuous across the earth's surface unless disturbed. Sedimentologists and stratigraphers still employ Steno's principles to assign relative ages and to correlate strata. Dating methods are used to assign relative or numerical ages to sedimentary layers or the biotic materials preserved within and are commonly separated into two categories: relative and radiometric (absolute). Several dating methods are presented below that are commonly used in anthropological contexts.

Relative Dating Methods

Relative dating methods largely stem from the principle of superposition and thus do not yield numeric ages. Rather the methods give an "older than" or "younger than" tie point to compare one human archaeological or paleontological site with another. These methods all produce sequences of relative dating information that can be correlated to other locations or records with established numeric ages. As a result, these methods are commonly used in concert with radiometric dating techniques.

Biostratigraphy

Fossils preserved in sedimentary sequences can be used to assign relative ages if the fossil species is geographically widespread (i.e., laterally extensive) and tightly restricted in one or a few sedimentary units (i.e., temporally constrained). A fossil species that meets these criteria is termed an index fossil. One long sedimentary sequence with a fossil succession can be used to develop a stratigraphic chronology of fossil speciations and extinctions; thus, Fossil A is "older than" Fossil B. Fossil A found in other locations is equal to the time horizon preserved in the long sequence.

Dendrochronology

Trees in temperate conditions typically grow by annual increments with early and late forming woods (tree rings). These increments can be counted in cross section and used to estimate how many years the tree lived. As trees respond to varying climatic conditions, the increments wax and wane, and thus, a distinct pattern forms at particular times in the region. Coupled with radiometric methods or historical records, the patterns of numerous trees have been compiled to generate a long (banded) time sequence. Wood used by humans for building materials and preserved at archaeological sites can be analyzed for these tree rings and matched to a particular time.

Paleomagnetism

The present configuration of the earth's magnetic field is *normal* (indicated by a black strip on a rock), where the magnetic north pole is located at the geographic north pole. In earth's history, the magnetic field has collapsed and reformed in the opposite configuration, or *reversed* (white strip), such that the magnetic north pole is located at the geographic south pole. The orientation of the earth's magnetic field, either normal or reversed, is imprinted on those rocks and compact sediments with magnetic minerals at the time of formation. Sequences of rocks and sediments all over the world have been sampled in either discrete intervals (e.g., every meter) or cored continuously and analyzed for magnetic orientation, and they display a record of reversals. The result resembles tree rings as a banded pattern (white and black stripes), which can be matched to long paleomagnetic records of known radiometric ages. The phenomenon of magnetic reversals is global and therefore can be used everywhere an appropriate rock sequence is present.

Tephrochronology

Volcanic eruptions eject ash, pumice, and other products (collectively known as tephra) that can be chemically fingerprinted. The fingerprint is typically unique to a particular eruption of one volcanic edifice and therefore represents a particular time in earth's history. Tephra is characterized by major, minor, and trace (chemical) elemental and oxide abundances. Tephra layers represent synchronous units that can be traced laterally to compare archaeological and paleontological sites across landscapes.

Radiometric Dating Methods

Radiometric dating methods make use of the radioactive decay of chemical elements in various materials (e.g., bone, shell, minerals) to calculate the numeric age of human skeletons directly or to infer the age of humans associated with the measured material. Chemical systems used for dating are specific to time intervals because each chemical element decays at a particular rate. *Half-life* refers to the time required for half of a radiometric element (parent material) to decay to a daughter element.

Radiocarbon

The radioactive isotope of carbon (^{14}C) is found in several different kinds of organic materials (e.g., bone, wood, shell, paleosols) and thus is useful in many anthropological contexts. Living organisms incorporate ^{14}C into their tissues by physiologic processes, such as photosynthesis and respiration, in equilibrium with the atmosphere. When an organism dies, ^{14}C within its tissues is converted to nitrogen (^{14}N). Since ^{14}C decays to ^{14}N at a known constant (half-life: 5,370 years), time since death can be calculated by measuring the amount of ^{14}C remaining

relative to ^{14}N in preserved tissues. Due to the relatively short half-life, radiocarbon methods are applicable to time intervals younger than approximately 50,000 years ago.

Potassium-Argon and Argon-40/Argon-39

Radioactive potassium (^{40}K) decays to argon (^{40}Ar) at a relatively slow rate (half-life: 1.3 billion years), and therefore, the method is typically used to date human fossil contexts older than 100,000 years. This method is restricted to minerals that contain ample amounts of K (e.g., feldspar, sanidine) with negligible ^{40}Ar at the time of formation. Minerals are dated by measuring how much daughter product (^{40}Ar) has been produced by the decay of parent material (^{40}K). A slight variation on the method ($^{40}\text{Ar}/^{39}\text{Ar}$) uses a smaller amount of material and can measure single crystals. Anthropologists employ $^{40}\text{K}/^{40}\text{Ar}$ and $^{40}\text{Ar}/^{39}\text{Ar}$ to date rock and sediment layers associated with fossil materials rather than the fossils directly.

Uranium Series

Various daughter products of ^{235}U and ^{238}U with different decay constants are used to date materials (e.g., coral, enamel, mineral) spanning a few years to 350,000 years old. Uranium decay in equilibrium produces an amount of daughter product equal to that decayed from parent material. If the system is disturbed, the balance between parent and daughter material is offset, and thus, the time since disturbance can be calculated. The method requires that either (1) the measured material formed without prior parent product, or (2) the equilibrium of parent to daughter has been disturbed. With regard to the latter, the initial amount of parent and daughter must be known.

Luminescence

Luminescence refers to light emission by a mineral (e.g., quartz, feldspar) when heated (TL: thermoluminescence) or exposed to light (OSL: optically stimulated luminescence). The dating method requires that a material (e.g., bone, tooth, artifact) has been buried and thus not exposed to light and heat since that individual was alive or since the artifact was used. Burial exposes the material to radioactive elements contained within the sediments, which contributes free electrons to the material's crystal lattice. The amount of light emitted from the material represents burial duration. The method requires known or no residual luminescence from the time before burial and no disturbance since burial.

Stable Isotope Geochemistry

Using stable isotope geochemistry in anthropology rests on the principle that a human's skeleton and preserved soft

tissues represent aspects of the individual's life. In addition, geological materials preserved at an archaeological or human paleontological site (e.g., shell, soil carbonates, animal bone, and teeth) can be used to reconstruct portions of that past human environment.

Stable isotopes do not decay or decay so slowly that the process is undetectable in contrast to radiometric isotopes. Lighter isotopes of a single chemical element, or those with the lowest atomic masses, have higher kinetic energy and are readily incorporated into chemical reactions. The heavier isotopes of the same element, or those with the highest atomic masses, move more slowly and are less likely to be integrated into reactions. These elements behave predictably in nature, and thus, comparing ratios of heavy to light isotopes in different materials can be used to reconstruct environmental conditions. Stable isotopes are analyzed by mass spectrometry. Mass spectrometers have three primary components: ion source, magnet, and ion detector. Once the preparation systems convert the solids to gases, the gases are introduced into the ion source, which removes an electron and creates a positively charged ion. The ions are accelerated and directed along a flight tube toward the magnet. The magnetic field causes the ions to bend to varying degrees based on atomic mass. Detectors at the end of the flight tube count the number of ions of each atomic mass and charge number. These results are compared with a standard and the ratio of heavy to light elements is given in delta notation calculated by the equation $\delta^{18}\text{O}(\text{‰}) = \left(\frac{^{18}\text{O}/^{16}\text{O}_{\text{sample}}}{^{18}\text{O}/^{16}\text{O}_{\text{standard}}} - 1 \right) \times 1,000$, using oxygen as an example and reported in parts per thousand (per mil, ‰). Generally, three stable isotopic systems are employed to answer questions about past human lifeways: oxygen, carbon, and nitrogen, and more recently, trace isotopes, such as strontium.

Oxygen Isotopes

Oxygen, in the form of water, can be ingested and precipitated into tissues such as bone, enamel, and dentin. Oxygen can also be precipitated from water to form invertebrate shell material or carbonate nodules in soils. Oxygen isotopes are all incorporated into the skeletal material of organisms or soil carbonates according to the isotopes' relative abundances in the water source. Due to a greater mass difference, the ratio $^{18}\text{O}/^{16}\text{O}$ is measured and reported as $\delta^{18}\text{O}$ values. The differences in $\delta^{18}\text{O}$ values of water sources result from differential evaporation rates of the two isotopes. The lighter isotope, ^{16}O , is preferentially evaporated from water into the atmosphere resulting in an enrichment of the heavier isotope, ^{18}O , in the water. Water temperature also changes $\delta^{18}\text{O}$ values, and therefore, paleotemperatures can be estimated based on known relationships in biological tissues or soil carbonates formed in equilibrium with water. Oxygen isotope analysis detects systematic variation when individuals obtain water from different sources.

Carbon Isotopes

Carbon occurs in organic and inorganic phases of plant and animal tissue, and as carbonate in soils. In plants, carbon isotopes reflect one of three photosynthetic pathways: C_3 , C_4 , and crassulacean acid metabolism (CAM). C_3 plants use the Calvin-Benson (3-carbon) cycle and consist of trees, shrubs, and moist climate-adapted grasses. C_4 plants use the Hatch-Slack (4-carbon) cycle and include hot and dry climate-adapted grasses and marine vegetation. CAM plants switch from the 3- to 4-carbon cycle due to diurnal requirements and comprise the succulents. C_3 plants prefer the lighter isotope (^{12}C) and therefore have lower $^{13}C/^{12}C$ ratios or $\delta^{13}C$ values. C_4 plants do not discriminate between the two stable isotopes as strictly as C_3 plants, and as a result, have higher $\delta^{13}C$ values. CAM plants in effect display the full range of $\delta^{13}C$ variability. In an individual, carbon isotopic ratios represent the photosynthetic pathway of ingested plant material with additional fractionation, or change in isotopic ratio, by means of metabolic activity as the organism digests the plant material. For instance, an organism that consumes corn or other C_4 plants (e.g., sorghum, sugar cane, and tropical grasses) will have high $\delta^{13}C$ values, whereas one that eats C_3 plants (e.g., legumes, rice, wheat, trees and shrubs) will have low $\delta^{13}C$ values. Carbon isotopic analysis can also distinguish marine and terrestrial floral and faunal dietary sources. Marine sources yield similar ranges of $\delta^{13}C$ values to those of C_4 plants. It is important to note, however, that $\delta^{13}C$ values do not differentiate between an animal consuming plant material directly and a carnivore eating an herbivore that has consumed plant material. For this reason, carbon is a useful tool for reconstructing the ingestion of plant foods but lacks resolution in interpreting protein consumption.

Nitrogen Isotopes

Nitrogen is common in organic systems and provides trophic level information, and by extension, protein consumption. The lighter isotope (^{14}N) is more easily incorporated into metabolic processes, such as ammonia excretion, resulting in enrichment of organism tissue in ^{15}N . At the base of the food pyramid, nitrogen-fixing flora, such as legumes, are typically lower in ^{15}N . These and other primary producers supply herbivores with low starting $\delta^{15}N$ values, resulting in isotopic distinctions between herbivores feeding on legumes versus nonnitrogen fixers. As individuals consume protein, they incorporate the food $\delta^{15}N$ values, resulting in a stepwise function up trophic levels. Additional trophic spaces in marine ecosystems give rise to higher $\delta^{15}N$ values relative to terrestrial and freshwater ecosystems.

Strontium Isotopes

Strontium is a trace element found in numerous lithological and biological systems. Strontium isotopes are

heavy elements and cannot be discriminated by physiological processes. As a result, plants and animals incorporate strontium isotopic ratios ($^{87}Sr/^{86}Sr$) from the bedrock on which they obtain food and water. All isotopes of strontium are stable and do not undergo radioactive decay; however, ^{87}Sr is derived from the radioactive decay of ^{87}Rb . Since the abundance of nonradiogenic ^{86}Sr in a mineral does not change with time, $^{87}Sr/^{86}Sr$ ratios are determined by rock type and age. Old metamorphic rocks contain high ^{87}Rb concentrations and therefore have high $^{87}Sr/^{86}Sr$ ratios. Young volcanic rocks, on the other hand, have little ^{87}Rb and low $^{87}Sr/^{86}Sr$ ratios. Marine limestones reflect the $^{87}Sr/^{86}Sr$ composition of seawater at the time of formation.

Since strontium isotopes are indicators of where an individual obtained food and water, the method can be used to infer mobility and sedentism. In terrestrial ecosystems, $^{87}Sr/^{86}Sr$ ratios reflect the geologic substrate, or bedrock, from the landscape where plants and animals obtain nutrients. Soils and vegetation incorporate $^{87}Sr/^{86}Sr$ ratios from underlying bedrock. Ground and surface waters dissolve and integrate strontium from surrounding substrates, often mixing strontium from various sources. Organisms feeding on vegetation and drinking local water sources record bedrock $^{87}Sr/^{86}Sr$ ratios in oppositionally forming tissues, such as dental enamel and bone. Mammalian teeth are formed at different times in an individual's life, and therefore, several snapshots can be measured isotopically by sampling throughout the dental arcade and, more recently refined, by subsampling growth intervals of individual teeth. Place of origin and movement across bedrocks is then inferred by variable $^{87}Sr/^{86}Sr$ ratios sampled from teeth with different eruption times.

Geological Applications to Anthropological Questions

The geological methods presented above among many others have been used independently or in conjunction to answer critical anthropological questions and have expanded knowledge of the human lineage. As a result, many anthropologists have become experts in the various geological specialties and apply geological tools to modern and fossil human contexts with regularity.

Site Formation and Fossilization Processes

Human archaeological sites, whether they are composed of artifacts, ecofacts, structures, features, or skeletal material, typically involve or are preserved in the rock record. As Waters (1992) articulates, sediments and soils are the *matrix* of the archaeological site. Anthropologists apply principles of sedimentology and stratigraphy to unravel how humans used these sites in the past and how the sites in whole or in part changed through time until discovery. In the context of the site,

sedimentological information and facies associations are intertwined with human activities.

South African Cave Site Formation

From Raymond Dart's first discovery of *Australopithecus africanus* and recognition of its ancestry to humans, anthropologists made inferences of ancient lifeways, hunting capabilities, and history of violence. "Man the Hunter" was the prevailing view garnered from ethnographic studies of modern hunter-gatherer populations, which were constructed as a primitive society and a window into past human behavior. Cultural anthropologists have long since deconstructed these linear models of cultural evolution; however, geological applications by paleoanthropologists also aided in shifting paradigms. *Australopithecus* and other mammalian fossils excavated from cave deposits in South Africa were thought to be the result of interpersonal violence and hunting activities. C. K. Brain conducted detailed analyses of these cave layers using sedimentological and stratigraphic methods. He deciphered the timing of layer accumulations and found connections to surface processes. Brain reinterpreted the cave as a natural sink of bone accumulation rather than a home base used by early hominins. Moreover, based on his observations on modern leopard behavior (i.e., actualistic studies), he found that early humans were not violent hunters at all but just another mammal on the landscape hunted by saber-toothed cats.

Time Averaging of the Human Fossil Record

Similar to archaeological sites, the human fossil record forms by an interaction between geological and biological processes during formation and after deposition. Fossil accumulations represent a mixture of several time scales that culminate to produce a finite sedimentary unit. One fossil skeleton represents one individual with a particular life span, whereas a sedimentary layer full of many fossil skeletons may represent one coeval population, several generations, or more than one species. Paleoanthropologists separate these timescales with sedimentological and stratigraphic methods and actualistic studies of fossilization processes. Kay Behrensmeyer has verified *time averaging* within the human fossil record with modern studies in savanna environments in Amboseli National Park, Kenya. On her "bone-walks" she records the manner in which animal carcasses enter the fossil record and how fossilization processes vary significantly with respect to sedimentary matrices and geomorphological features.

Tempo of Human Evolution

Principles of stratigraphy and various dating methods provide the critical temporal framework for the origins and extinctions of modern humans and ancestral human

species. Early discoveries of primitive and derived human forms in stratigraphic sequence painted a broad-brushed picture of linear and gradual evolution. Over the past two decades, paleoanthropologists have demonstrated a more complicated and branching pattern of human evolution. Below are three examples of how geochronological data informed anthropological interpretation and overturned established paradigms.

Evolution of Early *Homo*

The rise of the human genus *Homo*, represented by fossil material discovered principally by the Leakey family in the Turkana Basin in Kenya and Olduvai Gorge in Tanzania, was long reconstructed as gradual and linear. *Homo habilis*, or handy man, dated to 2.5 million years ago (mya), was placed at the beginning of the human family tree. *H. habilis* possessed a slightly larger brain size compared with members of *Australopithecus*, and moreover, was associated with rudimentary stone tools. *Homo rudolfensis*, discovered on the shores of Lake Turkana (formerly Lake Rudolf), was dated to 1.9 mya and possessed a larger brain than *H. habilis*. In the same location, *Homo erectus* was discovered and dated to 1.8 mya. Corresponding with the model of linear evolution, *H. erectus* indeed showed a larger brain and body size than *H. rudolfensis*. Additional fossil finds led to morphological comparisons that indicated a complex pattern of speciation; however, the linear model persisted until recent years in the scientific community largely due to the handful of dates. Tephrochronological work in the Turkana Basin by Frank Brown and Craig Feibel and $^{40}\text{K}/^{40}\text{Ar}$ measurements by Ian MacDougall in the 1980s and 1990s provided a detailed sedimentological and stratigraphic framework for all paleontological collecting areas. In 2007, Fred Spoor and colleagues reported a new specimen of *Homo erectus* that predated the last appearance of *H. habilis* and *H. rudolfensis* in the region. Based on the established geochronology, early members of genus *Homo* are now interpreted to have lived during overlapping time periods. As a result, these species do not represent an ancestral line of humans, but rather sympatric species competing for resources.

Dispersal of *Homo erectus* From Africa

Anthropologists conceived early dispersal of *Homo erectus* from Africa to Asia as a technological advancement to new resources occurring only after the first appearance of the Acheulean tool kit. Even without numeric dates, researchers claimed that *H. erectus* did not inhabit Asia prior to 1 mya. In 1994, Carl Swisher and colleagues dated volcanic material associated with early *H. erectus* specimens (Mojokerto) by $^{39}\text{Ar}/^{40}\text{Ar}$ and paleomagnetic methods on the island of Java. Previous estimations placed *H. erectus* on Java by 500,000 years

ago; the new date, 1.8 mya, was significantly older and led to a controversy within the anthropological community. Many claimed that *H. erectus* was incapable of dispersing with only the primitive Oldawan tool kit. Others claimed the provenience of the hominin fossils was questionable. The dates remained debated until 2000 when *H. erectus* specimens were discovered in the Republic of Georgia and were dated by many geologists, including Swisher, by $^{39}\text{Ar}/^{40}\text{Ar}$, paleomagnetic, and biostratigraphic methods to be 1.7 million years old. Although some anthropologists remain skeptical about the plausibility of early dispersal, geochronological data provide evidence for an alternative view.

Rise and Longevity of *Homo floresiensis*

The 2003 discovery of the small human specimen on the island of Flores stunned the anthropological community, and researchers are still debating about if the finds represent a new species, *Homo floresiensis*, or a pathological individual. Anthropologists relied on geological tools to determine the context, age, and, possibly more important to the debate of new species or pathology, the longevity of the small-bodied forms. The most complete specimen of the so-called Flores hobbit was initially dated to 13,000 years ago by radiocarbon and luminescence methods. This date was surprising because it meant that these dwarfed individuals were coeval with normal-sized humans inhabiting the region and must have had watercraft/raft technologies. Another mandibular (jawbone) specimen was discovered showing the same unusually small proportions, but it was radiocarbon dated to 18,000 years ago. Overall, several specimens have been recovered and span the interval from 38,000 to 12,000 years ago. The debate over the identity of these dwarfed individuals continues, but because of geochronological evidence, anthropologists must incorporate thousands of years within their explanatory models.

Human Diet and Mobility

Stable isotope-geochemical methods revolutionized studies of human diet and mobility. Prior to these analyses, information about diet and movement was inferred from time averaged and taphonomically altered plant and faunal remains, artifact assemblages, and materials. Geochemical analyses of skeletal material provided an independent test of other methods, but moreover, offered diet and movement information about the individual. Over the last three decades, stable isotope analysis has been rigorously developed and has now become a standard measure of human materials from numerous archaeological and paleontological sites. Here are three examples of geochemical approaches to anthropological questions of diet and mobility.

Introduction of Corn to the New World

Age calculations of North American archaeological sites using radiocarbon methods assumed a constant ^{12}C and ^{13}C abundance in plant tissue; however, due to different photosynthetic pathways, dates on corn yielded systematic errors. Researchers realized that plants with different photosynthetic pathways are distinguished by stable carbon isotopes as discussed in the carbon isotope section above. It wasn't long before anthropologists applied these geochemical findings to questions about the origins of corn cultivation and spread throughout the New World. John Vogel and Nicholas van der Merwe (1977) isotopically analyzed human skeletons from New York State and demonstrated that "you are what you eat." Dale Hutchinson, Lynette Norr, and colleagues have documented the mosaic pattern of corn domestication in southeastern North America integrating skeletal indicators of health, disease, and pathology. These early investigations paved the way for numerous isotopic studies into diet and the rise of agriculture.

Early Hominin Diets and Mobility

Workers from the Light Stable Isotope Laboratory at the University of Cape Town, South Africa, obtained carbon and oxygen isotopic data from several fossil hominin specimens that indicate aspects of early diet and mobility. Matt Sponheimer and Julia Lee-Thorp found that *Australopithecus africanus* and *A. robustus* were encroaching on the more open habitats and may have subsisted on a mixed diet of vegetal matter and animal protein. Lee-Thorp and colleagues interpreted the close isotopic results of carnivore and hominin species indicating hominins as prey, although she demonstrated that saber-toothed cats might not have been the culprits as C. K. Brain initially thought. However, Lee-Thorp cautions that carbon isotopes alone may be insufficient in answering questions about trophic space. Andrew Sillen and colleagues applied strontium isotopes to determine mobility of *A. robustus* across the karst landscape of South Africa. Sillen and later Sponheimer found significant differences between male and female specimens, and those specimens suggest that robust australopithecines (paranthropines) may have had male dispersal patterns similar to that of modern gorillas.

Neanderthal Hunting and Mobility

Groups led by Herve Bocherens and Michael Richards have applied nitrogen, carbon, and strontium isotopic methods to well-preserved Neanderthal specimens from Europe. Although to date few individuals have been analyzed, these studies suggest that Neanderthals consumed high levels of herbivorous prey and may have traveled long distances to obtain dietary resources. Moreover, these dietary interpretations challenge the previous notion that Neanderthals were inefficient foragers and hunters.

Reconstructing Human Environments

Geological methods provide tools for reconstructing the environmental contexts of modern and extinct humans. As discussed above, excavation of archaeological sites involves geological expertise to infer site formation processes; however, geological tools can also be used to infer aspects of the surrounding local, regional, and global contexts with respect to climate, resource distribution, and geomorphology present during the humans' tenure. Two examples are presented that demonstrate how geological data were used to show the influence of the environment on human cultural and morphological change.

Drought and the Collapse of the Maya Civilization

In 1995, David Hodell, Jason Curtis, and Mark Brenner conducted oxygen isotopic analyses and mineralogical studies of lake cores from Central America and Haiti and reconstructed paleoclimate and paleoenvironmental conditions in these regions for the Holocene. The lake sediment records illustrated the gradual shift from cold and dry conditions from the start of the Holocene—coinciding with the last glacial period—to warm and wet conditions reaching a maximum between 7,000 and 4,000 years ago. They also detected a relatively small-scale dry phenomenon from roughly 2,000 to 3,000 years ago previously undetected by deep-sea core operations. At the height of the dry period, Hodell et al. reported a 200-year drought in the Yucatan Peninsula. Radiocarbon analysis of pollen showed that the drought temporally coincided with the collapse of the Maya civilization. Since that time, other researchers have found similar patterns of environmental change and drought. Although archaeologists disagree as to the ultimate cause(s) of societal collapse, the reconstructed context suggests that severe environmental conditions may have been a significant factor.

Grassland Spread and Early Human Evolution

Since Darwin first suggested grasslands played a key role in shaping human evolution, researchers have been drawing temporal associations between environmental change and the rise and extinction of hominins. Darwin explained increased range with living and evolving in open habitats. Paleoanthropologists proposed that hominins were arid-adapted species and took their beginnings in a savanna environment. Several researchers have linked climate to grassland spread to frame hominin adaptations including the rise of bipedality, dietary change, and technological advancements. Although the proposed hypotheses of adaptations involve complex interactions of the environment with behavioral and morphological underpinnings, they all rely on the presence of grasslands.

Evidence for grassland spread was largely determined by carbon and oxygen isotopic geochemistry by Thure Cerling and colleagues. Cerling and others documented a global shift in photosynthetic pathway from C_3 , used by many low- to midlatitude plants including grasses, to C_4 , used mostly by tropical grasses, beginning in the Miocene. Cerling and others isotopically analyzed suites of mammalian enamel and ancient soil carbonates from fossil-bearing sediments, and they reconstructed grassland versus woodland distribution in hominin environs. Evidence to date from many fossil hominin locales illustrates that grassland spread occurred in a mosaic pattern that is both temporally correlated and out of sync with hominin speciation and extinction events. Local and regional tectonic regimes, paleogeography, and paleohydrology, among other factors, rather than climate alone influenced the timing of grassland distribution.

Future Directions

The future likely holds a closer relationship between geology and anthropology, although possibly one where anthropology can be useful to geological pursuits rather than one that is strictly characterized by an anthropologist's use of geological tools. Two new directions are briefly mentioned here: The first illustrates a recent application of geological methods by forensic anthropologists, which has become a new and widespread undergraduate major in the United States. The second direction is how anthropological knowledge and tools may serve geological interests.

Forensic Geology

Geological tools have recently been applied to forensic anthropology and crime scene investigations. When human remains are discovered in sedimentological contexts (e.g., earthen burials), sediments and sedimentary features can prove useful to determine manner and timing of deposition. Recently, stable isotopic methods have been applied to individuate unidentified human remains. Strontium isotopes, in particular, identify a person's place of origin based on geologic bedrock.

Impact of Climate Change on Humans

Departments of earth sciences have become increasingly invested in studying past global climate in order to predict how and when global climate change will affect humans in the future. Geologists are commonly asked to weigh in on political and social decisions about global warming. Anthropology has much to offer geology with respect to perspective, information, and methods in both living and past human groups that can be used to address how climate (and environmental) change will impact humans today.

Conclusion

Methods from the field of geology are critical to advancing understanding of human lifeways and evolution in the past and present. Geology's theory of uniformitarianism has shaped anthropology's use of actualistic studies and the development of archaeology's middle range theory. Sedimentology offers tools to infer site formation and fossilization processes. Stratigraphy and dating methods provide the temporal framework for the human lineage from the earliest members to yesterday's cultures. Over the past three decades, stable isotope geochemistry has been applied to anthropological questions of diet and subsistence, mobility and sedentism, and environmental influences on speciation and extinction.

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PALEONTOLOGY AND ANTHROPOLOGY

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To anyone with a rudimentary understanding of paleontology and anthropology, it may not be readily apparent that these disciplines can be in any way related to one another or useful in informing the other's primary interests. Anthropology, broadly speaking, is concerned with the study of human culture and behavior, with data provided directly by investigations of modern human populations, as well as historical and ethnographic texts and objects. Paleontology, however, is the investigation of the history of fossil flora and fauna and is, as such, allied closely with geological sciences.

Despite what may appear to be two entirely separate and unrelated forms of study, both are united in their multidisciplinary nature, rigorous comparative methodologies, and crucially, an emphasis on context. An object is more meaningful when one grasps the variety of cultural, historical, and geographical contexts of the object itself. Likewise, the context of a fossil discovery can tell us a great deal about how old it is and under what circumstances the organism lived, died, and was deposited. Aside from simply sharing a context-based interpretive framework, where the two disciplines meet, there is a unique branch of biological anthropology known as *paleoanthropology*. Like the straightforward combination of their individual names, this subdiscipline is a straightforward combination of the essence of both paleontology (fossil life-forms over time) and anthropology (human behavior and culture), resulting in the study of the evolution of the

biology, behavior, and culture of humans and our hominin ancestors in the past several million years.

We modern humans, *Homo sapiens*, are primates. We are the only living member of Hominini (the group to which all human ancestors belong), and the only living member of our genus *Homo*, but this was not always the case. Like many of the living, or *extant*, nonhuman primates (e.g., the great apes, Old World monkeys, New World monkeys, etc.), our hominin ancestors frequently lived during the same time periods and sometimes in the same geographical regions as closely related species. The majority of accumulated evidence suggests that our ancestors diverged from chimpanzees between 5 and 7 million years ago (henceforth referred to as mya, and thousands of years ago as kya). The story of how this hominin *clade* (a group of related species that has the same common ancestor) evolved, subdividing into a number of lineages on the human family tree during the past several million years but now represented solely by *H. sapiens*, is what paleoanthropology seeks to understand.

Fossil evidence constitutes a major aspect of our quest to make sense of our complex evolutionary history. Prior to the earliest evidence for stone tools—found in an area of Ethiopia known as Gona and dated from approximately 2.5 to 2.6 mya—our prehistoric ancestors leave us no evidence other than their fossilized remains (Semaw et al., 1997). After this time period, stone artifacts become critically important and comprise yet another major component

of paleoanthropological investigations. Archaeologists who examine the material culture of hominins rely in particular on their stone tools, in the discipline known as *lithics*, and on the remains of other mammals living at the same time. We can glean a great deal about hominin behavior from the differences in lithic industries across time and space, and the marks left by teeth and tools on fossilized bones of other mammals provide evidence of hominin dietary adaptations and the ways in which meat resources were acquired and processed. There are many more sources of evidence included in the paleoanthropological repertoire as well, such as investigations of living primate behavior and molecular studies.

This chapter will focus primarily on the mammalian fossil evidence for hominin evolution. The dental and skeletal features of hominins and nonhominin mammals can tell us a great deal about the evolutionary relationships of the different species as well as how they moved, what they ate, and the types of habitats to which they were best adapted. You will be presented first with background theory in paleontology and ecology focusing on the ways in which fossils can be analyzed and interpreted, and this will be followed by brief summaries of the hominin fossil species known from the major phases in hominin evolution. Emphasis will be placed on Late Miocene through Plio-Pleistocene hominins because at this stage in evolution the fossil evidence is critical as there are fewer archaeological traces compared with more recent stages of evolution where this type of evidence becomes equally important.

Fossils, Depositional Context, and Taphonomic History

Major paleoanthropological fossil finds are rare, and they are often celebrated scientific events. It is not unknown for the discovery of one fossil to radically alter the way in which we understand hominin relationships or the behavior of a particular species. Therefore, it is important to understand what a fossil is, how it is created, and what happens between the death of the organism and its subsequent discovery by field researchers.

A fossil can be simply defined as the remains or traces (such as animal tracks or the imprint of a fern) of a once living organism. In the case of skeletal elements and teeth, which are particularly interesting to paleoanthropologists, they are buried and mineralized in a long process during which minerals present in the sediments replace the hard tissue. It is extremely rare for the remains of soft tissues, such as muscles, skin or hair, to be preserved in the fossil record. For fossilization to occur, skeletal material must be buried quickly. When subjected to a lengthy period of exposure on the land surface, the material may become badly weathered or damaged. Thus, a quick process of deposition, which favors

fossilization, increases the likelihood that an element will survive in a more complete form that ultimately preserves more information for scientists analyzing the material.

Because of this, we can say that the fossil record is biased. If only particular conditions favor the fossilization of bone, then there must be many more bones that are not deposited in such conditions and will never make it into the fossil record. In fact, there are a number of factors that influence a bone's entry into the record; some of these are geological and others biological. Paleoanthropologists must therefore examine the possibility that any one or a combination of these factors influenced the history—and subsequent interpretation—of a particular fossil. The history of a fossil from its deposition to discovery is what is known as *taphonomy*.

As described above, the depositional contexts that favor the preservation of fossils are ones in which sediments accumulate quickly. Lakes, rivers, and seasonal floodplains provide excellent conditions for fossilization; mammals frequently gather at water sources, and if their remains are deposited there, they can be quickly buried by silts that accumulate rapidly as compared with the soils that accumulate on dry land surfaces. Lacustrine (i.e., lake) and riverine deposits are common in the fossil record, but while both are formed through the action of water, they are distinctive depositional contexts that can be identified by their unique signatures in the sedimentary record. There is a wide body of taphonomic literature pertaining to the effects of water movement on the transport and damage of bones in modern environments (e.g., Behrensmeier & Dechant Boaz, 1990), which can be useful analogues when we interpret the depositional context of fossil sites. Bones that have been moved by the flow of water are often abraded, and indeed, we can see this type of damage in a number of assemblages. The speed of the water is also a factor; rapidly moving water will transport bones differentially according to size, moving light bones and those with a large surface area a greater distance than denser elements. Low-energy water contexts, such as lakes, will result in different patterns of accumulation.

Volcanic sediments also preserve fossil remains. Ash is particularly good at preserving the tracks of mammals such as the deposits from 3.7 mya at Laetoli, Tanzania, where hominin footprints were discovered (Leakey & Hay, 1979), and both ash and lava rapidly bury living organisms, capturing a picture of the living community in a fairly short period of time in one geological stratum. In addition, volcanic deposits can not only be traced back to the source volcano but also often be dated with a high degree of precision. The issue of dating is a critical one in paleoanthropology because without sound dates associated with particular fossil finds, it is difficult to interpret the evolutionary relationships of the different species represented in the record. Finally, cave deposits also preserve fossil remains. Bones may accumulate through the activity of carnivores dragging in their prey, mammals simply

falling in and becoming trapped, or even water washing remains inside. The stratigraphy of cave deposits is often quite complicated, and the deposits themselves, often hard, cementlike *breccias*, can be difficult to excavate.

The depositional contexts described above have a significant impact on the fossil assemblage that is eventually uncovered. However, these geological factors are not the only taphonomic forces at work. We must also take into account certain ecological and biological conditions. Consider what the entire mammal community, or *living assemblage*, of an African bushland or European forest would look like. There would be many different species present, and they would represent different body sizes from the smallest of rodents to the largest quadrupedal mammals. They would live in all manner of physical spaces present in their habitat including underground, in the trees, on rocky outcrops, or simply on the land surface. They would also consume a variety of dietary resources from herbs, grasses, leaves, and fruit to insects and other animals.

The relationships of the different species with each other and to their ecological niches will also have an effect on what the *death assemblage*, or the bones of dead organisms in a natural environment, looks like. Carnivorous mammals, reptiles, and birds prey on other animals. As a general rule of thumb, smaller carnivores prey on smaller species, and the remains of their meals look quite different from the remains of the meals of larger carnivores. Small-prey remains might accumulate in dens or other sheltered places as well as being found in the fecal matter of their predators such as in hyena droppings or in regurgitated owl pellets. Larger carnivores, like bears or leopards, may also retreat into caves or trees before consuming their prey. Once the primary, large predator has had its fill of a carcass, other carnivores will often attempt to displace the original predators or wait until the original predators have left the carcass alone so that they may consume the remaining meaty portions of the skeleton. Some carnivores, like hyenas, are specifically adapted to crushing and breaking open bones where marrow may be accessed. Several carnivore species may contribute to the destruction of one carcass, and at some point in the past, hominins entered this process when they left their purely vegetarian-based diet behind them.

In addition to the effects of meat consumption by various predators, if the bones of a dead animal are not transported or buried rapidly, they are subjected to the general effects of exposure, insect activity, damage caused by growing vegetation, or trampling by other mammals. All factors considered, only a small fraction of the living community survives the process of deposition and fossilization, and an even smaller proportion survives without significant breakage or damage. Of course, fossils are only of any use to us when they have been naturally exposed and discovered or intentionally excavated by scientists capable of identifying and analyzing them. These remains, after a long journey from living animal to

deposited bone to fossil specimen, constitute the final *fossil assemblage*, the remit of paleontologists.

Fossil Mammals: A Useful Paleanthropological Tool

The fossil record of interest to paleoanthropologists is not limited to hominins, and in fact, many other families of mammals far outnumber hominin remains. Nonhominin remains are informative: They can tell us about the nature and overall composition of the once-living community, the relationship between hominins and contemporaneous species and the dominant habitat where the community lived, and where hominins were evolving.

There are many ways to examine and interpret the non-hominin mammalian community. In particular, mammals can provide clues as to the characteristics of the habitats where hominins were known to live. It can be as simple as noting the presence or absence of a particular species that is believed to indicate specific conditions. For instance, the presence of a hippopotamus species, such as the extinct *Hippopotamus aethiopicus*, would signify that a permanent water source was in the area in the past. However, these so-called *indicator species* are not always such reliable sources of information. We know that the fossil record can be biased, so in fact, the absence of a particular species in the fossil record does not necessarily mean that it was not present in the past. In addition, we cannot assume that the behavior that we observe in modern mammals is the same behavior that they or their ancestors exhibited in the past.

A much more useful analytical approach to mammalian fauna is an assessment of the *functional morphology* of the skeletal and dental remains, which is an investigation of the relationship between specific morphologies and the functions for which they are best adapted. This approach is neatly grounded in Darwinian evolutionary and ecological theory. Animals have evolved specific adaptations that allow them to efficiently exploit—and thus survive in—their natural habitats. Within any environment there are many niches that the animals can occupy. Living spaces can be under- or aboveground, in the trees, and so on, and this is known as the *spatial niche*. Long bones, such as a femur (upper leg) or humerus (upper arm), will tell us about the kind of environment that an animal was adapted for moving around in or what form of locomotion it used. The *trophic niche* refers to food resources that are exploited. Fossil dentition will tell us primarily about the diet of an individual because there are certain types of teeth that are best for consuming the meaty flesh of prey animals, crushing insects, shearing leaves, and so on.

Recall the earlier examples of an African bushland or European forest. Both habitats provide a diversity of niches. However, the types of niches will be dictated by the specific habitat. Arboreal animals that live in the tree canopy and

those that eat leaves and fruits are abundant in forested habitats where there are plenty of trees. Bushland will support a different array of animals, ones that rely less on trees and more on shrubs, bushes, and grass cover. So by analyzing how an entire fossil community occupied available ecological niches, we can develop a picture of what the overall habitat was like. This is known as an *ecological diversity analysis* (i.e., Andrews, Lord, & Nesbit Evans, 1979), in which each species that is identified at a fossil site is categorized according to its dietary and locomotor adaptations on the basis of its skeletal and dental functional morphologies. This technique has been successfully applied to a number of important sites where hominins were present (Andrews & Humphrey, 1999; Kovarovic, Andrews, & Aiello, 2002; Reed, 1997), and despite taphonomic biases in the fossil record that inevitably result in the differential loss of particular species, it is possible to identify sites that were heavily wooded, those that were more open, and those that possessed sources of water.

One way to address the taphonomic underrepresentation of certain species in a fossil community is to focus on just one family of mammals that might be less biased in the fossil record or where the bias is better understood. For instance, small species may be transported great distances and/or damaged before deposition and, in the past, were often passed over in favor of collection strategies that focused on large-bodied mammals, which not only are abundant in the fossil record but are now well represented in paleontological collections. Primates, suids (pigs and related species), and bovids (antelopes and related species) are all examples of diverse, larger-bodied families that have been subject to functional morphological analyses attempting to reconstruct past habitats. When we consider functional morphologies specifically in relation to the exploitation of particular habitat types, we refer to this as the study of mammalian *ecomorphology*.

A classic example of a well-known ecomorphology is the head of the femur of bovids (Kappelman, 1988). The femur articulates with the pelvis and comprises the hip joint, which is relevant to locomotion. In bovids inhabiting more forested habitats or habitats where a high level of maneuverability is required in order to negotiate obstacles, the head of the bovid femur is round. Bovid living in open habitats must be able to run far and fast to escape predators, and they possess a more cylindrical-shaped femoral head, the biomechanics of which relate to efficient running. Knowing this fact, we can look in the fossil record and analyze the bovid femora that we find at individual sites to determine if the bovid community was better adapted for running in open or closed habitats, thus providing a picture of what the dominant habitat was likely to have been. Analyses of fossil bovid femora have been successful at reconstructing the habitats at the important sites of Olduvai, Tanzania, and Koobi Fora, Kenya, where early hominins are known. Other skeletal elements are also useful in ecomorphological analyses including the metapodials

(Plummer & Bishop, 1994), astragalus (DeGusta & Vrba, 2003), and phalanges (DeGusta & Vrba, 2005); in addition, one can conduct an ecomorphological survey of the entire bovid skeleton rather than rely entirely on one element (Kovarovic & Andrews, 2007).

Fossil mammals are useful in other ways besides habitat reconstruction. In many circumstances, geological strata cannot be absolutely dated; therefore, relative dating techniques must be applied. One approach is to use fossil mammals in constructing a *biochronology* of a region, sometimes called *faunal correlation*. Where particular families of mammals are diverse and abundant and we know the dates of each species's first and last appearance in the fossil record, we can use them as a framework for understanding the time period over which the deposition of a site is likely to have occurred. This is often the first way in which sites are dated, and many families of mammals are considered, especially Suidae (pigs). For example, we know that the fossil species *Kolpochoerus limnetes* evolved at approximately 3 mya and persisted for one million years. *Nyanzachoerus jaegeri*, a species that is part of a different suid lineage, is present in the fossil record from approximately 4.8 to 3.6 mya. Therefore, where we find *K. limnetes* present in a fossil assemblage, we can infer that the site is younger than a site where we find *N. jaegeri*. If an assemblage has more than one pig present, this can help us pinpoint a more specific time period if we know when these species overlapped.

There are, of course, other ways in which mammalian fossils can be informative, including methods such as isotopic studies of tooth enamel that give us an idea of what sort of vegetation an individual was eating and therefore was present in its natural habitat (e.g., Sponheimer & Lee-Thorp, 2003). Skeletal remains also provide us with more direct evidence of human behavior by preserving on their surface the tooth marks left by carnivores and cut-marks left by lithic tools (e.g., Potts & Shipman, 1981). The placement of these two types of marks on the bones can tell us about the order in which the different carnivores—including hominins—were procuring meat-based resources, and that, in turn, tells us about hominin scavenging and hunting strategies and the context of the evolution of meat-eating. The paleoanthropological value of fossil mammals cannot be overestimated. One should also not forget that hominins, as mammals, may be approached using some of the techniques outlined above.

Distinguishing the Hominin Lineage: Early Fossil Evidence From Africa

Prior to the first hominin dispersals out of Africa around 2 mya, our evolutionary history is confined to this continent. The environmental and geological conditions in eastern and southern Africa favored the preservation of fossils, and this is where we find the majority of relevant sites; in

southern Africa, they are primarily cave sites, while in East Africa they are open-air sites, many of which are in the Rift Valley System. The first phase of hominin evolution began in the Late Miocene, a time period that ends approximately 5.2 mya, so to investigate our earliest evolutionary developments, we would look to Late Miocene sediments for evidence of the first species that diverged from the common ancestor with the chimpanzees. Unfortunately, evidence for the earliest stages of these lineages or the probable first hominins is rare. The lack of a good fossil record at this time is compounded by the fact that regardless of the number of fossils available, it is difficult to identify individual species in the past. Zoologists have extra information when they work with populations of modern organisms: Things that do not fossilize, such as fur color, behavior, vocalizations, and DNA, can all be used to distinguish between taxa. Paleoanthropologists have only fossil hominin remains for identifying the different species and determining their evolutionary, or *phylogenetic*, relatedness. They do this through an assessment of shared morphological features, or characters, and the amount of variation displayed within each character that is considered acceptable within a single species.

Features that are understood to define the hominin lineage include bipedal locomotion, smaller canine teeth, and increased brain size, among many others. While these features may be obvious at later stages of evolution, it is not known how they would be represented by the first hominins. There are three recently announced species that are generally considered viable candidates for the earliest hominin. The oldest is *Sahelanthropus tchadensis*, which includes a well-preserved skull, fragments of mandible, and teeth, discovered in Chad (Brunet et al., 2002, 2005). Associated mammalian fossils infer that the region was moist with permanent water sources and heavily wooded, and recent research dates the finds from 6.8 to 7.2 mya (Lebatard et al., 2008). In addition to the early age and habitat, its location in north-central Africa, where hominins are infrequently discovered, makes it a unique species. But is it hominin? It possesses a mix of anatomical features that are considered *primitive* (i.e., apelike) and *derived* (unique evolved characters). Its brain size was small like those of apes, and some aspects of the teeth are also considered primitive; however, the canines are reduced in size, and perhaps more importantly, there is evidence that the species could have been bipedal. Its *foramen magnum*, the hole at the base of the skull through which the spinal column enters, is located directly beneath the skull in a more forward position. This positioning indicates that the head of the individual was placed directly on the top of the body inferring an upright, or bipedal, posture. This is in contrast to apes where the foramen magnum is located toward the back of the skull. The discoverers of *S. tchadensis* and many other researchers propose that this species is an early hominin situated close to the chimp-hominin split.

The next oldest Late Miocene species, *Orrorin tugenensis*, is known from only a handful of postcranial and a few

dental remains discovered in the Tugen Hills in Kenya. The deposits have been absolutely dated to between 6.2 and 5.6 mya, corroborated by mammalian biochronology (Senut & Pickford, 2001). The material is fragmentary, and there is much controversy over its interpretation. The scientists who uncovered the specimens claim that they clearly represent a bipedal hominin (Galik et al., 2004; Senut et al., 2001) but one that is more directly related to the *Homo* lineage as opposed to other species within the genus *Australopithecus* (who you will read about later) that are present in the Pliocene (5.2–1.8 mya). Many critics agree with the overall conclusion regarding its bipedality but disagree with the particular functional morphologies on which they focused their analysis and from which they drew their conclusions regarding its evolutionary relationship to other hominins. A recent and comprehensive analysis shows a reinterpretation of the morphology of the *Orrorin* femora and a conclusion that the species was certainly bipedal but did in fact resemble later Pliocene species and not *Homo* (Richmond & Jungers, 2008).

Straddling the Miocene-Pliocene boundary is the genus *Ardipithecus*. It is considered by many to contain two species separated by approximately 700,000 years. Both are found in the Afar region of Ethiopia, *Ardipithecus kadabba* from 5.7 to 5.2 mya and *Ardipithecus ramidus* from 4.5 to possibly 4 mya. *A. ramidus* was discovered first and *A. kadabba* after that, but it was initially described as a subspecies of *A. ramidus* (Haile-Selassie, 2001; Haile-Selassie, Suwa, & White, 2004; White, Suwa, & Asfaw, 1995; WoldeGabriel et al., 1994). Its discoverers eventually decided that the variation observed in the combined material as well as the time between the two major collections warranted separate species distinctions. *A. kadabba* appears more primitive, with larger, more apelike canines, but both species are, like *Sahelanthropus* and *Orrorin*, a mixture of apelike and hominin-like morphologies. The strongest evidence for the hominin status of *A. ramidus* is the position of its foramen magnum, which is forward placed on the base of the skull. Isotope analyses of fossil nonhominin teeth and the ecological diversity of the mammalian fauna indicate that both species inhabited a mosaic of woodland and open cover, grass-dominated habitats with ample water sources (Levin, Simpson, Quade, Cerling, & Frost, 2008; WoldeGabriel et al., 1994).

Established in Africa: Diversification of the Plio-Pleistocene Hominin Lineages

The number of fossils recovered from African sediments of the Pliocene (5.2–1.8 mya) and Pleistocene (1.8 mya–10,000 years ago) from approximately 4 mya onward can be considered a veritable explosion compared with the Late Miocene material. Some hominin species from this time period are better known than others, and naturally, there are many debates regarding their relationships to one another

and whether or not they have a direct evolutionary relationship to the *Homo* lineage. Although there are numerous species in the Plio-Pleistocene, they can be summarized as (a) *Australopithecus*, a diverse and long-lived genus comprising possibly five species; (b) *Paranthropus*, the so-called robust australopithecus species; and (c) early *Homo*.

The best-known and longest-lived australopithecus is *Australopithecus afarensis*, which is known from remains from East Africa including both the famous “Lucy” skeleton from Hadar, Ethiopia, and the fossilized tracks of footprints at Laetoli, Tanzania, that provide some of the best and earliest direct evidence for bipedal locomotion (Leakey & Hay, 1979). This species emerges at approximately 3.9 mya and is predated only by *Australopithecus anamensis* from the Lake Turkana region of Kenya (Leakey, Feibel, McDougall, & Walker, 1995). The functional morphologies of the *A. anamensis* leg and arm bones and the reduced canine size indicate that it is clearly a hominin and is probably the direct ancestor of *A. afarensis*, which shares a number of anatomical features with it but many derived ones as well, including further reduced canines. *A. afarensis* is an interesting species not just for its longevity but also for its extensive geographic range across East Africa and its variability, especially in body size. This diversity led some paleoanthropologists to suggest that it should be split into two separate species (e.g., Häusler & Schmid, 1995). Although the discussion periodically resurfaces in the scientific literature, most scientists believe it is a single species displaying a large but acceptable amount of morphological variability and *sexual dimorphism*, or variation in size between males and females (e.g., Gordon, Green, & Richmond, 2008).

There are potentially two other East African australopithecus recognized, but less is known of them. *Australopithecus bahrelghazali* was named a separate species on the basis of mandibular material discovered in sediments, which were dated by mammalian faunal correlation to between 3.5 and 3 mya (Brunet et al., 1996). However, referring to this taxon as East African is misleading; the remains are known from Bahrel-Ghazal in Chad. Although its location is exciting because it extends the known hominin geographical range further west at this time period, some people argue that the specimen is not unique enough to warrant its own species designation and it simply represents a geographical variant of the East African *A. afarensis* (e.g., Kimbel, Rak, Johanson, Holloway, & Yuan, 2004). *Australopithecus garhi* from Ethiopia is one of the youngest australopithecus, from approximately 2.5 mya (Asfaw et al., 1999). Cutmarked bovid bones discovered at the same site provide the earliest evidence for hominins making and using stone tools, presumably for the procurement of meat (de Heinzelin et al., 1999).

The final australopithecus species to be considered is not from East Africa but a long-lived species known from South African cave sites, *Australopithecus africanus*. The latest date for this species is 2.4 mya, and there is the possibility that it extends as far back as 4 mya, but as we

mentioned earlier, cave sites are difficult to date and material of this age is scarce (Partridge, Granger, Caffee, & Clarke, 2003). Mammalian biochronologies are constructed based on what is known of East African material where better dates can be secured, and the majority of *A. africanus* sediments fall between 3 and 2.4 mya based on this methodology. Overlapping in time with some of these species is also a different genus of hominin, *Kenyanthropus platyops*, known only from Kenya between 3.5 and 3.2 mya (Leakey et al., 2001). It has an extremely flat face and other derived characteristics that distinguish it from the australopithecus and potentially link it to *Homo*.

Appearing later in time than *Australopithecus* and *Kenyanthropus* but overlapping with some of those species at the end of their evolutionary lifespan are three species commonly referred to as the “robust” australopithecus. They have evolved a very distinct suite of craniodental characteristics, in particular, wide flat faces and molars with large, broad chewing surfaces. On these grounds, most researchers place them in an entirely different genus, *Paranthropus*. Functional morphological interpretations were traditionally seen as indicating a tough vegetarian diet that required the teeth and surrounding facial architecture to withstand significant force from grinding (see Wood & Straight, 2004, for review). However, isotopic studies indicate that they may have also consumed a certain amount of animal matter, and a microwear analysis of several tooth surfaces suggest that the diet might not have been as tough as previously assumed (Sillen & Lee-Thorp, 1993; Ungar, Grine, & Teaford, 2008). The only South African species known is *Paranthropus robustus*, which was found in a number of cave sites dating from between 2 and 1.5 mya. In East Africa, *Paranthropus boisei* persists for a million years between 2.3 and 1.3 mya and is predated only by *Paranthropus aethiopicus*, which is known from a limited number of sites in Tanzania, Kenya, and Ethiopia and is dated from between 2.5 and 2.3 mya. A partial mandible lacking teeth and a tibia from Laetoli, Tanzania, are likely to represent *P. aethiopicus*, pushing their geographical range further south and their date range back slightly further to 2.6 mya (Harrison, 2002). It is not clear how these species are related to each other, but the general consensus is that they were not direct ancestors of *Homo*.

There are possibly four species of early *Homo* in Plio-Pleistocene Africa: *Homo habilis*, *Homo rudolfensis*, *Homo ergaster*, and *Homo erectus*. Species in the *Homo* genus are placed there on the basis of a number of unique features including an increase in brain size and smaller teeth and jaws. The oldest species, *H. habilis* (2.4–1.6 mya), is usually separated from another, *H. rudolfensis*, which possessed a larger brain and dentition, as well as a wider face (Alexeev, 1986). A recent review of the morphological evidence of African *Homo* infers that these two taxa share more features in common with earlier australopithecus than with later *Homo*, prompting a revised taxonomy that places them in the genus *Australopithecus*, which is followed by

some researchers (Wood & Collard, 1999). This system proposes only two species of *Homo* in Africa, *Homo ergaster* and *Homo erectus* emerging at 1.9 mya. Others argue that all of these later African fossils can be lumped under *H. ergaster* and believe that *H. erectus* is a distinct taxon found only in Asia. This later *Homo* material is interpreted as more “modern,” particularly in the further reduction of the dentition and jaw and longer lower limbs adapted for more efficient bipedalism than earlier hominins. *H. ergaster* skulls show only a slight increase in brain size from *H. rudolfensis*, but *H. erectus* brains are most certainly larger.

Plio-Pleistocene hominins inhabited a variety of habitats; at nearly every site there is evidence for grass-dominated areas as well as more wooded areas. This is in contrast to early work in the field that interpreted most sites as representing quite open, arid habitats, suggesting further that bipedalism evolved in response to this type of ecological setting. However, ecomorphological interpretations of certain aspects of the earlier hominin forelimb anatomy, for instance, the long curved finger bones of *Australopithecus*, indicate that they retained the ability to locomote arboreally, which would certainly be advantageous in a habitat providing adequate tree cover where both shelter and food can be sought. Newer interpretations of African paleoenvironments indicate that most sites did in fact possess a significant woodland component and open settings did not arise until approximately 2 mya when we also see more modern forms of bipedalism evolve with *Homo ergaster/erectus* (e.g., Reed, 1997; Spencer, 1997). Despite the diversity of habitats exploited, some distinctions can be drawn regarding hominin habitat preferences. Ecological diversity and ecomorphological analyses indicate that *Australopithecus* is generally associated with habitats that have a considerable amount of woodland present while *Paranthropus* occupied similar areas but also ones with a higher proportion of more open woodland and bushland where wetlands were often, but not always, present (e.g., Kovarovic & Andrews, 2007; Reed, 1997).

In addition to these varying habitat preferences, hominins also evolved different diets, which are indicated by their craniodental adaptations. Perhaps the most significant dietary adaptation to emerge during the Plio-Pleistocene was the evolution of meat eating. The development of the first stone tool industry, the Oldowan, around 2.5 mya, and the first evidence of cutmarked mammal bones in Gona, Ethiopia (Dominguez-Rodrigo, Pickering, Semaw, & Rogers, 2005), infers that a shift to a greater amount of meat consumption evolved around this time (note though that earlier evidence of meat eating may not be visible in the fossil record; in other words, hominins may first have consumed or scavenged meat without the use of stone tools). We mentioned above the isotopic evidence for *Paranthropus robustus* meat consumption, and there is even evidence that this species may have used mammal long bones to forage for

termites (Backwell & D’Errico, 2001). A large body of archaeological and paleoanthropological literature pertains to the first stone tool industry and to using mammal fossils to determine how hominins obtained and processed meat, but this will not be reviewed herein (for informative reviews see Blumenshine & Pobiner, 2006; Plummer & Bishop, 1994). Still, it is important to note again at this point the relevance of fossil mammalian remains in our paleoanthropological investigations.

Moving Abroad: Fossil Evidence of *Homo* in Asia

Determining if the taxonomic distinction between *H. ergaster* and *H. erectus* is indeed correct will be aided in the future by analyses of *Homo ergaster* such as from material from a site called Dmanisi in the Republic of Georgia (Gabunia et al., 2000; Gabunia & Vekua, 1995). The biochronology of mammals found at the site indicates an age of approximately 1.7 to 1.8 mya. This material may provide clues as to which species migrated from Africa and if *H. erectus* evolved in or en route to Asia. Regardless, the material confirms that *Homo* had ventured far from its African home some time toward the end of the Pliocene, expanding into less tropical climates and new environs.

The antiquity of *Homo* in Asia is confirmed by sites in mainland Asia and Indonesia where classic *H. erectus* material is well documented. Many of these sites cannot be absolutely dated, and biochronological dates are offered for most. Some of the oldest dates previously accepted in Asia were from Javanese sites that indicated an approximate age of 1 mya. However, radiometric dates were determined for two critical sites in Java where absolute dating is possible, and they indicate that the *H. erectus* occupation of Asia was well established in the islands by 1.6 to 1.8 mya (Swisher et al., 1994). However, there is some doubt as to the exact location where some of the relevant hominin fossils were found at these sites and if the dates derived from these analyses are indeed from the correct strata. The time frame for *Homo*’s extraordinary migration is not yet clear, but it appears to have started with a rapid exit from Africa shortly after the evolution of *H. ergaster* since the earliest evidence for this species emerges in the fossil record at roughly the same time that *Homo* remains emerge in Asia. Some paleoanthropologists also suggest a scenario in which there were migrations back to Africa and others out again, with some of the African material representing *H. ergaster* and other material representing *H. erectus*.

Classic *Homo erectus* features are not displayed by every known specimen, and there is substantial variation in the Asian sample, as well as between *H. erectus* and *H. ergaster*. However, some of the basic features that define the species include a thick browridge above the eye sockets, thick skull bones, and an angular shape to the top and back of the skull. In addition, more humanlike limb proportions

(i.e., shorter arms in relation to earlier species) are evident in both *H. ergaster* and *H. erectus*; it is particularly obvious in the Nariokotome Boy, a 12-year-old male skeleton found in Kenya (Brown, Harris, Leakey, & Walker, 1985).

Until recently, researchers believed that *H. erectus* persisted in Asia until approximately 30 kya. It was therefore an exciting moment when a team of researchers announced the discovery of the remains of a small hominin, *Homo floresiensis*, at the site of Liang Bua on the Indonesian island of Flores (Brown et al., 2004). The youngest sediments in which the remains were found are only 17,000 years old. This means that hominins existed as an island population long after *H. erectus* had disappeared from the mainland. Analyses of its small skull and other elements, including the wrist bones, indicate that these remains represent an entirely different species of Pleistocene hominin (Tocheri et al., 2007). It retains some primitive traits in relation to modern *Homo sapiens*; this is relevant because some arguments arose claiming that the specimens were modern humans suffering from disease. Although *H. floresiensis*'s exact evolutionary relationships are not agreed on, its unique characteristics clearly distinguish it from other hominin material.

It is likely that *Homo ergaster/erectus* consistently consumed meat (although we still do not understand if they were hunting or scavenging), and the lines of evidence for this are various and come from both African and Asian sites and specimens. A reduction in the size of the molars, which are so helpful in grinding tough-plant foods, indicates a greater reliance on the canines and incisors, which would be good for tearing and biting. The force required for this might have been supported by the more robust nature of the skull. In addition, the Acheulean industry in Africa from 1.6 mya onward, which is characterized by teardrop-shaped hand axes, represents a more advanced form of stone tool. They have been demonstrated to be excellent butchery tools, and in fact, many sites have associated tools and mammalian remains bearing cutmarks (e.g., Schick & Toth, 1993). All lines of evidence in Asia indicate that the climate was colder and more temperate than in Africa, which would affect the seasonal availability of vegetation, inferring that there were times of the year when meat was the most plentiful and likely to be an exploited resource. Finally, there is some evidence for the controlled use of fire in both East and South Africa, as well as in Asia (Bellomo, 1994; Brain & Sillen, 1988). Fire would be useful for processing meat, as well as generally allowing for the colonization of colder climates. It is clear that at this point in evolutionary history *Homo* had developed the technology and know-how to exert a certain amount of control over its environment. Despite this, hominins were still mammals in a diverse landscape of many other well-adapted species. Fossils bearing tooth marks, for instance, the remains of deer at the Zhoukoudian cave site in China where both hyenas and their prey species are found,

remind us that they were not the only carnivore species in the community (Boaz, Ciochon, Qinqi, & Jinyi, 2000).

Recent *Homo* Evolution

The main players on the stage of recent *Homo* evolution used to be restricted to *Homo neanderthalensis* and *Homo sapiens*. However, it is now generally understood that a number of fossils in both Africa and Europe, which were once lumped under the general heading "archaic *Homo sapiens*," can be designated a separate species that is evident by approximately 700 kya, *Homo heidelbergensis*. Other species have been suggested as well, generally with regard to particular geographical populations, but these are contested and not well-known with the exception of *Homo antecessor*. This taxon relates specifically to material from Atapuerca, Spain, where cave sites have preserved large numbers of fossils, with more than 20 hominin individuals attributed to one site alone (e.g., Bermudez de Castro et al., 1997). Researchers there believe that the material may be ancestral to Neanderthals on the basis of shared characteristics, such as a large brain size and the shape of the middle part of the face. The validity of this species will be more generally accepted if fossils that can be definitively assigned to it are discovered outside of Atapuerca, and until then, some prefer to assign these specimens to *H. heidelbergensis* (e.g., Rightmire, 1996).

We may eventually discover that *H. heidelbergensis* merits more than one species distinction as there is considerable variation displayed by the specimens. Generally, they are united by derived features, such as a larger brain size, round cranium, and reduced dentition, that distinguish the species it from *H. ergaster* and *H. erectus*, with which it overlapped in time. This species is widespread across Europe and Africa (where the earliest material is known), with some suggestions that it ranged as far as China by 200 kya (see Stringer, 1993, for a summary of Pleistocene sites and dates). One of the major questions is how *H. heidelbergensis* is related to later Neanderthals and modern humans. It possesses features that seem to indicate a relationship with Neanderthals and is present in Europe before them. This is significant because Neanderthals are only found in Europe, an area of the Middle East known as the Levant, and Central Asia, although we do not know in which region the Neanderthals evolved. *H. heidelbergensis* also overlaps chronologically with the earlier Neanderthal material, so it is possible that Neanderthals evolved from a population of *H. heidelbergensis*, which also persisted as a species. Others believe that *H. heidelbergensis* led only to modern *Homo sapiens* and *H. neanderthalensis* evolved from *H. erectus*. More alternative views exist, often hinging on interpretations of specific fossils, and there is no common viewpoint regarding the relationships of later Pleistocene hominins. It is difficult to interpret the extensive

fossil record of these species. This stage in evolution, in contrast to Miocene and Pliocene evolution, presents us with a much greater amount of fossil material, but regional morphological variations and complicated movements across three continents, coupled with the problematic nature of dating different types of sites, make it difficult to construct a clear framework for evolutionary relatedness.

One of the best-known hominins is, of course, *Homo neanderthalensis*. The wealth of fossil material and great number of sites, in addition to the fact that it was the first hominin material to ever be discovered and identified as different from *Homo sapiens*, means that it looms large in both the popular consciousness and the scientific literature. It has become increasingly clear that they were a distinct and unique species, and advances in genetics will help us understand when they might have diverged from a common ancestor with modern humans. In addition, DNA analysis will also throw more light on the debate regarding the possibility that Neanderthals contributed to the modern human gene pool. Morphologically speaking, they were robust and large brained with many unique features in the skull and dentition including a distinctive projection in the middle of the face, large nasal aperture, and large incisor teeth. Many of their features have been interpreted as representing adaptations to a cold and seasonal climate, which is exactly what reconstructions of their environmental conditions indicate they had to contend with during their evolutionary lifespan. Fossils of large mammals typical of cold Pleistocene habitats are present at their sites, often in association with stone tools and bearing telltale cutmarks of hunting and butchery.

Neanderthals survive until approximately 30 kya, after which point, other than the relict *H. floresiensis* population in Indonesia, *Homo sapiens* is the only remaining hominin (the complicated debate about why Neanderthals did not survive is beyond the scope of this chapter, but see Hall, 2008, for an easy-to-read review). It is likely that *H. sapiens* evolved in Africa, as the oldest material of what is sometimes referred to as “anatomically modern humans” is known from this continent. Cranial remains from Ethiopia and South Africa in particular have been pivotal in discussions about the location, timing, and context of the evolution of *H. sapiens*. The South African material from a site known as Klasies River Mouth was ascribed a date much earlier than people once believed modern humans had evolved from, 120 kya (Deacon & Geleijnse, 1988). Biochronological dating of a modern-looking specimen referred to as the Omo I skull, from Ethiopia, also indicated an age of 120 kya; however, recent radiometric dates for this and another slightly more primitive but still modern skull from the site have proposed an even earlier age of 200 kya (McDougall, Brown, & Fleagle, 2005, 2008). Additional Ethiopian remains from Herto are likely to be from at least 160 kya (White et al., 2003). The likeliest scenario is that *H. sapiens* evolved in Africa and

migrated outward, probably several times. There is extensive evidence for anatomically modern human occupation in the Middle East where Neanderthals are also known, but it is only *H. sapiens* that survived and colonized the world.

And what makes modern humans *modern*? Compared with other hominins, including the ones our species once coexisted with, we have many distinct characteristics although expressed to a variable degree. We lack the robustness of earlier hominins in the thickness and form of our cranial bones, limb bones, and facial features; we possess large brains for our body size, straight limb bones, a projecting chin, and smaller dentition. Simply look around at the people who walk past you every day, and you can see how diverse we are as a species even today, let alone in the late Pleistocene.

Conclusion

Major recent discoveries have significantly expanded our understanding of hominin evolution, and the recovery of new fossils is of primary importance. In the past 15 years, we have established the antiquity of hominins in Late Miocene Africa and Pleistocene Asia; furthermore, we have enhanced our awareness of the diversity and longevity of the different lineages. In particular, we await more evidence of the earliest hominins and fossils found in regions not traditionally associated with the evolutionary narrative, such as northern and central Africa. Defining *Homo ergaster* and *Homo erectus* as separate species and determining the timing of *Homo*'s migration out of Africa will also be critical and feeds into another complex issue that must be resolved: the evolution of later *Homo* and how some of the Pleistocene species (*H. antecessor*, *H. heidelbergensis*) are related to modern humans. We also continue to set hominin evolution in the context of the evolution and migration of other mammals in relation to changing climates and shifting habitat availability and to develop better techniques for assessing how geological and biological processes affect fossil assemblages.

This chapter has focused primarily on the paleontological evidence for hominin evolution, that is, hominin and nonhominin fossils, their geological and environmental contexts, and how paleoanthropologists currently assess the hominin species identified in the fossil record. But this discipline is multidisciplinary in the truest sense; anatomists, geologists, archaeologists, zoologists, geneticists, and primatologists all examine aspects of our evolutionary history from both the biological and cultural perspective. New methods and techniques for approaching the fossil and archaeological record are always under development, and we increasingly rely on modern technologies. The recent announcement of the sequencing of the Neanderthal genome reminds us that what were once unapproachable questions now have

answers within our grasp—and the spirit of discovery in the field, in the lab, and elsewhere is very much a part of this unique science (Green et al., 2008).

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PREHISTORIC CULTURES

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The study of prehistoric culture concerns preliterate societies from their earliest development until the beginnings of the first political structures—the Greek and Roman empires. Neanderthals, *Homo erectus*, and *Homo sapiens* were among some of these early peoples. Of these, only the *Homo sapiens* survived. Some of these peoples coexisted for periods of time. There is not always a clear indication of the time frame when different societies lived, as some developed at faster rates than others. Evidence of humans in Africa is millions of years older than evidence in the Americas. Even today, there are some hunter-gatherer societies that are without written language. The study of these societies is called protohistory.

Anthropologists make determinations about prehistoric cultures based on the best available evidence. Interpretations of artifacts and settlements are open to debate, and as more evidence is found, or uncovered, new interpretations are made.

Out of Africa

Current evidence suggests that the first hominids walked the earth over 5 million years ago. The earliest fossils indicate that there were people in Africa perhaps as long as 5.5 million years ago. These early people were much smaller than modern humans and had a

much smaller brain capacity. They were of the genera *Australopithecus* and *Paranthropus*. These comprised several species that lived in Africa from approximately 5 million to 1.3 million years ago. As the *Australopithecus* and *Paranthropus* moved toward extinction, the first *Homo erectus* began to appear approximately 2.5 million years ago. The first humans to leave Africa were probably the *Homo erectus*. Bones of *Homo erectus* dating 1.5 million years old have been found in Indonesia. Humans continued to evolve and migrate across Asia and Europe, eventually crossing the Bering Strait into Alaska during the last Ice Age and ultimately populating North and South America. Different theories put this at between 13,500 and 20,000 years ago. Some say that this population expansion would have taken place on foot, but new evidence indicates that some of it may have taken place along the western coast of the Americas in boats. Evidence of people in Australia dates to approximately 100,000 years ago. There was no land bridge from Asia to Australia; the migration would have taken place in boats.

More recent theories suggest that hominids may have evolved in Asia separately from those in Africa or even that the migration took place in reverse (Asia to Africa). However, evidence for these theories is sparse. As more paleoanthropological work is done in Asia, more light may be shed on the question. The focus during the late 20th and early 21st century has been on Africa.

There is some debate as to when the very first humans appeared in Europe. Evidence from findings of stone tools can put the very earliest people as far back as 1.5 million years ago. However, the oldest bones discovered come from a cave called Gran Dolina in Northern Spain. These bones are about 800,000 years old. The bones are similar to the *Homo ergaster* found in Africa, but because of facial differences, a new species name was suggested by excavators—*Homo antecessor*. Because of these differences, some suggest that this species evolved from a separate, much later wave of movement out of Africa rather than from those who peopled Asia.

Methodology

Human Paleontology and Archaeology

The study of human fossils involves the recovery and interpretation of remains. These remains are usually bones, wood, and stone. Under certain conditions, however, muscle, tissue, skin, and feces have also been preserved. Cultural adaptations (use of fire, toolmaking, and language) have made the interpretation of these remains more difficult. The earliest humans adapted to the environment biologically and behaviorally. Later humans manipulated their environment. Interpretation is also made difficult by the fact that most fossil records are incomplete. Bones get scattered, and pieces are missing. Skeletons and bones that are missing pieces were historically pieced together with glue and plaster; today, however, computer technology is used to fill in the gaps and to generate images of facial features.

In addition, interpretations are made based on found artifacts and on excavations of settlements and burial sites. Interpretation of the finds can be difficult, as archaeologists cannot always tell if a site has been disturbed by other societies. It is often difficult to study death rituals as grave sites are places where significant wealth can be found and therefore are common targets of looters.

Written History

For the most recent prehistoric societies, anthropologists have some written records; for instance, the Greek and Roman records of the Iron Age reference other pre-literate societies. The conquistadores of what is now Latin America have written records of the people they encountered. And the Europeans who came to Australia in the 17th century have records of the Aborigines. However, researchers must keep in mind that these records are necessarily written by those whose culture was quite different and who would have found the customs of others strange, although they were perfectly normal to those practicing them.

Observation of Modern Societies and Primates

Anthropologists can draw some conclusions by observing preliterate societies today. However, caution must be taken when making these conclusions. Although modern humans (*Homo sapiens sapiens*) have existed for about 40,000 years, today's hunter-gatherer societies are living in a much changed world from that of the original hunter-gatherers. Hunter-gatherers in the 21st century may have contact with those who practice agriculture. They are often living in areas with poor soil, and their hunting practices may be different as the type and range of game available has changed drastically.

Three Ages of Prehistory

The study of prehistoric peoples in Europe, Africa, and Asia is divided into three broad periods, the Stone Age (which is further divided into the Paleolithic, Mesolithic, and Neolithic periods), the Bronze Age, and the Iron Age. The ages are defined by the types of tools used during the period. There are no clear beginning and ending dates for these ages as people in different parts of the world progressed through them at different times.

Stone Age: Paleolithic

The Stone Age is the longest of the three ages, beginning from about 2.5 million years ago and continuing until the beginning of the use of metals for toolmaking (about 5,000 years ago). Tools in the Stone Age were made of stone, bone, and antler.

Lower Paleolithic

The earliest stone tools were formed of flakes and cores, and they appeared about 2.6 million years ago. They were apparently used for hammering, cutting, and smashing. Fossils in East Africa indicate that early hominids of the Pliocene epoch lived in forests and other wooded areas.

Although humans are omnivores, diet was probably primarily vegetarian. Animal protein was probably derived from all types of animals, including birds, fish, amphibians, reptiles, mammals, and insects. Although bones from very large animals (including elephants and rhinoceroses) have been uncovered at some very early archaeological sites, it is unlikely that they were hunted by the early hominids and instead were scavenged. Early humans did not have tools sophisticated enough to kill the animals, and evidence indicates that they would not have hunted any animal larger than themselves. Rotten food was probably routinely eaten—and a taste developed for it—as scavengers ate what they found, and there was no way to keep food fresh.

The earliest fossil specimens of *Homo erectus* date from 1.78 million years ago at Koobi Fori. The range covers most of the African continent, with exceptions in the western and central forest areas. Fossils indicate that some *Homo erectus* were cave dwellers while others lived in open sites. They were the first hominid to leave Africa; early bones were found in Indonesia from about 1.5 million years ago. These bones were given the name *Java man* after the site where the bones were first discovered. At about the same time, tools evolved from course pebble chopping tools and flakes to bifacial hand axes. *Homo erectus* hominids were hunter-gatherers and were well used to fire. They were probably the first to cook food.

There is still debate as to how much speech capacity *Homo erectus* may have had. Some say grunts and basic guttural noises were possible; others say that they could not have lived and hunted cooperatively without a more developed speech.

Social groups were probably small, about 40 to 50 people, with foraging groups 10% of that. Female and male foraging ranges were different. Female ranges would have been less wide. It is unlikely that *Homo erectus* would have foraged more than a day's walk beyond their water source as they would have had no watertight containers with which to carry water for longer hunts. The social organization of the early hominids is still open to debate. Some evidence suggests polygyny, the practice of men having more than one female mate, was observed.

Middle Paleolithic

Several different hominids lived during the earliest part of the Stone Age (approximately 2 million to 10,000 years ago). Some of these peoples coexisted, and there is still debate as to whether some of these human species may have interbred or if some became extinct all together or if one species evolved from another. The Neanderthal (*Homo sapiens neanderthalensis*) is named for the Neander Valley in Germany where many of the remains have been found. Neanderthal remains have also been found in Spain, Britain, Asia, and the Middle East. The Neanderthals' appearance was marked by a short, stocky stature; wide brow; and protruding bun at the base of the skull. These remains date from as long ago as 230,000 years to 10,000 years ago. These hunter-gatherers traveled in small groups (fewer than 30 people) and did not set up permanent settlements. Some lived in caves, although there is also evidence that some of the Neanderthals lived in open sites. The fact that they lived in caves has helped us to study them, as the limestone has preserved their bones well. They appear to have moved frequently over short distances and used whatever materials were on hand rather than taking things with them when they moved. The cooperative hunting they practiced involved big game. Because they used spears rather than bows and arrows, surrounding and herding the game was essential. Thrusting of spears at

close range after driving the game into a bog was probably the common practice; however, this also meant that the hunters were easily put in harm's way, and in fact, skeletal remains often indicate numerous injuries. Very few Neanderthals lived beyond 40 years of age. Neanderthals' diet also included small prey, such as tortoises, shellfish, and lizards. These would have been easy to catch and would require less planning than a big-game hunt and were certainly less dangerous. At many of the Neanderthal sites, there is clearly an indication of taste preference as shown by a preponderance of certain types of animal bones, providing evidence of a hunter-gatherer culture rather than a scavenger culture. Plants were a very small part of the Neanderthal diet.

There is still debate as to whether the Neanderthals practiced any kind of ritual. There is evidence that they buried their dead; however, whether this was part of a ritual or simply an efficient way of disposal is not known. Bodies have been found in most instances placed in rectangular pits in flexed positions and covered with stone slabs and sometimes with "grave goods"—flowers, animal parts, tools, and semiprecious stones. In other cases, bodies were not covered but were found in shelters; however, even these appear to have been placed with some sort of ritual—two bodies placed head-to-head, for example. Grave goods have also been discovered with some but not all of these bodies. Some archaeologists argue, however, that none of these were ritualistic, and can be explained through natural processes.

There is also debate concerning the practice of cannibalism. Cutmarks on some human bones are consistent with those seen on animal bones, indicating flesh removal; bones were broken in a way that would have exposed the marrow. It is not known whether this was a death ritual or if it was a desperate act to get food; indeed, some suggest it does not indicate cannibalism at all and that the cutmarks were ceremonial. There is other evidence that interpersonal violence was not uncommon among the Neanderthals. Skeletal remains show signs of healed wounds; although some appear to be accidental or inflicted by nonhuman predators, others were obviously inflicted intentionally.

Upper Paleolithic

The Upper Paleolithic period marks the transition from the Neanderthals to the "fully modern" human (*Homo sapiens sapiens*). This period was roughly from 45,000 to 30,000 years ago. By 10,000 years ago, all the Neanderthals had disappeared. Humans during the Upper Paleolithic wove clothing and nets, and they began to build huts or other shelters from bones and animal hides or rocks. It is not known whether this indicates that the inhabitants stayed at the shelters year-round or returned to them on a regular basis.

Tools from this period are carved and polished rather than chipped, and show other technological advances.

Blades are long and narrow and have parallel sides; other tools include the eyed needle and the bow and arrow. In addition, we see a profusion of items used as ornaments. Beads and pendants made from bone, ivory tusks, animal teeth, shells, stones, and antlers are in abundance. Art is also in evidence during this period. Carvings of animals and humans have been discovered as well as cave art in the form of painting and carving and fired clay to make figurines.

There is evidence of exchange of goods during this period. Shells and fossils from one area appear to have been transported very long distances (800–1,000 kilometers) to other areas. This exchange can indicate a desire for adornment and/or a social and economic “safety net.”

Stone Age: Mesolithic

The Mesolithic time period (approximately 10,000–7,000 years ago) is marked by the end of the last Ice Age. There were major climactic changes as glaciers melted, and people began to migrate north.

The Mesolithic period also saw the earliest stages of agriculture. Animals such as goats, sheep, cows, pigs, and chickens were first domesticated in Asia and the Near East approximately from 9,000 to 8,000 years ago. Meat was essentially kept fresh by keeping livestock alive until needed.

Tools of the Early Mesolithic were microliths—composite tools inserted into shafts made of replaceable parts. Stone, antler, teeth, and bone were all used in making tools.

Big-game hunting, as well as fishing, was a large part of the subsistence economy of this time period. Shellfish became more important during the late Mesolithic period. This may be due to stabilization of sea levels. Some animals such as beaver, lynx, wildcat, and wolf appeared to have been hunted only for their fur. “Gathering” became more important as legumes, nuts, fruits, and vegetables comprised more of the diet.

Shelter was in the form of caves, rock shelters, and huts. Evidence from these settlements suggests that the Early Mesolithic groups were rather small and somewhat mobile, traveling within a diameter of 80 to 100 kilometers from their settlements. During the later Mesolithic period, groups became more sedentary. There is also evidence of some trade between groups whose settlements were up to 250 kilometers apart.

Art forms began to take on geometric patterns as well as animal and human forms. Beads and other artwork were made from amber, animal teeth, stone, bone, antler, shells, fossils, and red ochre. Jewelry was used during the Late Mesolithic, and tools were decorated with geometric patterns. Pottery and wood were also used during the Late Mesolithic. Hunting and fishing are themes in the petroglyphs found from this time period.

The first real cemetery is dated from this time period. Bodies were placed in a variety of positions (supine, flexed,

and sitting). Grave goods were common. There appears to be a real distinction of gender with men being buried with tools and women with jewelry. There are also indications of segregation by status during this time, with special status given to the wealthy (usually adult males) or shamans. Also, in some areas, there is evidence of a “skull cult” in which skulls are separated from the bodies and buried separately.

Stone Age: Neolithic

The Neolithic ranged from approximately 7,000 to 5,000 years ago. The first farmers practiced mixed farming, using plants and animals. As plants and animals were domesticated, some competition for land between the farmers and the hunter-gatherers would have been expected. It is not known how long these two cultures coexisted or to what extent they cooperated. Some anthropologists believe there may have been an exchange of goods between the two groups (labor for domesticated goods during harvest time). Others believe that as the two groups competed there may have been an increase of warfare. There are several theories as to how farming grew across Europe: Perhaps farmers migrated from the Middle East, or one group of people may have learned about agriculture through trade with others. Slash-and-burn agriculture was probably the method of cultivation. Horses, Bactrian camels, ducks, dogs, and water buffalo were domesticated in Asia during this period. “Aquaculture” (the cultivation of water plants and animals) began in Northern China. In river valleys in China, the importance of fishing is evident in the use of canoes and in tools such as fishhooks, harpoons, spears, and stone net sinkers.

Early Neolithic peoples probably were part of groups larger than those in the previous epochs, perhaps 250 people interconnected through kinship links. These were egalitarian societies. Status was not something that could be inherited but perhaps could be obtained through age, achievement, or talent. It appears, though, that men had a higher status than women. Rituals became important in household and community life.

Exchange of goods across geographic areas was evident as not all raw materials were naturally available in all areas where goods produced from the resources were found. Some of this trade would have been done directly within kin systems and probably involved reciprocity. Trade with strangers, however, may have been more deviant, and included robbery, cheating, and violence.

These early cultivators likely moved frequently, returning to the same place on repeated occasions. People built shelters of wooden posts and mud walls—rather than using already-formed rocks and caves—and lived in villages. Settlements consisted of longhouses and pits. Most longhouses were living spaces, but some appear to have been used for communal or ritual purposes. These buildings were longer than the living spaces and had some structural

differences. Structures were rebuilt on the same spot over generations. Some archaeologists believe that the houses were occupied seasonally; others say that they were lived in year-round and rebuilt when they collapsed. Long-term occupation of specific spots is indicated by the buildup of debris. Some believe that status may have been afforded to those whose family occupied the same spot for a long period of time.

The Neolithic period is marked by the beginning of a pottery culture. Pottery vessels indicate first use of storage for grains and seeds as well as drinking vessels and burials. Pottery was decorated with patterns, using shapes, lines, bands, and whorls. In river valleys where fishing was common, fish designs were used as decorations. Pottery was made from coiling techniques and finished with bone scrapers, stone polishers, and pigment and other decorating techniques using impressions and appliqué. In some areas, kilns were found; in others, it appears pottery was burned on the ground.

In Europe, figurines believed to be part of a ritual or religious icons have been found in what appear to be communal areas. Clay figures of men, women, asexual humans, and human figures with penises and breasts have been discovered as well as animal figurines. The majority of figures, however, are of women. It does appear that goddess worship was part of their religious practices. One theory suggests that there are so many women figures because they represented fertility. This would have been especially important in an agricultural society.

In China, a separate cemetery was part of the village. There was clearly a ritual aspect to the burials. Ornaments, including pottery vessels, beads, and grains were often placed in the graves, with some singular burials standing out as especially elaborate compared with multiple burials. Some burial sites segregated the deceased by gender or age. Placement of bodies was deliberate. They were clearly placed in specific positions and pointed in specific directions. Others appear to be segregated by clan or wealth status; still others did not segregate at all. European burial customs involved burying and cremation. Grave goods were evident, with some of these being gender specific (arrowheads for men, jewelry for women), and as in China, placement of bodies was intentional.

Evidence of violence during this period demonstrates that brutal raids for mates or resources may have taken place. Several sites with mass graves of people who died of similar wounds have been discovered.

Bronze Age

The Bronze Age is marked by the beginning of the use of metals for toolmaking. Ore extraction took place in mines, and alloys (combinations of metals) were developed along with mold forms and other technological developments for an early type of “mass production.” Decorations were added to pieces after they were smoothed, and seams

were removed, providing evidence that aesthetics, in addition to function, was becoming more important.

The Bronze Age began at different times for different societies, as early as 3000 BCE in Greece. But in other parts of Europe, it did not start for another 1,000 years. While some trade of raw and manufactured materials took place in the Mediterranean, farming was still the principal occupation, with subsistence agriculture an essential aspect of the culture. Most settlements were in small villages. Houses were made of wooden posts with daub-and-wattle walls (mud, clay, woven branches) or log cabins. Some houses were small, one-room buildings; others were larger multiroom structures. In some settlements, particularly in the East Mediterranean, there were central palaces, indicating a status given to one family or kin group that was unavailable to others.

Trade of raw materials and of manufactured “commodities,” such as beads, ornaments, pottery, and weapons, is evident. Movement of goods took place not only over land but also by water.

Woodworking continued to be important for building of trackways across wet ground, for making bowls and other containers, and for making farm implements, such as hoes, plows, and rakes. Bone and antler continued to be used for the manufacture of weapons and tools. In the later Bronze Age, elaborate armor and shields were developed for protection during warfare.

Weaving of cloth is evident, and new techniques were developed. Wool and flax were the most commonly used fabrics. Textiles were woven on looms. As the Bronze Age progressed, the weaving became more complex to create patterns; this, in addition to the use of decorations and ornaments on clothes, indicates the desire to express oneself. The ornaments on the pottery became more elaborate during the Bronze Age and included bones, teeth, and jade.

The typical means of disposing of dead bodies was burial or cremation. Urns were used to dispose of ashes. Cemeteries and cremation pits were the norm, and there was often a distinct placement of the bodies when burial was used. Often, there was a difference by sex as to how the head was oriented or on which side (left or right) the body was placed. Grave goods might indicate the occupation of the occupant, such as metallurgical equipment. Men were sometimes buried with swords, perhaps indicating status gained from a warrior society. Women were commonly buried with “ornament sets,” which could have indicated marital status and age. The types of goods placed in the graves as well as the positions and different treatments of the bodies indicate that there was some social status afforded to few that the many did not have.

Iron Age

As iron replaced bronze as the principal material for tools and weapons, new technologies were developed.

The Iron Age ended around the time of Christ with the Roman conquest of Europe. As with other ages, the movement from one manufacturing material to another was a gradual process that developed over hundreds of years. And many of the technologies and industries used in previous times continued to be important. Flint and bronze remained in common use for tools and other purposes, and farming continued to be an essential part of the subsistence economy.

Cereals and domestic animals continued to be an important aspect of the subsistence economy although food production was made more efficient by several technological advances. Iron plowshares allowing for exploitation of richer soils and scythes allowing for more efficient harvesting of hay for feeding animals as well as other tools made farming a more efficient operation, and fewer farmers were needed to feed people. During the Late Iron Age, rotary querns (an early form of mill) made from stone came into widespread use for grinding grains, creating yet another more efficient method for providing more food.

Even as methods for extracting and refining iron came into use, bronze was still commonly used for some tools, jewelry, ornaments, and vessels. Pottery also remained widely used for several purposes: storage containers for grain, seed, and water; tripod cooking utensils; cups and bowls for eating and drinking; and burial urns. The use of the potter's wheel is evident and would have made production of pottery more efficient. Wool, linen, silk (imported from the orient), and animal hair are all evident as textiles and cloths.

Trade between geographically distant areas was a regular feature of the Iron Age. Amber, bronze, precious metals, and salt were among some of the most commonly traded items. A barter system was certainly in place, and by the end of the Iron Age there is clear evidence of the use of coins.

Fortified stone and earth walls; weapons such as lances, spears, shields, and battle axes; and art work depicting soldiers wearing armor all indicate warfare. Lances and shields in graves were common in burials of men who were believed to be warriors.

Complex social and political structures started to form during the Iron Age. Wooden tracks to ease commerce and trade demonstrate political structures beyond subsistence farming. Manufacturing and trade of goods across Europe, the Mediterranean, and the Middle East is evident. Luxury goods at certain burial sites and houses with clay floors at some settlements indicate the emergence of an elite class.

Deposits of metal objects in special locations, such as hot springs, have been interpreted as being offerings to gods or part of another ceremonial practice. This interpretation is made possible by the fact that Greek and Roman societies began using written language, and some of the offerings were inscribed. However, the

practice is evident in many parts of Europe, in both pre-literate and literate societies.

Australia

The Aboriginal culture of Australia dates from approximately 40,000 years ago, although there is evidence of humans in Australia (stone tools and cave art) from as long ago as 100,000 years. Tools were generally made of stone, shell, and bone. The Aborigines were among the first to use stone-ground tools (10,000 years before Europeans) and used the tools for woodworking to make hunting implements, such as spears, clubs, and boomerangs. Designs on these implements as well as on sacred objects were carved or painted, making all objects sacred. Music and dance rituals that called on the *Dreamtime* (the time before the collective memory of the tribe) ancestors gave the implements power.

The Aborigines were organized into tribes, which were governed by elders. Size ranged from several hundred to over 1,000. A variety of factors affected this number such as abundance or scarcity of food. There is evidence of trade between tribes over long distances. Mobility of the tribe may have been based on resources; where there were more, there was less mobility.

Tribes were subdivided into clans based on kinship of genealogy and marriage. A person with whom one could not find a common relative was a stranger, but if a pair had any relative in common, whether through a genealogic line or through marriage, they would be considered kin. Depending on the tribe, a marriage might have been arranged by the families of the man and woman, or the partners may have arranged it themselves. In other cases, camps were raided by others, and the women were taken by force. Polygyny was widely practiced among the Aborigines.

Europeans encountered the Aborigines in the 17th century, which drastically altered the Aborigines' way of life with regard to how land was viewed. Aborigines did not see land as something that could be owned or bought and sold.

Americas

The peopling of the Americas probably begins with the first migration across the Bering Strait, which may have been as long ago as 20,000 years. The migration continued along the west coast of North America and eventually into Central and South America, where evidence shows that the first people arrived approximately 10,000 years ago.

North America

There are not clear divisions of time periods for North American prehistoric cultures, although several attempts

have been made to divide these cultures into time periods based on culture traits, artifacts, and projectile points. The earliest people are usually referred to by the term *Paleo-Indians*; the Clovis and Folsom cultures are two of these very early hunter-gatherer cultures. This period is followed by the Archaic period, the preagricultural cultures of North America. And then came the Woodland cultures, marked by agriculture and ceramics. This final period in some areas of North America did not end until after colonization.

The first people to arrive in North America were likely to have been mammoth and mastodon hunters. Tools found on the continent are dated from about 9,000 to 20,000 years ago and were designed to be used in group hunting to stab a large animal at close range. By 6000 BCE, other game was being hunted such as moose, bison, bear, and caribou.

Paleo-Indians

The Clovis culture hunting tools are identified by fluted points, the first of which were found embedded in some now extinct mammals (bison and mammoth) in New Mexico. It appears that these points were attached to the end of a handle or shaft and used as a knife. Evidence of Clovis culture has been identified throughout North America and into Central and South America. Later Folsom culture tools indicate that these fluted points were used as projectiles. Some Folsom sites appear to have been used as gathering places for communal hunts. Post-Folsom Paleo-Indian sites have been discovered west of the Mississippi. These sites include a variety of point styles, indicating there were several different groups of Paleo-Indians, with differing styles of hunting and diets. Those on the Great Plains appear to have hunted large mammals, whereas those in the foothills and mountains hunted smaller game and ate more plants.

Archaic Indians

As the Pleistocene period ended and the climate began to warm, people of the Holocene period in North America had to adapt to the changes in the environment. Large mammals became extinct, weather became warmer, and lakes in southwestern North America began to dry out. Archaic culture refers to the nonagricultural adaptations prehistoric peoples made in response to these climactic changes.

Drier climates in southwestern North America forced some people to migrate into the mountains; others stayed and adapted by taking advantage of seasonal changes and new flora and fauna. Archaic people of California learned to manage the changing conditions by exploiting a variety of resources, including acorns, plants, fish and other sea food, and large animals. Early Californians also learned to control fires when dry conditions threatened the danger of

chaparral fires and understood that these controlled burns promoted new growth. Plains people hunted bison as well as gathering nuts and berries.

There is a definite correlation between large-scale outbreaks of violence and catastrophic climactic changes. Violence and homicide were not uncommon among hunter-gatherers of North America. Evidence from various parts of the continent shows intentional projectile wounds, scalping, decapitation, and forearm trophy taking. One especially remarkable case involves a site at Saunaktuk (Eskimo Lakes region of the Northwest Territories). Human remains from the massacre show various signs of trauma, including cuts, slashes, and long bone splitting. The latter almost always is an indication of cannibalism. And while it appears that males were usually the victims and perpetrators of violence, most of the victims in this massacre were women and children. The men of the victimized group may have been out on a beluga whale hunt. This case is especially interesting because oral tradition confirms what was found in the excavation site.

Woodland Phase Indians

The Woodland phase is determined by three traits: manufacture of pottery, agriculture, and the appearance of burial mounds.

The gathering of plant foods became more controlled, and people began to select seeds from the best wild plants to sow and harvest themselves. They also began to store food for later use so that migration was less frequent. As populations grew, villages became too big to sustain agricultural productivity. Trade of foods and other goods between distant populations began.

Burial of the dead is clear in several sites. Some burial sites were simple; others, like the Hopewell complex, a large, precisely built burial mound dating from about 2,000 to 1,500 years ago, show an elaborate ritual associated with funerals. Grave goods brought from distant locations and carved into artifacts were buried with the dead.

Mesoamerica

Prehistoric culture in Mesoamerica (Mexico and Central America) is divided into several time periods dating from about 10000 BCE, the earliest evidence of humans in the area, through the time of colonization by Europeans in the 16th century CE. These periods are the Paleo-Indian (10000–3500 BCE); Archaic (3500–1800 BCE); Preclassic (2000 BCE–CE 250); Classic (CE 200–900); Postclassic (CE 900–1519); and Postconquest (up to CE 1697).

Paleo-Indians

It is believed that the first inhabitants of Mesoamerica arrived during the last Ice Age. Tools similar to those

found in North America indicating the Clovis culture have been discovered in Central America as well. There is evidence as far south as Brazil of the peopling of South America from as long ago as 12,000 years. The first people in Central and South America were hunter-gatherers.

Archaic to Preclassic Eras

During the Archaic era, people began to cultivate plant food rather than forage. Agriculture continued to be developed in the Preclassic era through the cultivation of maize, and the first cities began to appear.

The earliest of the preclassic cultures was the Olmec (1200–500 BCE). The name was provided by scholars; it is unknown what the inhabitants actually called themselves. The Olmec Empire was centered in what is now Veracruz, Mexico, on the southern Gulf Coast. This was the first culture to build stone monuments. Most of these monuments appear to be of rulers. Many have been mutilated. It is not known if the mutilation was intentional for ritual purposes or if it was the work of non-Olmec vandals.

Classic

Perhaps the largest and best known of the classic cultures is the Mayan, although evidence from the Preclassic period indicates they had villages as early as 1800 BCE, and there are still over 6 million Mayans in Central America today. The ancient Mayans occupied an area that included eastern Mexico, northern Guatemala and Belize, Honduras, and El Salvador.

City centers were built in rain forests and were therefore sparsely populated. They were used for ceremonial purposes, including human sacrifice. The farmers lived much farther out, as each needed space for crops. Farming would have been difficult in the humid areas. Slash-and-burn agriculture was practiced, and new land would have had to be cultivated every 7 years.

The Mayans were the first in the Americas to develop writing. Their system was based on hieroglyphics and phonetic symbols. There are some records in the form of *codices*, books made of bark, and writings on stones and wood, which provide mythological and historic accounts of these peoples. The Maya also developed a calendar based on a 365-day year with 18 months of 20 days each plus 5 “unnamed” days. They were also the first civilization to develop a mathematical system using zero.

Postclassic

During the Postclassic era, the autonomous villages began to give way to a more hierarchical structure in which some villages were under the control of others during the period from 1200–500 BCE. Along with this hierarchy came palaces for kings and temples for worship of ancestors.

Temples were often built on pyramids in order to be seen from distances. These would necessarily have required intense labor. Empires were formed as different groups began to conquer neighboring towns and provinces. Some of the early empires were the Teotihuacán (CE 400–600), the Toltecs (CE 900–1200), the Mixtec (or Aztec), and the Incas. These last two were still in existence when the Spaniards arrived in the 16th century.

Aztecs of Central Mexico

Aztec legend has it that Huitzilopochtli (their god) came in a vision and told them to find Tenochtitlan, which they would recognize by finding the place where an eagle lived on a cactus with a snake in its mouth. There, they developed their empire by conquering 489 towns. Tenochtitlan was very well developed with a system of paved streets and canals for transportation.

The Aztecs’ hierarchical structure included three levels of nobility: the *tlatoque* (“major nobility”), *teuctlatoque* (“lesser nobility”), and *pipiltin* (“nobles in general”). These levels were achieved through birth. Others (“commoners”) could earn a certain level of nobility (*quauhpipiltin*) through achievement but never to the same status of the pipiltin. Those without status included the *macehualtin* (“commoners”), *mayerque* (“landless peasants”), *tlalmaitl* (“farmhands”), and *tlacotin* (“slaves”).

Human sacrifices were common and believed to be necessary to appease the gods. The people “harvested” for these sacrifices came from wars and battles with neighboring armies, although in some cases a threat of an attack was enough to simply cause the neighboring army to provide captives for sacrifice. Counterattacks were unknown, as the Aztecs believed that the outcome of the battle was decided by the gods. This fatalism would prove to be their downfall when confronted by invaders from Spain.

Inca—Bolivia and Peru

The earliest Incas lived on coastal lowlands and cultivated beans, squash, chili pepper, and cotton. Later, their descendants moved into the lower Andes and eventually into the highlands. As they moved into the foothills, they began cultivating tubers. Moving farther up the mountains, they figured out how to cultivate the land by building soil terraces and upslopes and digging ditches to bring water down the mountain. They domesticated the llama (as a beast of burden), the alpaca and guinea pig (for meat), and the vicuña (for its wool).

Although they had no written records, the Incas created a “record-keeping system” of colored knots and cords called *quipu*. It was used by priests to keep historic and religious records and was also an accounting method, which could be used for adding, subtracting, multiplying, and dividing.

Machu Picchu, located in the Andean mountains, was a sacred city of the Incan empire. Built with huge granite blocks and without cement, how this grand city was constructed is still unknown. Mystery also surrounds the use of this archaeological wonder. For every 10 women's skeletons found there, there is only one man's remains. Some suggest that the city was a refuge for virgins.

The Incas had no royalty until the 15th century when a small group moved into the Cuzco valley of what is now Peru, and rulers Pachauti and his son Tupac began an empire of some 2 million people. There, they developed a system of roads and bridges through the Andes. This society was based on wealth, power, and political stability.

Future Directions

The study of prehistoric cultures has implications in the fields of medicine, agriculture, and engineering. A rather new field of study called evolutionary medicine, or Darwinian medicine, is beginning to emerge. Through the study of diet and activity levels of early societies, health care professionals may gain insight into diseases and obesity that may be connected with a sedentary lifestyle that hunter-gatherer societies did not experience. Questions about how structures such as pyramids, Machu Picchu, and the Olmec sculptures were built and how the materials were transported without modern technology are still unanswered. Early agricultural practices involved mixed farming. Today, most farms are run by agribusinesses that specialize in a single type of crop or livestock. Genetic variability in these products is small and can lead an entire harvest to be wiped out by disease or plague. Some smaller farms are working on preserving genetic diversity by raising heritage breeds of livestock and planting heirloom seeds of crops. Further archaeological work in areas outside of Africa may yield new theories on how and where people evolved.

Conclusion

While contemporary cultures may be studied through direct observation, anthropologists study prehistoric cultures through the things they left behind. Some of these societies had sophisticated rituals for hunting, religion, death, and warfare and in addition built monuments and other structures that defy explanation today. There is much to study and learn from these cultures. Prehistoric peoples span a time period of over 5 million years, and they ultimately populated the earth on six of the seven continents. Despite popular images to the contrary, not all prehistoric people were "cavemen." Some of the first

prehistoric peoples lived in wooded areas or open sites, and later prehistoric people lived in shelters constructed from wood and other materials. The time periods generally associated with the study of prehistoric cultures (Stone Age, Bronze Age, and Iron Age) are specific to Africa, Europe, and Asia. The names of these ages refer to the types of tools used. Tools became more sophisticated as people progressed through these three ages, leading to the development of trade routes as roads were built and agricultural societies replaced the hunter-gatherer societies.

Evidence of humans in Australia is only about 100,000 years old. And people arrived in the Americas only about 20,000 years ago. Only the remains of the modern *Homo sapiens sapiens* have been found in North and South America.

Europeans who arrived in Australia and the Americas during the 15th, 16th, and 17th centuries encountered people who were living in cultures vastly different from their own.

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ANCIENT CIVILIZATIONS

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Many ancient civilizations have added to our current knowledge, technology, and understanding of the world. Some provide the foundations of modern ideology. The ones covered in this chapter commenced the movement from the very ancient agrarian society to modern culture. They are all geographically located in the Mediterranean Basin or the Middle East and include Mesopotamia (Sumer, Babylonia, and Assyria), Egypt, the Hittite Empire, Persia, Greece, and Rome. (See Table 43.1, “Ancient Civilizations Timeline,” at end of chapter.)

Mesopotamia

Often called the cradle of civilization, Mesopotamia was the site of the world’s first cities. This urban development involved not only just a large group of people living in close proximity but also a revolution in social organization, in farming, and in technology. This cultural leap was a transition from the primitive settlement to the modern society.

Beginning around 5500 BCE and continuing for the next 2,000 years, people gradually began to move from the mountains into the Mesopotamian plain and settled in cities. In addition to the development of cities, these people developed irrigation, canals, and flood control. They learned how to drain marshes and to turn them into farmland. They also invented the plow, the wheel, and metallurgy

(copper and bronze). During this time, the Sumerians moved to this area and became the dominate people.

Sumer

About 3100 BCE, the Sumerians developed writing. Initially, the writing took the form of pictographs or hieroglyphics, with each symbol representing a word. By 2500 BCE, the language had simplified and developed into cuneiform, that is, wedge-shaped symbols representing syllables of words. For over 3,000 years, various civilizations, such as the Hittites, Assyrians, and Babylonians, adopted and used this system of writing. Most of the early Sumerian texts were records of economic activity, but by 2500 BCE, they expanded to include religious and literary texts as well as historical documents.

As cities emerged, social and political complexity increased significantly and people developed specialized vocations. These developments led to interdependence. Thus, the people became dependent on outside trade and commerce to meet their everyday necessities. Leaders of cities emerged who sought to expand their influence and control into the surrounding villages, and social classes developed among the populations. These communities developed into city-states. Kings (or warlords) expanded their influence to include other city-states through military conquest. They also captured and enslaved people.

The Sumerians invented bronze, a copper and tin alloy. They developed sculpture (high-profile statues), religious imagery, literary styles, and views on kingship, law, and society. They laid the groundwork for various sciences including arithmetic, astronomy, botany, and medicine. Perhaps most notable, the Sumerians developed monumental architecture. Specifically, they developed temples that sat on ziggurat platforms. These temples, dedicated to a patron deity, functioned as more than just places of worship. They also served as banks, libraries of economic records, and trade and political centers. Priests at these temples wielded enough power that they even rivaled the kings.

Around 2350 BCE, Sargon, an Akkadian from central Mesopotamia, overthrew the Sumerian city-states and began the world's first nation-state. The Akkadians adopted much of the Sumerian culture but used the Akkadian language for international business. They developed a national administration, with appointed officials administering, and military garrisons stationed in conquered cities. The Akkadians extracted tribute from subjected people, levied taxes, and expanded trade to as far away as the Indus Valley to the east and Anatolia to the west.

The Akkadian state was short-lived. Around 2150 BCE, the nation collapsed and individual city-states reemerged. Lagash and Ur were two of the more successful city-states. They expanded their control into small empires based on economics rather than military strength. Ur soon became the stronger state and ruled all of Mesopotamia by 2111 BCE. Ur inaugurated a massive building program, its crowning achievement the completed ziggurat dedicated to the moon-god Nanna. They improved transportation on land, on rivers, and on canals; developed law codes; established standardized dry weights and measures; and maintained a strong, centralized government. Influxes of people from the mountains and internal revolts led to the fall of the last Sumerian kingdom (around 2000 BCE).

Babylonia

A new group of Semitic people, the Amorites, moved into Mesopotamia around 1800 BCE, threw off Elamite domination, made the city of Babylon their capital (creating the Old Babylonian Empire), and elevated Babylon to the status of a holy city, a status it would retain throughout ancient history. Hammurabi (1792–1750 BCE), king of Babylon, conquered the Assyrians and claimed to have extended his empire to the Mediterranean Sea. He is most renowned for his law code, which is a valuable source of information on the social structure of this time. His law code, carved on an 8-foot stela of black diorite, was based on an earlier Sumerian code except harsher. Furthermore, Hammurabi is known for his diplomacy and administration. He entertained foreign diplomats. He had advisers and noblemen to oversee his empire. He held court for his subjects, where he heard and acted on their grievances

personally. Also, he maintained control of the military and oversaw public works building programs.

The glory of the kingdom was short-lived. The kings gradually lost their military power and authority. Around 1595 BCE, the Hittites plundered Babylon and returned to their land. Babylon never recovered from this blow and proved too weak to resist new invaders, the Kassites from the Zagros Mountains area.

The Babylonians developed complex mathematics, which included geometry and algebra. They developed a system of symbols representing the values of numbers (such as 100s, 10s, and 1s), knew the value of π (a mathematical constant, 3.1415927, which is the ratio of the circumference of a circle to its diameter), and developed a sexagesimal counting system (based on 60) that has survived until modern times. One Babylonian text has tables that give the square root of numbers to 59 and the cube root of numbers to 32. Also, they invented the abacus, a primitive calculator. The Babylonians applied their mathematics to commerce and large-scale building projects.

Assyria

One of the results of the Amorite invasions around 2000 BCE was the establishment of a dynasty around three Assyrian cities—Nineveh, Arbela, and Ashur. This event marked the beginning of the Old Assyrian period (2000–1363 BCE). Little is known about the Assyrians during this period except that they had trade relations with the Hittites and that Babylon was already a rival kingdom. Assyria began expanding and developing into an empire during Assyria's Middle Kingdom (1363–1000 BCE). They defeated the neighboring Mittani kingdom. They had an ongoing war with Babylonia and at times were able to control Babylon. Also, they fought against tribes to their north and west. The Middle Kingdom ended as Assyrian strength succumbed to the increasing Aramean pressure.

Assyria began to exert its might at the end of the 2nd millennium BCE, beginning the New Kingdom (1000–609 BCE) and what historians call the Assyrian Empire. The empire reached its zenith in the 8th and 7th centuries BCE. Tiglath-pileser III incorporated Syria into his kingdom, as well as set himself up as king of Babylon. His successor, Sargon II, added Palestine. In 663 BCE, Esarhaddon conquered Egypt and expanded Assyrian influence and control to its greatest extent. The Assyrian Empire fell to a Mede and Babylonia coalition through a series of battles. The coalition defeated Nineveh in 612 BCE and Haran in 609 BCE, and it won the final battle fought at Carchemish in 605 BCE.

The last great Assyrian king was Ashurbanipal (669–627 BCE), who had the Babylonian library texts copied and then deposited in Nineveh. The discovery of this library in the 1800s proved to be one of the most important Assyrian archaeological discoveries as the library contained many

texts from earlier civilizations, including a copy of the *Epic of Gilgamesh*, a 3rd-millennium Sumerian story.

Assyria is noted for its practice of exiling captured people. They moved entire populations, including the Israelites, Babylonians, Persians, and Arabians. This policy was not only to control the populations to prevent uprisings but also to maximize skills of certain peoples. For example, some foreign people worked for the Assyrians as scribes, interpreters, artisans, architects, and skilled laborers.

The Assyrians were also known for their proficiency in warfare. They incorporated the war chariot, the use of a cavalry, and iron weapons into their warfare. However, the Assyrian army preferred siege warfare, which they developed to an art. They circled a city, closing off any escape. They shouted at the population, telling them to surrender. After the city weakened from a lack of water and supplies, they attacked the city walls with siege engines and battering rams, contraptions that they had invented. Also, they used psychological warfare. They displayed flayed, defeated warriors; burned people alive; impaled warriors on tall poles in front of a city after a siege; and cut off hands, ears, and noses. These displays served to dissuade others from rebelling.

Babylon experienced a revival under King Nabopolassar (626–605 BCE). He, in a coalition with the Medes, defeated the Assyrians and permanently ended their dominance. Nabopolassar established a short-lived empire (the Neo-Babylonian Empire, or Chaldean Empire) of the once Assyrian-controlled lands. His son Nebuchadnezzar (605–562 BCE) expanded and consolidated the empire. Nebuchadnezzar is renowned for defeating Judah, destroying Jerusalem, and carrying the Jews into exile (586 BCE). After Nebuchadnezzar died, the empire deteriorated under the rule of inept leaders until Cyrus the Persian (also known as Cyrus the Great) captured Babylon in 539 BCE.

Egypt

A cursory look at the monuments of ancient Egypt reveals that this ancient civilization was not only impressive but also important to regional cultural development. The mere mention of ancient Egypt brings to mind Pharaohs, gigantic pyramids, elaborate temple complexes, and hieroglyphics—Egypt's picture language. Not only was ancient Egypt the longest existing ancient civilization, but also it was a unique civilization in that, unlike Mesopotamia, desert and the Mediterranean Sea surrounded its arable land and isolated the Egyptians from other groups of people. Also, Egypt was unique in that life and culture centered on, depended on, and were shaped by the Nile River.

Although people lived in the area from 5500 BCE, historians usually define the kingdom of ancient Egypt as the time between the beginning of the dynastic period around 3100 BCE and the conquest of Alexander the Great in 332 BCE. The dynastic period began with the unification

of Lower and Upper Egypt under one ruler. Little is known about this ruler (usually associated with Menes, or Narmer) or the unification of the two kingdoms due to a lack of written and physical evidence. What is known is that Early Dynastic Egypt (ca. 3100–2640 BCE) was a peaceful kingdom in which the rulers established a standard for the following dynastic periods. They traded as far south as Nubia and into the Levant as far as Syria and had already begun to exploit turquoise mines. During this time, the Egyptians advanced religion, promoted the notion of kingship, centralized governmental administration, developed sophistication in art and architecture, introduced hieroglyphic writing, and initiated the building of pyramids as funerary monuments.

In the Old Kingdom period (ca. 2640–2160 BCE), the Egyptians advanced monumental architecture to levels never seen before and rarely reached afterward. During this period, the pharaohs built the Great Pyramids at Giza, Saqqara, and elsewhere. Such building feats demonstrate that the pharaoh had centralized control of a willing population in addition to having a highly developed bureaucracy needed to undertake such projects. This development also demonstrates that the Egyptians had knowledge of higher mathematics and skill in moving extremely heavy building materials.

Egyptian art became standardized into “Egyptian” form during the Old Kingdom. It became elegant in style, with attention given to linear and rectilinear control and to baselines. The artists paid close attention to natural forms. For example, they drew animals in a common posture as found in the wild so that they looked realistic. Egyptian artists drew humans in an ideal form. They depicted men as being tall, lean, and fit, having broad shoulders and a narrow waist. They depicted women as young, slender, and well shaped, without any excess fat. Artists portrayed both men and women as having an air of self-confidence, balance, and proper proportions.

After a period of war and disunity (First Intermediate period, ca. 2160–2040 BCE), Egypt entered the Middle Kingdom period (ca. 2040–1650 BCE). Provincial lords held much power during much of this period in Egypt. However, the government did regain enough internal stability so that it could reestablish trade with the Levant (Byblos and Ugarit) and Lower Nubia.

During the Second Intermediate period (ca. 1670–1550 BCE), an Asiatic people that Manetho (an Egyptian priest and historian from the 3rd century BCE) called the “Hyksos” ruled Egypt. Eventually, the Thebans ran them out of the country and reunited Egypt. Battle with the Hyksos marked the beginning of a warrior culture in Egypt that led to its rise as a military power that had an organized, standing army. Also, the Egyptians made several innovations in weapons and military technology. They incorporated the chariot as a fighting platform into their ranks as well as the composite bow. This warrior mentality and a predisposition toward expansionism predominated the

New Kingdom period (1550–1070 BCE), a time when ancient Egypt reached the height of its influence, wealth, and power. The pharaohs, particularly Thutmose III, made multiple campaigns into Nubia and into Asia as far as the Euphrates River, amassing the largest empire of ancient Egypt.

Almost all pharaohs of the 18th and 19th dynasties made military campaigns outside of Egypt's traditional borders and then returned home to have their exploits written down and put on public display at temples and at their elaborately built mortuary complexes. The most famous of these campaigns is the battle of Rameses II with the Hittite Empire at Kadesh on the Orontes River. These two chariot armies fought for 2 days before the battle ended in a stalemate. On returning home from the battle, Rameses II had accounts written of the battle, portraying him as the victor, and displayed these accounts at various places throughout his empire. Gifted with a long, 67-year reign, he had more cities, temples, statues, and monuments built than any other pharaoh.

The end of the New Kingdom marked the end of Egypt's empire and her golden years. After the death of Rameses III (1152 BCE), Egypt lost control of the Levant and much of Nubia, due mainly to the invasion of the Sea Peoples and internal struggles. Papyri dating to this time indicate widespread corruption and internal strife. Although a few pharaohs exerted power, none could build an empire. After falling to the Libyans, Nubians, Assyrians, and Persians, Egypt fell finally to Alexander the Great, the Macedonian, in 332 BCE. Egypt did have some glory in the Ptolemaic period (323–30 BCE). Egyptian religions were popular throughout the Hellenistic and Roman worlds, especially mystery religions. Furthermore, the Egyptian coastal city of Alexandria, founded by Alexander, became the learning center of the ancient world during this time, having a library with a vast collection of writings.

One of the more interesting anthropological developments unique to ancient Egypt is the influence of women. Egypt had two women pharaohs for certain: Hatshepsut (18th Dynasty, 1479–1458 BCE) and Cleopatra VII (69–30 BCE). Hatshepsut ruled for 22 years and engaged in warfare in Nubia, the Levant, and Syria. She established trade relations with the land of Punt when she brought back 31 live frankincense trees, the first recorded attempt to transplant a foreign plant. Also, she engaged in a massive building campaign at Karnak and Beni Hasan, with her greatest project being her mortuary temple complex at Deir el-Bahri. Egypt possibly had other women pharaohs; however, the Egyptian records are not clear as to their role or function. These women include Merneith (1st Dynasty), Nimaethap (3rd Dynasty), Ankhnesneferibre II (6th Dynasty), Nitocris (6th Dynasty), Sobekneferu (12th Dynasty), Ahhotep I (17th Dynasty), Nefertiti (18th Dynasty), Meritaten (18th Dynasty), Neferneferuaten (18th Dynasty), and Twosret (19th Dynasty). Whether pharaohs or not, these were women of great influence. Also, Egyptians held the belief

that women carried the royal bloodline. Men had to marry a royal woman, usually the eldest daughter of the previous pharaoh, in order to be pharaoh. Furthermore, ancient Egyptian women had more rights than women in other contemporary cultures. They could own land, inherit from family members, and even go to court to defend their rights.

Ancient Egypt's imprint on humanity continues to be visible today. The Great Pyramids of Giza, Rameses colossal statues, numerous hieroglyphic texts, and Bible stories of the Hebrews' struggle in Egypt are all markers of this past great civilization. Archaeological discoveries, such as Tutankhamun's gold-filled tomb, a plethora of mummies (and the so-called mummy's curse), and ornate temples and buildings, combined with the ancient Egyptian obsession with the dead, have fueled the storyline of many modern novels and movies. Ancient Egyptian art continues to impress upon modern culture and continues to be appreciated for its simplistic yet sophisticated elegance.

The Hittites

The Hittites were an Indo-European people of mysterious origins who peacefully arrived in central Anatolia around the beginning of the 2nd millennium BCE. The Hittite kingdom centered on the city of Nesa and the capital city of Hattusa (located near Boghazköy in modern Turkey). These cities also are significant in that the Hittites called their language "Nesite," named after the city of Nesa, and called their kingdom "the land of Hatti," named after the capital city of Hattusa.

Scholars divide Hittite chronology into two periods: the Old Kingdom (ca. 1750–1500 BCE) and the Hittite Empire, or the New Kingdom (ca. 1430–1180 BCE), with a time of turmoil in between sometimes called the Middle Kingdom. During the Old Kingdom, the Hittites expanded from being colonies of merchants to a kingdom incorporating much of Asia Minor and northern Syria. The most notable event and demonstration of Hittite power came in 1595 BCE when the Hittites under Mursili I took northern Syria, the city-state of Aleppo, and then sacked Babylon, ending the Old Babylonian Kingdom.

After a period of internal struggling for control of the throne, the Hittites once again exerted their power and thus began the New Kingdom. This kingdom expanded to include most of Anatolia and northern Syria. During this time, the Hittites rivaled Egypt in power and influence. In 1274 BCE, these two kingdoms met at Kadesh to fight one of the greatest chariot battles of the ancient world. Although the battle ended in a draw, Rameses II had accounts of the battle describing his great victory written in public places all over Egypt. A few years later, the Egyptians and Hittites made a peace-and-mutual-protection treaty, one of the first of its kind in history. The Hittite Empire ended suddenly around 1180 BCE with the mass migration of the Sea Peoples.

Although nearly forgotten for 3,000 years, the Hittites were one of the most significant civilizations in the ancient Near East. Archaeological excavations in the late 19th and early 20th centuries turned up tens of thousands of texts on clay tablets. Although many of the texts were written in Assyrian or Babylonian cuneiform and could be translated, scholars could not read the Hittite hieroglyphic texts for almost a century after their discovery. Once deciphered, these texts divulged a wealth of information about the Hittite civilization, including laws, treaties, business transactions, correspondences, and religious rites. Also, these texts show that the Hittites excelled at commerce. They traded throughout the ancient Near Eastern world, connecting the Mesopotamian world to Palestine, Egypt, Greece, and the eastern Mediterranean area. The Hittites adopted and modified Sumerian and Old Babylonian culture, including laws, political and economic structures, and ideas, and they passed this culture to their commercial partners. Also, Anatolia was rich in raw ores and metals, which were the Hittites' main items of trade. Particularly, the Hittites developed technology in working with iron thereby leading the transition of this region into the Iron Age. Furthermore, they invented the war chariot and were among the first people to use iron weapons. The combination of the war chariot and iron weapons made them formidable in battle.

Hittite texts also included many laws and treaties. In terms of laws, Hittite laws tended to be fairer than the harsh Babylonian laws, with much fewer capital offenses. The most famous treaty, and the oldest known nonaggression document in history, was one made between Hattusili III and Rameses II of Egypt in 1258 BCE. In this treaty, both sides agreed to cease hostilities against each other and come to the other's aid in the event of external or internal aggression. They sealed the treaty by Rameses II marrying the daughter of Hattusili III; thus, they became in-laws. Such marriage alliances were a common practice in the ancient Near East.

Also, the Hittites are known for their architecture. Hattusa was a heavily fortified, 300-acre city with massive walls, monumental administrative buildings, and grand temples. Recent discoveries show that the Hittites initiated the creation of the underground cities in Cappadocia. Authorities believe that the Hittites began carving underground chambers for storage. The Phrygians expanded these areas into underground cities for protection against the Assyrians.

The Hittites were very accepting of the culture and traditions of other peoples, even their gods and religions. The religious shrine at Yazilikaya, a site located about one kilometer northeast of Hattusa, best demonstrates this incorporation of foreign deities. The Hittites carved this shrine from a natural outcropping of rock that formed two natural chambers. The Hittites carved a parade of Hurrian deities down the side walls of the larger chamber. The two processions of carved figures, one of male and one of female

deities, converge on the back wall. All totaled, they number about 70 figures. Because of their tolerance and incorporation of foreign deities, the Hittites became known as the "kingdom of thousands of gods."

Future research in Hittite studies, particularly of the Hittite texts and continuing archaeological excavations of the main sites, will further illuminate this once lost and remarkable civilization. One of the most exciting areas of current research is the study of the Hittite development of and influence on the Cappadocian underground cities.

Persia

The Persians went from being a group of nomadic tribes to a first-rate empire in the span of a generation. At its height, the empire stretched from the islands of the Aegean Sea and Libya in North Africa in the west, to India in the east, to the Aral Sea and the Jaxartes River in the north, and to the Persian Gulf and Indian Ocean in the south. Cyrus II the Great began expanding Persia, originally located in the Zagros Mountains of what is modern Iran, in 550 BCE by conquering their overlord to the north—Media. This event began the Achaemenid Empire, or Persian Empire, and propelled the Persians on their way to building the largest empire of the ancient world. This empire endured until Alexander the Great of Macedonia defeated Darius III, the last Persian king, in 331 BCE. After Media, Cyrus turned his attention west where he defeated Lydia (in modern Turkey) in 546 BCE, then central Asia, and then Babylon in 539 BCE. Cyrus died in 530 BCE and left the empire to his son Cambyses. Cambyses continued Persian expansion by conquering Egypt in 525 BCE. Darius I the Great usurped the throne after the untimely death of Cambyses in 522 BCE. After stabilizing the empire, Darius instituted many reforms that made Persia great, including improvements in roads, better communications, building programs, the introduction of coinage, and so on. Darius sought to add Greece to the empire, thus beginning the Persian/Greek Wars, but died before he could accomplish this task (486 BCE). Darius's son Xerxes launched a massive land and sea invasion into Greece only to be defeated by a much smaller Greek army and navy. This defeat ended Persian expansionism and marks the height of the Persian Empire. Artaxerxes, Xerxes's son, sued for peace with the Greeks in 449 BCE. Subsequent Persian kings, not being great military generals like Cyrus and Darius I, dealt mostly with internal issues. The Persian Empire fell to the young, ambitious king of Macedonia, Alexander the Great, in 331 BCE.

Politically, the Persians did not follow some of the practices of preceding empires. They allowed exiled peoples to return to their homelands. They encouraged and often paid for the rebuilding of foreign temples. They allowed local rulers to govern their own territories by their own laws. Also, they incorporated foreign armies, usually of defeated foes, into the Persian army; thus, they could amass vast

armies at will. For example, Darius III's army numbered over one million when he battled Alexander the Great.

The Persians also brought innovation to the ancient world. They made paved roads, with small relay stations spaced out about one day's journey, so that people could travel in comfort and safety. However, travel on Persian roads required a travel document—a pass. The Persians had an express postal system along these roads. News from the Aegean Sea, for example, could reach Susa, some 1,200 miles away, in less than 2 weeks. The Persians learned about and adopted the use of minted coins (standardized currency) from the Lydians and spread it throughout the eastern part of the ancient world. Darius I particularly promoted coins, even to the extent of having a denomination of gold coin named after him—the *daric*. Darius used coinage to standardize the payment of tribute from subjugated nations and people groups. Because of the efficient tribute system, the Persian Empire was one of tremendous wealth. The Persians also introduced the first known team sport—polo. It was a fast-paced game with few rules to the extent that fatal injuries were common. They also played a game similar to modern chess.

Studies of the Persian Empire have increased in recent years. Scholars have recognized that the Persian and Greek wars were a defining point for East/West relations. They were not only a clash of militaries but also a clash of cultures, social customs, and worldviews as well. Had Persia won those wars, Europe and the West would look vastly different today. This clash of cultures is still a sticking point as demonstrated by the terror attacks on the United States on September 11, 2001, and subsequent attacks on Western nations.

Greece

The ancient Greeks, especially those of Archaic and Classic Greece, influenced modern Western culture more than any other ancient civilization. Philosophy, democracy, architecture, theater, art (particularly sculpture), literature, and loan words (English words derived from Greek) are just a few contributions the Greeks made to Western culture.

Greece, being a mountainous country with small plains and valleys and a plethora of islands, naturally lent itself to the development of semi-isolated city-states. Furthermore, given the mountainous terrain, the Greeks found the sea to be well suited for communication and travel, and it became their primary means of contact with other cultures.

The Mycenaean Civilization

Often referred to as representing the first civilization of modern Europe, the ancient Greeks were an Indo-European group that moved into the area around 1900 BCE. By 1600 BCE, the Greeks had developed into a warrior society, and they had begun to expand their influence into

the Aegean and Mediterranean seas. They captured Knossos, the palatial capital of the Minoan civilization on Crete. About a century later, the palaces at Knossos lay destroyed; however, the Mycenaean began building palaces on the Greek mainland at sites such as Mycenae, Tiryns, Thebes, Orchomenos, Pylos, and Athens. The Mycenaean constructed megalithic fortifications around these cities with thick walls and massive gate complexes. This period is also known for large *tholos* (cone shaped) tombs and chamber tombs. The Mycenaean mastered hydrology as demonstrated through their building of dams and dikes and their channeling of water via aqueducts into their cities where it collected in underground chambers. Perhaps their greatest hydrological feat was draining the valley area called the Kopais basin—formerly the largest lake in central Greece, a natural, shallow marshy lake measuring about 18-by-11 kilometers—and turning it into farmland. They developed a series of canals leading to a central canal that funneled the water into the northern Euboean Gulf. The Mycenaean heavily fortified a site called Gla, a former island in Lake Kopais, to protect this drainage system. Gla, the largest of Mycenaean sites in land area, had cyclopean walls measuring up to 6.75 meters thick 5 meters high, and stretching over 2.8 kilometers around the site.

Archaeologists have discovered many Mycenaean period texts, written in a script linguists call Linear B. These texts are concerned mostly with business matters including taxation, sale of slaves, distribution of rations, descriptions of textile and furniture production, lists of weapons, estate holdings, and so on. Some of the texts also deal with social matters and politics.

The Mycenaean were a seafaring people. Items discovered in tombs show that they traded at sites all over the Mediterranean Sea area, including Egypt, Phoenicia, Syria, Asia Minor, Crete, Sardinia, Sicily, Spain, and southern Italy.

For unclear reasons, the Mycenaean civilization came to an abrupt end around 1200 BCE. The palatial cities were destroyed, and the people migrated away from these cities to other areas near the Mediterranean Sea or to naturally defensible positions. Political organization changed radically, and writing stopped. This upheaval moved Greece into the Dark Ages (ca. 1100–776 BCE).

Archaic and Classical Greece

The Archaic Age (776–500 BCE) was a time of immense change in Greece. People began to resettle the cities throughout the Greek mainland, which developed into autonomous city-states. They also scattered throughout the Mediterranean world, settling colonies in southern Italy; southern France; on Sicily; on the islands of Rhodes, Cyprus, Lesbos, Crete, and Samos; in Asia Minor; and along the shores of the Black Sea. Although scattered, the Greeks had some commonalities that promoted loyalty. They were of the same race, spoke the same language,

worshipped the same pantheon of gods, held many of the same religious and national myths, and participated in pan-Hellenic cult centers located at Delphi, Delos, and Olympia. Monarchs, members of families of nobility, ruled the city-states at the beginning of the Archaic Age; however, tyrants (Greek *tyrannoi*) ousted the monarchs and were the primary rulers by the end of the age. In conjunction with, and in contrast to, the move toward tyranny was the extension of citizen rights to people outside nobility, usually expressed in the form of city councils.

Athens began developing its democratic form of government in the early 6th century BCE, but it did not reach its fullest form until the 5th century BCE. This city-state was unique in that its citizens could elect political leaders, military generals, and other government officials. They could even vote to banish someone from the city. During this election, the people wrote on a piece of broken pottery, called an *ostrakon*, the name of a person they wanted removed from the city. The person receiving the most votes then had 10 days to permanently leave the city; hence, they were “ostracized.”

In general, Greek city-states flourished during the Archaic Age. They traded extensively with each other and with *barbaroi*, that is, non-Greek-speaking cultures. The Greeks adopted and spread the use of coins, a Lydian invention, which aided in commerce and trade. They also began the tradition of making coins in the shape of flat, round discs with impressions and texts on both sides (heads and tails). Two confederations of city-states dominated this age: the Thessalian League in the north and the Peloponnesian League led by Sparta in the south. The Spartans dominated the Peloponnesian League to the point that they invaded their neighbor, Messenia, and enslaved them (whom they called Helots). Athens did not join either league but rather chose to be independent, eventually creating its own league. Growing tensions between Athens and Sparta tended to dominate national politics late in the Archaic Age. Although related, the Greeks tended to mistrust and fight each other as exemplified by Athens and Sparta’s dubious relationship. However, they tended to join together against a common external foe, as they did against the Persians in the 5th century BCE.

In addition to politics, the Greeks excelled in art, architecture, philosophy, and literature in the Archaic Age. They began to paint pottery with lifelike scenes, depicting both real and mythical events and settings. The two most popular types of pottery painting styles were black figure and red figure where the painters depicted the principle people or characters in either black paint or as the natural red color of the pottery. Both skillfully depicted human and mythic figures in fine detail. This period saw the beginning of monumental sculpture. Sculptors carved humans in life-size or larger than life-size forms in the round. Architecture incorporated symmetrical design and columns using mostly stone for building material. This marks the beginning of “classical architecture,” a style highly influential

up to modern times. Persian and Babylonian thought influenced Greek philosophers living in Miletus, such as Thales, Anaximander, and Anaximenes. They began to ponder the nature of man and the universe as well as mathematical and astronomical principles. Some of the philosophers, like Pythagoras, developed schools and trained followers (students). Although much poetry is attributed to this period, the greatest literary works are the writings of Homer and Hesiod. These works shaped Greek mythology, and scenes described in their literature became common themes in Greek art.

The Classic Age (500–338 BCE) was more a refining of Archaic traditions and customs than a distinct age. War, both external and internal, dominated this period. The Greeks fought the Persians (499–479 BCE) in several key battles—Marathon (in 490 BCE), Thermopylae (480 BCE), Salamis (480 BCE), and the final battle at Plataea (479 BCE). The Persians vastly outnumbered the Greeks in each battle, and the fact that the Greeks won every battle except Thermopylae (which was a psychological victory) is amazing. The Greeks’ surprising victories can be attributed to their using heavily armed infantry who fought as a unit against a lightly armed enemy who fought as individuals, their selection of strategically advantageous locations for battle, their making fewer mistakes than the Persians, and luck. The Spartans, under oligarchic rule, won on land, and the Athenians, under democratic rule, won on sea. These differences in political ideology set the stage for a later clash between these two city-states and their allies. Furthermore, the defeat of the Persians was one of the most defining events of Western civilization, galvanizing a conflict between the East and the West that is still present today. If the Greeks had lost, then the Persians would have taken most of Europe thus radically changing history and the modern world.

Greece enjoyed peace for nearly 50 years after the Persian defeat. Athens grew to be the largest city in the world and created a seafaring empire. Athenians began electing juries to courts and electing and paying magistrates. They even allowed poor people to participate in politics, a move that promoted the fledgling democracy. Sparta continued in its traditional ways. This difference between Athenian and Spartan rule and customs led to growing mistrust and ultimately conflict. In 431 BCE, the Corinthians asked the Spartans for assistance against Athenian oppression. Sparta agreed. This act began the Peloponnesian War (431–404 BCE), a civil war that nearly tore Greece apart and began the decline of the Greek civilization. Sparta came out victorious but even Sparta fell to Thebes in 371 BCE. Greek power continued to wane until Philip II, king of Macedonia, defeated the Greeks at Chaeronea in 338 BCE and incorporated them into the Macedonian kingdom.

The period between the Persian and Peloponnesian Wars were the golden years of ancient Greece and perhaps the time of greatest influence for modern Western culture.

Architecture, literature, and art thrived. The Athenians, under the supervision of the great sculptor Phidias, constructed the famous temple to Athena on the acropolis at Athens, containing a large statue of Athena. The gold plating on the statue of Athena reflected the wealth Athens brought in from its empire. During this time, the great playwrights Aeschylus, Sophocles, and Euripides wrote tragedies while Aristophanes wrote comedies. Herodotus and Thucydides wrote histories, which are significant sources for the modern understanding of ancient events. People listened to great orators, such as Pericles, and a little over a century later, Demosthenes. Socrates, followed by Plato, Xenophon, Aristotle, and Aristophanes, laid the foundation for Western philosophy. In the Hellenistic Age (323–31 BCE), Greece also excelled in discoveries in science and mathematics.

Fortunately, Greek culture did not end with the fall of the Greek city-states. Alexander the Great, Philip II's son, adopted Greek culture and spread it eastward throughout his empire. A few centuries later, the Romans also adopted and spread Greek culture except this time throughout the Mediterranean Basin and into Western Europe.

Rome

The Roman civilization was the last major ancient civilization before Europe and North Africa plunged into the Dark Ages. Modern Western civilization owes much to the Romans, including the influence of the Roman legal system, tactics in warfare, monumental architecture, the spread of Christianity, and the *pax Romana*—the peace of Rome. The Roman civilization was also one of the most enduring civilizations, lasting over 1,200 years.

The city of Rome lay north of the Greek colonies in southern Italy and south of the metal-producing cultures of Central Europe; thus, both cultures influenced it and traded with it. Furthermore, the city was far enough away from the sea to avoid pirates but sat at the first practical crossing of the Tiber River. Being located in the center of the Mediterranean Basin made Rome strategically located to be the capital of a Mediterranean/European empire.

According to tradition, Romulus founded the city of Rome in 753 BCE. However, historians know little about the early history of Rome, except that it was a part of a collection of individual communities in Latium. During its early years, kings ruled Rome and established its political and religious institutions. Rome grew to be a prominent city, partially due to its geographic location, and eventually became the capital of Latium.

In 509 BCE, patrician nobles overtook the government, ousted the king, and began the Roman Republic (509–48 BCE). Under the Republic, the Senate ruled the people and selected magistrates to oversee various administrative functions, including the military. The Senate could

appoint a temporary dictator (for up to 6 months) in times of crisis or war. Roman society also contained groups other than the patricians, including the plebeians, who were free-born commoners. For 200 years after the beginning of the Republic, these social classes struggled for power. In the end, the plebeians won equal rights with the patricians, including the right to vote, hold offices, and make law and the right to intermarry with patricians.

Rome's realm of control and influence spread during the Republic years. In 338 BCE, Rome began to fight with other members of the Latin League and defeated them. Then, the Romans fought the Samnites in the mountains of central Italy, and they had subdued them by 295 BCE. Twenty-five years later, they controlled the entire Italian peninsula, having defeated the Etruscans, the Gauls, and the Greek colonies in southern Italy.

Rome rapidly expanded its land holdings during the three Punic wars (wars against Carthage). During the First Punic War (264–241 BCE), Rome made Sicily, Sardinia, and Corsica their first provinces. They added the eastern and southern sections of Spain during the second war (218–201 BCE, also called the Hannibalic War) and annexed North Africa during the third war (149–146 BCE). These wars left no doubt that Rome was the supreme power in the Mediterranean area. Between the wars, Rome defeated the tribes of southern Gaul and began to spread to the Greek-controlled territories to the east. Contact with the Greeks brought Hellenization to the west (Alexander the Great had spread Hellenistic culture as far as India to the east and Egypt to the south). Rome adopted much of Hellenistic culture, including its religion, art, architecture, literature, and language. The Romans even stole sculptures and objects of art from Greece and took them to Rome. They effectively spread a common culture, the process of Hellenization, into all areas of the ancient Mediterranean world.

A fast-growing population in Rome provided the need for efficiency and promoted the seed of invention. The Romans invented the screw and various kinds of gears, devices they used to make grain mills more productive. They developed aqueducts to bring water from mountains many kilometers away to supply their many fountains and baths with fresh water. They created waterwheels to power olive presses, winepresses, or presses to crush metal ores. Also, they created animal-powered machines similar to the ones powered by water. They developed ceramic technology so that they could mass-produce terra-cotta items, such as fine tableware, roof tiles, and fired bricks. In the late 1st century BCE, they invented glassblowing. The Romans used shipping to move goods cheaply throughout the republic; thus, all kinds of goods flowed throughout the Mediterranean Basin. They built protected ports and lighthouses to aid their maritime interests.

The Roman Republic ended when the Roman system of government (the Roman Senate) could no longer

effectively rule the vast region that Rome controlled. Therefore, powerful men began to serve as tribunes for the people, usually having their own armies and serving over a geographical region within the republic. This led to the Senate's appointment of the First Triumvirate: Julius Caesar, Pompey the Great, and Licinius Crassus in 60 BCE. These men added vast areas to the empire—Caesar added Gaul and Pompey added Syria and Palestine; however, Crassus died in battle fighting the Parthians in southwest Asia. Civil war broke out between Julius Caesar and Pompey when Caesar brought his army south of the Rubicon River and into Rome in 49 BCE. Caesar defeated Pompey in 48 BCE and became sole ruler, thereby ending the Roman Republic. Senators who supported oligarchic rule assassinated Caesar on March 15, 44 BCE, the famous “Ides of March.”

After another period of civil war, Caesar's chosen heir, Octavian Augustus, became the first Roman emperor in 31 BCE. He reorganized the Roman Republic into an empire, consolidating power under the emperor (the principate) and away from the senate although he kept the magistratures in place. Through good administration, he brought organization and efficiency to the empire. He placed the army along the borders of the empire to protect it, and he changed the policy from treating conquered territories as such to treating them as peaceful provinces. He instituted a system of taxation that replaced extortion as a means of collecting revenues. By the end of his 44-year rule (CE 14), Augustus had reorganized Roman politics and laid the foundation for the institution that would govern the Roman world for the next 400 years. Augustus brought peace (*pax Romana*) to the Mediterranean world thereby allowing commerce, literature, and the arts to flourish. During the 1st century CE, Christianity, a new sect out of Judaism, began to spread throughout the empire. Christians tended to maintain their own culture and traditions, and that attracted suspicion. Under Nero (CE 54–68), they became the object of persecution.

Perhaps one of Rome's greatest achievements, and certainly an icon of its strength, was the Roman Colosseum. Vespasian (CE 69–79) began building the colosseum about CE 71, but it was not completed until the reign of Titus (CE 79–81) in CE 80. This elliptical structure measured 189 meters long, 156 meters wide, and 48 meters high and had a seating capacity of around 50,000. The colosseum floor covered underground rooms and tunnels where performers and animals remained until elevators and pulleys raised them up. The colosseum hosted a variety of shows, including battles with gladiators. The colosseum is a major tourist attraction in modern times.

The Roman Empire reached its largest extent under the emperor Trajan (CE 99–117). Trajan conquered Arabia, Mesopotamia, and Dacia. A few years later, Hadrian (CE 117–138) had to evacuate Mesopotamia thus starting the shrinking of the empire. Trajan's reign began a “golden age” for the empire that lasted until the

death of the “philosopher emperor” Marcus Aurelius (CE 161–180). The empire enjoyed good rule, relative peace, and cooperation between the senate and the emperor. During this time, many people became Roman citizens. Architecture flourished such as the building of Hadrian's Wall across Britain. The Romans invented concrete at this time. Concrete allowed for the construction of structures that spanned wide spaces. Literature also flourished, as exemplified by Tacitus's writing of history and Juvenal's writing of satire.

The 3rd century CE saw the beginning of great change. Caracalla (CE 211–217) granted Roman citizenship to all people within the empire. This move shifted the tensions between citizens and noncitizens to a struggle between the upper and lower classes. Internal struggles and foreign invasion began tearing the empire apart. The Roman emperors blamed the Christians for the empire's plight and began widespread persecutions. Although persecutions had been carried out sporadically and locally before, Decius (CE 250) and Valerian (CE 257) carried out general, empirewide persecutions of the Christians. Interestingly, Christianity became a tolerated religion under Constantine I the Great (CE 306–337) and made the official religion of the empire under Theodosius I (CE 379–395).

Diocletian (CE 284–305) realized that the empire was too large for one person to control. He created the tetrarchy in CE 285 thereby dividing the empire in half into the West and East. In CE 324, Constantine I established the city of Constantinople as the Eastern capital. Afterward, the East (Byzantine) Empire prospered while the West disintegrated. The city of Rome finally fell to Germanic tribes in CE 476 thus ending the Roman Empire. The East (Byzantine) Empire continued to exist and thrive until the Ottoman Turks captured Constantinople in CE 1453 and ended the empire.

The Roman civilization set the foundation for Western culture. It introduced and spread the Latin language, provided a legal system that many modern Western governments would emulate, and spread or produced many inventions that aided in mass production. Also, the Roman Empire saw the development and expansion of Christianity. Interestingly, the church was the means that provided continuity of culture into Europe's Medieval Age.

Conclusion

Modern Western civilization owes much to the civilizations of the Mediterranean Basin and the Middle East. They provided the foundation for art, architecture, science, mathematics, literature, religion, philosophy, law, and technology. One can hardly walk in a modern, Western city and not see evidence of this influence in architecture or hear it in the words people speak. Even the names of the stars and planets have links to these ancient cultures.

Table 43.1 Ancient Civilizations Timeline

	Mesopotamia	Egypt	The Hittites	Persia	Greece	Rome
3500 BCE	<ul style="list-style-type: none"> – Sumerian migration into Mesopotamia (pre-3500) 					
3000 BCE	<ul style="list-style-type: none"> – Cuneiform writing invented (ca. 3100) 	<ul style="list-style-type: none"> – Menes unifies Egypt (ca. 3100) 				
2500 BCE	<ul style="list-style-type: none"> – Akkadian overthrow of Sumer (ca. 2350) – 3rd Dynasty of Ur (ca. 2100) 	<ul style="list-style-type: none"> – Old Kingdom (ca. 2640–2160) – Building of the Great Pyramids 			<ul style="list-style-type: none"> – Minoan civilization on Crete (ca. 2700–1450) 	

	Mesopotamia	Egypt	The Hittites	Persia	Greece	Rome
2000 BCE	<ul style="list-style-type: none"> – Rise of Babylon (ca. 1800) – Hammurabi (ca. 1792–1750) 	<ul style="list-style-type: none"> – Middle Kingdom (ca. 2040–1650) – Hyksos occupation (ca. 1670–1550) 	<ul style="list-style-type: none"> – Old Kingdom (ca. 1750–1500) 		<ul style="list-style-type: none"> – Indo-Europeans migrate into the Greek mainland (ca. 1900) 	
1500 BCE	<ul style="list-style-type: none"> – Hittites sack Babylon (1595) 	<ul style="list-style-type: none"> – New Kingdom (ca. 1550–1070) – Hatshepsut (1479–1457) – Thutmose III (1479–1425) – Ramesses II (1279–1213) – Battle of Kadesh (1274) – Invasion of Sea Peoples (ca. 1200) 	<ul style="list-style-type: none"> – Mursili I sacks Babylon (1595) – New Kingdom (1430–1180) – Battle of Kadesh (1274) – Kingdom ends (1180) 		<ul style="list-style-type: none"> – Mycenaean period (ca. 1600–1100) – Dark Ages (ca. 1100–776) – Archaic Age (776–500) 	<ul style="list-style-type: none"> – Founding of Rome (753)
1000 BCE	<ul style="list-style-type: none"> – Rise of the Assyrian Empire (ca. 1000) – Esarhaddon invades Egypt (671) – Neo-Babylonian Empire (626–539) 	<ul style="list-style-type: none"> – Assyrians invade Egypt (671) 				

(Continued)

Table 43.1 (Continued)

	Mesopotamia	Egypt	The Hittites	Persia	Greece	Rome
500 BCE	<ul style="list-style-type: none"> – Assyria falls (605) – Babylon falls to the Persians (539) 	<ul style="list-style-type: none"> – Persians invade Egypt (525) 		<ul style="list-style-type: none"> – Cyrus II the Great defeats Media (550) – Cyrus II takes Babylon (539) – War with Greece (499–479) 	<ul style="list-style-type: none"> – Classical Age (500–338) – War with Persia (499–479) – Peloponnesian War (431–404) – Defeated at Chaeronea by Philip II the Macedon (338) 	<ul style="list-style-type: none"> – Beginning of the Roman Republic (ca. 507)
1 CE		<ul style="list-style-type: none"> – Alexander defeats Egypt (332) – Cleopatra VII (69–30) 		<ul style="list-style-type: none"> – Alexander defeats Persia (331) 		<ul style="list-style-type: none"> – 1st war with Carthage (264–241) – 2nd war with Carthage (216–202) – Rise of the Roman Empire (ca. 48) – Beginning of Christianity (30) – Golden Age (99–180) – Division between East and West (283) – Constantine the Great (307–337)
500 CE						<ul style="list-style-type: none"> – End of the West (476)

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HISTORY AND ANTHROPOLOGY

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History is both a structured and a dynamic process. The history of history begins with the proposition that it is the telling of history that is important. Objectivity is a specific interpretation that is related to a specific subjective reference point. The social facts a historian deals with are related to dominant but changing social forces that appear dissimilar to people with different points of reference. These social facts and forces are defined in terms of historical trends that are interpreted differently by different historians of the same time period. Historical trends then presuppose that a transformation is happening with these social facts. Changes in the social life of a nation are reflected in the changes in the class structure, and ultimately changes in the productive techniques and social environment.

Human knowledge as expressed by individual psychology develops collectively through growing up and interacting in a social setting in concert with a changing social environment. Even the language that a people speaks is learned through communication within social groupings. The world as we experience it is created out of the way we see our lives and think about our personal active participation in the events of our lives. This, in turn, is at every point a social creation.

We are products of our social upbringing. Our thoughts and ideas are the invention of a specific set of social, cultural, and historical conditions. We learn through the exchange of ideas in the social setting we participate in.

Each culture within its own historical setting develops a unique worldview. Every culture develops along its own path, with its own thought patterns that are created out of a shared but changing worldview and narration. This is reflected in the way a people responds to events in their world.

Within each society and each ethnic group in that society, different classes often develop different, and sometimes competing, belief arrangements and points of view. Even within classes, different genders and generations develop competing convictions and perspectives. This is true even if people are employing the same symbols and unifying ideologies. These distinctive occurrences in the collective beliefs and attitudes are built on historical paradigms. New sets of assumptions that constitute a way of viewing reality for the community are forged from what is left over from past worldviews, creating an acknowledged understanding that becomes recognized as real. This change develops continuously because life is always changing. Altered circumstances that are lived in the present stand in contrast with past interpretations of life. Because people are active within their social environment, their environment reflects that activity. People interact consciously with their environment. While reacting to their immediate needs, they often create outcomes that have long-term effects. This is in part the nature of social evolution. The result is largely the consequences of our collective actions that are, in fact, unpredicted. This leads to a need for a people to come up with new strategies to come to terms with the changes brought

about in the societal ecosystem. History at this point is the story of important modifications.

History reflects recurrent adjustment to a continuously changing environment. There is constant engagement between communities, between individuals within communities, and between people within their larger environment. This alteration also coaxes a persistent reinterpretation of the conventional cardinal philosophy. This is the essence of the enduring human condition.

To understand these changes by using both diachronic anthropology and historical sociology, we begin by observing just how situational truth is. It is not enough to describe a social fact objectively. The historical sociologists/anthropologists need to also look at the cultural understanding of the fact in the context of the larger society. This includes the careful examination of the motives, values, and interpretations of the participating actors in their lived social drama. In the social sciences, objective explanations are in fact trite, dispassionate accounts, and without cultural understandings, they are basically dull.

Because changes in people's attitudes reflect changes in their existential reality, a people's beliefs and point of view are part of any scientific study of society. The actual experience of existence is filtered through a shared worldview that is culturally and historically specific. Each cultural-historical epoch has its own unusual and salient worldview. The historical artifacts of socially created worldviews are the tense interaction between differing worldviews of the historian and the subject matter being studied. The actual threat of domestic communism during the post-World War II era is going to be told differently by historians who came of age in the turmoil of the 1960s and those who came of age in the post-Cold War era, 30 years later. The second set of historians does not have the same sense of moral indignation leveled against the U.S. government's antisubversive programs.

Along similar lines, particular sociological theories are set in specific historical settings. Established social theories correspond to the position and point of view of the individual who initially set up the theory. The devotees inhabit a distinctive point in the tiered social structure. Each theory, then, has a legitimate perspective given the social site of the researcher.

Any serious study of anthropology or sociology would require that at some point students carefully read the classics while examining the historical context in which they were written. Because the contemporary code of beliefs and philosophies is created out of elements of past theories, the classics remain important to any dynamic study of sociology. Through anthropology, we can better understand the historical and social-cultural context that gives rise to any theory.

For example, the idea that a society is like an integrated organism requires that the writer be living in a modern industrial nation-state. British structural functionalism is set in the early 20th century and is intellectually reflective of the British Empire. The incorporated essence of this

society bears a resemblance to an organism. This analogy is derived from the structure of a society in which different institutions, like different organ systems of a living individual, tend to specialize in function. Functionalism reflects the development of a modern industrial society following the French Revolution in Europe. In these societies, because of an integrated market economy, the society moves in the direction of a more centralized and efficient economic and political amalgamation.

A modern industrial society cooks up a multitude of theories developed to explain the same or similar phenomena. The anthropologist or sociologist or historian is a product of this environment. The opposing theories represent conflicting social positions in the same society.

19th-Century Evolutionary Thought

Evolutionary thought began to take root during the 18th-century European Enlightenment. By the second half of the 19th century, evolutionary anthropologists were developing evolutionary thought even before Charles Darwin published *On the Origin of Species* (1859). Biblical scholars looked on non-European societies as being an erosion of a basic humanity that monotheism, and specifically Christianity, had generated. The evolutionist developed an alternative view by hypothesizing that nonwhites (i.e., non-Europeans) were a more primitive type of human subspecies. Monotheism was superior to either polytheism or animism. Science was superior to religion and rationalism superior to mysticism. Consequently, European civilization was at the apex of evolutionary development. All other cultures were somewhere along the evolutionary trajectory from early apelike hominids to modern Europeans.

In reaction to universal evolution, Franz Boas became a founding spirit of historical particularism, which claimed that the universal or unilinear evolution, in which Europe was the apex, was teleological and therefore not scientific. British structural functionalism also became antievolutionary in how it saw the separate parts of a society interact to form a cooperating whole as being the focus of their studies; this synchronic theory characterizes the most important goal of any cultural element as being the harmony of the society as a whole. In doing so, history is not the core in these studies. However, history could not be ignored. Change is a constant in all social settings. Therefore, societies must be studied in their historical context. Cultural evolution reemerges as a fact of life.

Diachronic Anthropology

Historical sociology as a part of diachronic anthropology demonstrates the continuous development of groups, classes, nations, and social institutions in which one set of social organizations replaces earlier examples. In doing this, we learn how each small part interacts with

the others in order to establish ever-larger units until we define a global economy.

In the study of the mixture of discrete elements, we learn that these parts come together to provide an interrelated whole. The world is made up of a combination of millions of local communities that are always in a process of transformation. Because of the increasing tempo of change following World War II and the degree of external intrusion in local affairs, process theory developed as a sharp criticism of functionalism by a younger anthropologist hostile to colonialism.

Cultural motifs form themes that condition the evolution of future national designs. A modern way of looking at the world would not have been possible before the advent of the Industrial and Liberal Revolutions. The modern mind-set develops a way of looking at things along the lines of a concept that holds that both the past and the future are real units of time and that this linear time frame is real and related to an ever-changing present. This liberal worldview is a noticeable departure from the previous age in which people saw truth as both absolute and unchanging.

Capitalism, liberal government, industrial technology, and scientific development mutually feed one another. Liberal society began being defined during the Enlightenment of the 18th century, and with Adam Smith's *Wealth of Nations and the Market Economy*, its rough outline was delineated. Along the same lines, feudal privilege and the power of religion was being challenged. Science developed in this environment. Modern rational philosophy was the expression of a revolutionary, capitalist bourgeoisie in its ascent to power. Empiricism and science became the practical expression of the empowered capitalist class. The growing capitalist economy required the quantitative analysis of market possibilities, production expenses, and technological innovation.

With a market economy, production grows in importance, replacing local subsistence economy. The new market economy was founded on an exchange of values and prices that defined the relationship among production units and thus among individuals. Previously, production and production units were embedded in social obligations. Thus, the expansion of market relations within a society changed the established social relations.

Because liberalism became the dominant worldview, the political changes that followed were revolutionary. Natural law and human nature became the cornerstones of the new philosophy. National identity creates a general spirit of the time and outlook, going beyond local distinctiveness and native uniqueness. "The rights of man" and resistance against tyranny replaced theocratic absolutes. Through revolution in Europe and America and colonialism everywhere else, liberal ideas spread throughout most of the world. As the liberal bourgeois society spread, it destroyed much of the time-honored social organization in traditional society. The ideas of John Locke, Jean Rousseau,

Adam Smith, and others helped to define much of the liberal thought, which gained a definition.

Conservative Philosophy

The reaction to the spread of liberal society was the expansion and fruition of conservative philosophy. Conservatism came into existence with the advent of liberal capitalism. Because there is a specific connection between beliefs, attitudes, values, and the social circumstances of a particular group, it can be seen that the conservative ideology appeals to those most threatened by the spread of capitalism. By putting an end to the ancient order, a call for its return is likely to follow.

Because of the rise of liberal society and its corresponding worldview, conservative philosophy would be characterized by its way of following and countering an opposition to liberalism. Conservative philosophy was born after and not before liberal philosophy. Because it was a reaction against capitalism, it was a dream of a return either to feudalism in Europe or to a traditional society everywhere else. Because science, empiricism, rationalism, and modern technology coevolved with capitalism, conservatives find a lot to fight against. Because this progressive market economy undermines the ancient order and the saga of heroes—to free both people and resources for production for profit—those who did better under a traditional society will oppose both free enterprise and science. To the conservative, liberalism, capitalism, and modernism were seen as the destruction of all that was decent in life to the conservative thinker.

The conservative movement was a romantic attempt to reestablish traditional communities that existed before capitalism. The capitalist and the working class are a product of capitalism, and both stand to gain nothing by a return to the antique civilization. Thus, both the capitalist and the working class are very much underrepresented in the ranks of the conservative thinker.

Those elements utterly damaged by the development of bourgeois-capitalist society are the small-property owners, such as small farmers, peasants, urban small-business owners, independent artisans, and the self-employed. These factions join forces with the natural leaders of the conservative movement, the large-landed aristocracy with ties to their feudal or traditional past.

With the robust formation of a romantic-conservative movement, a milieu is set up in which some intellectuals, who feel alienated from both bourgeois liberalism and the socialism of the revolutionary working class, can find a home within the setting of the romantic folklore, that is, a vision of what the traditional society was like before the Enlightenment of the 18th century, the Industrial Revolution of the 19th century, and the modern global capitalism of the 20th century. Community is defended against society. The spiritual is seen as preferable to science. Family and

kinship are understood as favored over contracts and professional qualifications. The conservatives such as Friedrich Wilhelm Joseph von Schelling or Joseph de Maistre believed that society must be governed by divinely inspired internal principles that are embedded in deep traditional roots, which are culturally embedded and long established within deep historical roots.

The Radical Left as an Intellectual Tradition

With the advancement of the market economy and the Industrial Revolution, a new industrial working class is formed from the disrupted elements of the previous society. These detached fragments come together to form a distinct organic class unique to capitalism. Wage labor is the minimum requirement for the further development of industrial capital. The working class has lost its connection to traditional society and can now be fashioned into an original class within capitalism. Because the very nature of wage labor is creating a surplus for the capitalist, the defining characteristic of the proletariat is exploitation. It is only the natural workers who develop an alternative perspective in opposition to liberal philosophy. Socialism stands in marked opposition to both liberals and conservatives. Because of shared common experiences, socialism can be neither liberal nor conservative.

Anthropology of Advocacy

Along similar lines, many anthropologists see their roles not only as researchers but also as advocates for the people they study. In 1968, anthropologist Helga Kleivan formed the International Work Group for Indigenous Affairs as a human rights support organization to help indigenous peoples define their rights, maintain control over their lands, and maintain their independent existence. Science has served capitalism well by creating this worldview of objectivity in which truth is independent of ethics. Now, these anthropologists claim that they must offer whatever assistance they can to help the surviving indigenous peoples to resist becoming the victims of someone else's progress.

Rise of Fascism

Fascism is the effect of failed liberalism and the excessive remains of conservatism that has come to nothing. As fascism goes, it absorbs disempowered liberals and disenfranchised socialists. Fascism is both activist and irrational. Militant engagement and the intuitive sentiments are glorified over reason and caution. Leadership is virtually made sacred. Elite theory states that history is made by elites, and everyone else simply follows. The acting without regard to science or reason, placing the act of conquest above ethical principles, negates the need for careful analysis or an interpretation of history.

Fascists believe that history at the simplest level, while an intellectually coherent and understandable method of knowledge, disappears. Fascism is the irrational exaltation of the deed, and the antihistorical myth takes priority over history as the imaginative symbols provide the edifice for the simple rendition of a future golden age based on a newly created folklore of the past that is envisioned by the leader. History becomes a lie, and the myth is a creative fiction become real in the hearts of the masses. Only the leader has the vision, and the rest of the population is only glad for the prophet to lead them out of the wilderness.

In the beginning, Fascism was anticapitalist and antisocialist. While destroying socialism by its strong hostility to equality, democracy, and all socialist ideology, it borrows from the people's socialism in order to make the claim that it speaks to the masses. While being anticapitalist, fascism can never come to power without making peace with the very largesse of capitalists who not only support but also finance it in the quest for power.

Fascism makes an extremely patriotic use of platitudes, catch phrases, flags, symbols, songs, and strong emotions to rally crowds of people into the frenzy of a unifying mania of patriotism. Xenophobia and a passionate love of one's "country" rally large groups of people against the treat of a common foe, that is, anyone or anything that is different. Because of a perceived need for national security, basic civil liberties and human rights are seen as a luxury that needs to be suspended for the greater need for security. The military, our protector, is given top priority in government funding until social programs must be cut to pay for the swollen military budgets. Life in the military is glorified, while human rights and peace activists are vilified. Sexism is commonplace. Opposition to abortion is a high priority, as is homophobia and antigay legislation. Religion is central to fascism. Government backing for the dominant religion receives support from many in the church hierarchies. The industrial and business upper crust support the government leaders, creating a mutually beneficial business-to-government relationship and strengthening the position of the power elite. In spite of a popular appeal, ordinary working people are treated like expendable resources. Workers in their labor unions are severely suppressed. There is encouragement of an open hostility to higher education. Intellectuals are dismissed as irrelevant. Professors who are competent are sometimes censored or fired for taking a political stand. Openness in the arts is blatantly harassed either in the public media or by the government, which refuses to fund the arts. Either the mass media are directly controlled or their range of opinions are limited through a control of funding.

Elite Theory

Elite theory is based on the idea that a small, powerful ruling elite rules all societies. Politics is but the tool by which this elite maintains control. Leaders govern because

the masses are too weak to rule themselves. Vilfredo Pareto (1848–1923) claimed that the ruling elite was in fact an association of superior individuals having the will to power. Because of this, history is the “circulation of elites.” As one group of elites becomes weak, it is replaced by another group of elites in a violent revolution. Gaetano Mosca (1858–1941) added that the superiority of the political elite was based on the fact that the elites have the virtues needed to rule. Often proponents of this theory looked on fascism as a necessary corrective force.

Conflict Approach

The conflicts among classes, ethnic groups, and classes within ethnic groups reflect larger social contradictions. The long-lasting results are the deployment of reciprocally contradictory explanations for social reality in capitalist societies. Sociology gives us the tools to study the complex interactions of a whole society within a global context. Anthropology adds a cross-cultural and historical component within which to better understand the relational connections among social interactions. But there is more than one kind of sociology, and social or cultural anthropology is often found in a separate department at a college or university. Competing groups use the sociological method in mutually antagonistic ways.

Critical historical sociology is the basis of scientific socialism. What is largely a cultural subconsciousness of competing groups within a larger society is exposed through historical sociology. This is why Marxism defines the rest of sociology as either a debate with the ghost of Marx or an attempt at trying to disprove or defend or reform Marxism.

Historical studies are embedded in a rigorous theory that can be used to examine the data. Radical social scientists use the critical methods in the demanding engagement of social activism. This is analyzed in the context of power relationships to determine the possibilities of collective vigorous action as a means of achieving radical political and economic change. By becoming aware of one's social, cultural, political, and economic situation, the activists become aware of the real conditions. From this awareness, one can begin to see the possibilities in terms of strategies to strengthen one's class or group's position in society.

Intellectuals exist in all classes, and many, for personal reasons, transcend class lines by strongly identifying with another class. Because many intellectuals identify so closely with a class other than the one of their origin, they bring fresh insights into their adoptive class. Communication among intellectuals of antagonistic classes is easy. This allows for the intellectual in each of the major classes to develop counterarguments to any and all criticisms of the intellectuals' theories. This creates a cross-fertilization of ideas. Intellectuals are strongly influenced by their opponents. Departmental divisions and specializations at the university only weaken this trend.

At one level, a group of intellectuals representing themselves as professionals structurally becomes its own class, both in and for itself. With the increasing specialization and growth of bureaucracy since the end of the 19th century, the modern nation-state saw the rise of a new class to challenge the capitalists for dominance. Not the industrial working class but the professional class is next in line to be the ruling class.

With increasing specialization, the expanding bureaus or departments are staffed with educated professionals. The importance of the expert means that democracy is continuously being undermined. Both capital and labor become increasingly dependent on the expert, and the professionals progressively take on more responsibility for all aspects of life. The overall working class is kept permanently disempowered. At the top levels of the major universities and research institutes, a small group of professionals form a power block that can be seen as a real threat to the most powerful capitalists. Because of the capitalists' dependence on these intelligentsia, there is a monopoly of expert knowledge.

With experts in a class of their own, the two power blocks, capitalists versus professionals, begin to compete for dominance in the larger capitalist society. The prize is control over the economy and politics. A small elite versus a not-quite-as-small elite means the serious rivalry between capital and expertise, suggesting that the majority of the population is left out of the preponderance of decisions affecting their lives. Add to this a highly industrialized military, and the total domination of society by these twin oligarchies is complete. Most people, because of the quality of their education, are kept ignorant of the process that allows a small group of autocrats to dominate their lives.

The anxiety of the powerless is intensified because of their inability to gain any substantive insight into their lives. Personal shrewdness replaces political understanding. Because rebellion becomes undirected, the repressed assert themselves through irrational outbursts. Leaders of the nation count on this and manipulate the influence of management in order to control the population. Either crime for the individual or fascism for the many allows people to avoid the worst aspects of this perfidious class structure. Crime and fascism is preferred to revolution.

For the proletarian intellectual, the challenge is to gain an understanding of these social facts in order to direct social change by influencing people to take the actions that will strengthen their choices. If a proletarian mental laborer and cultural worker carefully examine the current social situation and its historical background, the iron cage can be unlocked. The essential major thinking is the hopeful knowledge of objective opportunity making it likely to coordinate tangible circumstances and capability. Since each of the competing factions within society use their own sociological theories and have a drastically different understanding and analysis of what is going on, it is important to understand that the opposing theories are of the

social environment and must be carefully studied. The more complete the study, the more likely the activist will come up with a successful program.

If a psychological explanation fails to take into account changing goals, values, and beliefs that are socially defined, we will know nothing about how changing social and cultural circumstances mold the personality. Every judgment includes values of good and evil, beauty and unattractiveness, or just better or worse. All knowing or learning is a group project. Individual knowledge is born in this group process, and each person influences that process. This is what we study in our struggles with the opposition. Combined achievement of conflicting groups establishes daily habits while defining the struggle.

Different cultures have their own evolutionary trajectories. Individuals experience similar events differently, and the significance of events is viewed differently by different classes. Elites and the dispossessed live in different universes. Each segment within the larger group has unique standards and deciphers the ordinary contents and knowledge of daily life and life experiences differently. Unless an individual has a real break with the past, his or her experiences generally confirm what is already believed to be true. Only when the external world comes in direct conflict with established beliefs does conversion become likely.

While knowing is interpreted through the living experiences of a personal biography, it is set in a social and historical context. Social position and life situations influence the particular character of this world and the encounters of real people. Through the active creation of their technology, their material culture, and the process of survival, people reproduce and change their social relations, resulting in a particular way of thinking and responding to their environment.

Meaning is related to the general ideas that bring together a combination of culturally unique processes and purposes for a historically explicit episode. When a person fails to understand the long-term consequences of an immediate action, it can be viewed as an example of false consciousness. Because knowledge is set in a historical context, it is not relative because some statements are incorrect. Knowledge is dependent on historical and social relationships to be correct. However, values and goals of the observer are as important as the subject in any study. The interaction between theory and the social setting points to a relation between various elements in the social setting.

Ideology, Revolution, and Reaction

Science has grown with the advent of the university's independence from the church. Science by the mid-19th century was closely allied with industry, finance capital, and the rising power of the nation-state. During the prior 200 years, science had to fight against the feudal theocratic monopoly of political domination over the rest of

society. With the establishment of the liberal state, science as an intellectual movement became the new symbol of hope or official creed. The romantic-conservative reaction fought a pitched battle, retreating into idealistic reconsideration of a venerated fable of history. It established a historical tradition creating an antirational folklore of the way things should remain. However, socialists, both utopian and scientific, would steal science in support of a revolutionary transformation of society and its eventual management. This world-shattering overhaul and ultimate organization would develop but not replace science.

Science is a method of studying events and objects around us and produces a history of ideas developed using an evolving scientific method. What is chosen to be researched is entrenched in the history that the researcher is part of. These research priorities are in turn affected by and effect our living concepts of nature. The ever-changing result is that discoveries are embedded in political, social, and economic historical forces. Social science follows a similar path.

In point of fact, the economic base only sets the limits of what is possible, as the environmental and technological bases set the limits for the economy. The economy in turn is limited by the possibilities of the rest of the sociocultural environment. All parts of the social and cultural whole have a profound effect on each of the other parts of the historically changing whole. Science is no exception. The history of science is the investigation of associations. Now, although the arrow of causality goes both ways, it more often than not travels from existence to consciousness. This complicates social science research, making the break between science and philosophy less clear.

The philosophy of social science, like science itself, is set inside a moving history that reflects a set of values or reflects a point of view that is overloaded with cultural biases. Theory is necessary to understand anything, and theory reflects both ideologies and their underlying world-views. These basic culturally derived assumptions saturate our scientific thinking. This in turn establishes what we consider to be facts. This becomes the foundation of our scientific theories, and an established theory sets up research priorities and delineates adequate scientific discoveries.

Historical sociologists such as Weber, Mannheim, and Merton (and their current counterparts) find a way of rooting the history of science in society without risking tenure or promotion in the academic world by believing that they are objective scholars. Theory and practice are forever separated in their cowardice. While attempting neutrality, these scholars studied in detail the historical and social context of the development of science while avoiding the moral context of scientific research. These brilliant intellectuals carried on excellent scholarship. They even studied the close relationship between technology, economic class, and a global economy within the evolution of science, but what is lacking is the ethical consequences of scientific research. Much has been done in

the way of research into the class origins of scientists. The culture of scientific communities, patronage of individual research projects, commercial and political investments in grants to researchers, scientific accountability and to whom have been carried out in detail without asking the difficult question of ethical responsibility. The honors given to top scientists along with accolades, the ethos of laboratory analysis, and scientific lack of responsibility to the powerless, poor, and dispossessed is left unstudied.

Where Is Science Now?

Chronological storytelling would have us believe that scientific insight develops progressively in the path of a superior gathering of more and more factual knowledge. This myth is at the present time generally ridiculed as a history that is overly simple and highly subjective of a romanticized fantasy of fulfillment (Mannheim, 1936, p. 205). This fairy tale is founded on the illusion of a universal scientific method, similar to the economic fable of marginal utility. This literary fiction would have us believe a body of scientific knowledge is allegedly expanded by generalizing from the gathering of information from meticulous observations and experiments rather than to the articulation of universal laws presented as fact.

There are convincing points of view that there are many acceptable methods in any research. We need to subject all research to rigorous assessments because it is possible to chip away at the complete scheme of a single scientific method by arguing that human action cannot be comprehended as a simple process of following general rules applicable to any research project. It may be that working scientists are not constrained by any of the rules of method that are universally applicable.

Conclusion

The conflicting total worldview of an entire class in contemporary society is molded by the existential condition of history. This existential moment of choice is the focus of the external manifestation of a way of life. Each particular mind-set identifies itself as the psychology of an individual. What lies behind a personal set of beliefs is born out of that person's social and historical location. Ultimately, the total social and cultural origin of the psychology lies in a changing historical setting.

All philosophy or science or religion is a social product that is created out of a very real living history shared differently by different groups. Each person is the product of a specific social environment. Because different classes experience life differently, they develop conflicting interests and opposing values. The oppressed want change that will end their oppression. The oppressed look to the future with their utopian dreams. The liberal looks to preserve the

current social inequality by allowing only those reforms that will safeguard the status quo. The romantic looks longingly at the existing conditions of the past in the hope of reestablishing those golden days of yesteryear.

The predominant patterns that are socially arranged provide the raw resources for shared culture. Thinking, accepted wisdom, reasoning, imagining, judgment, conclusions, opinions, and beliefs can be radically transformed through ever-changing social conditions. However, the new patterns of thought are formed out of the obsolete and altered outlines of previous thought.

In every historical period, knowing is given birth from genuine existing phenomena. All elements of meaning in a given situation are interconnected causally and have reference to each part and to the whole. When a shared, collective set of circumstances changes, the arrangement of norms, customs, and values ceases to be in harmony with real life and a rupture arises with reference to traditional beliefs.

A crisis arises within the traditional philosophy of wisdom and its corresponding historical perspective. This forms a new reciprocal interrelated framework of thought. People themselves change as does basic human nature, both of which are culturally distinct. People are always adapting and regenerating through the awareness of a new body of knowledge and are consequently generating innovative factions. There are new compositions of groupings of intellectual categories, leading to changes in patterns of social stratification in the larger society and ever-changing debates between antagonistic segments of society and their differing views of that society.

Competing social theories are always being redefined and reinforced to offset potential criticism. The theories once articulated directly inform the participants of what needs to be done. Then, they act in ways that change the social environment and the corresponding political culture.

The statement of any scholar may be true or false, valid or invalid, but it is so only in the context of a specific social, cultural, and historical context. Because of continuously changing social environments, categorical forms of knowledge are always changing. What is right in any one period of time will be wrong in another. Validity is determined within the context in which categories themselves are changing. Consequently, theory must continuously be updated to be valid.

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PART VIII

THEORIES IN ANTHROPOLOGY

THEORETICAL ANTHROPOLOGY

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To understand the history of anthropology, it must be remembered that anthropology occurred as a response to twin events. First, it became apparent that Europeans were not alone on earth; and second, their initial theological view of humanity could not answer all questions about the “other.” This questioning accelerated during a period of time we call the Enlightenment, from around 1689 to 1789.

In the 1500s, the European awareness of the “other” greatly expanded. Travelers told of distant, radically different and exotic peoples. The first question was whether these surprising, remote, and alien peoples were, in fact, people. People had souls and could become Christian, from the European viewpoint. Europeans wondered if they were indeed people, then how could they have been created so bizarrely. Peoples outside of Europe were seen as degenerate forms of humanity. As scholars began using science to question the Bible, new explanations were sought and anthropology slowly began to take form.

Enlightenment

The Enlightenment was a European movement that became a commemoration of science and reason over blind faith. It reflected the growing rebellion of 18th-century intellectuals. All major institutions and official values were subjected to serious and critical examination.

John Locke (1632–1714) was possibly the earliest architect of this development. He shaped the idea that knowledge was actually intellectual perception, or perceptive intuition, and the foundation of learning. Locke, as an empiricist, announced that there were no innate ideas. The mind at birth was a *tabula rasa*, or clean slate. Soon after birth, experiences are drawn through the senses. These experiences are rationalized through reflection. Learning is then gained from thinking and from the development of the memory. Substance becomes our facility to recognize and comprehend those traits that come together along the lines of cause and effect. One collection of thought soon produces another clump of thoughts and changes the tendency of how one forms ideas. The way we rationalize the world changes with experience and reflection. Consequently, all knowledge comes from experience as revealed through our senses.

Real knowledge is always limited. Knowledge begins with simple ideas that cannot be broken down into simpler components. This basic knowledge comes directly through our senses. From these simple ideas, we can construct more complex ideas made from compounds of simple ideas. Upon doing this, we can compare two or more complex ideas to see which one best suggests the essence of the basics. From this, we create abstractions that recognize the characteristics that objects have in common. This is called *conceptualism* and is often falsely confused in the creation of the human imagination with reality.

Primary qualities come directly from our experience of the world around us. Secondary qualities are not through direct experience of the external world, but our attempt to sort information in order to make sense of our experiences. These secondary qualities are not true reflections of the world, but are at best a partial distortion of that reality. Our mind then interprets what it experiences. Through careful observation and reflection about what we observe, comparing one set of results with other careful observations, we come closer to the truth of the external world. Thus, we observe the world around us and systematically analyze our findings, getting closer to reality. We begin to understand the world without reference to the Bible.

The authority of the writings of Locke spread to France, where it effected an entire movement. Voltaire (1694–1778) became a member of the freethinking community, where he assumed the role of comedian, exposing the charade of the religious and political world around him. For this, he was imprisoned in the Bastille for a year in 1717. Teaching a deist philosophy, he believed God created the universe, including the world, according to rational laws discoverable through observation and reason. Afterwards, the universe and human society operated alone, according to these principles. God had no influence.

Voltaire came under the influence of Locke and later moved to England. There, he learned about English literature and theater. He advocated that the meaning of life was not achieving heaven through faith and repentance, as Christianity had taught. For Voltaire, humans could secure happiness only by progress in the sciences and arts, and as a part of the celebration of life on earth. His major passions included religious tolerance, material prosperity for all people, respect for the rights of all people, and the elimination of torture and ineffectual punishments. Ironically, Voltaire believed Europeans were superior to Africans and would always need to lead the rest of the world.

Paul-Henri Dietrich (1723–1789) exemplifies the thought being expressed during the 18th century. In his book, *The System of Nature*, under the name J. B. Mirabaud, he sarcastically ridiculed the religion of the time. He openly promoted an atheistic and skeptical worldview that was both deterministic and materialist. He saw religion as being false and detrimental. Humans were biological machines like any other animal. Humanity could thus be studied as a branch of biology.

Étienne Bonnot de Condillac (1632–1704) called attention to the importance of language in logical reasoning, while stressing specialized language as particularly designed for scientific investigations. The language of science was based upon a functional understanding of mathematics. Knowledge expanded through systematic, empirical investigations. Throughout history, observations of our “sense perception” were the ultimate underpinning for practical human knowledge in any society. Each of the human senses operates independently and brings information that cannot be

accessed by any other source. The mind of a person brings this information together and this knowledge has an effect on the sense perceptions in the future. From this, we study history as human development molded through both education and the environment.

Charles-Louis de Secondat (1789–1755) examined society through the use of ideal types. There were three basic types of society: the republic (which was further divided between democracy and aristocracy), monarchy, and despotism. The virtue of a republic was civic integrity, the virtue of monarchy was honor, and the virtue of despotism was fear. Each type of society was organized in a specific way in which all institutions and elements were reflective of the type of state in existence. The ideal types were broad similarities that categorize different societies into these distinctive groupings because of shared characteristics. Typologies made science possible. In addition, he believed that there were savages who were hunters and made up dispersed bands that could not be united into a larger clan, while barbarians were small nations of herders who could be united into a larger united group. Thus, thought began to arise about the connection between the political economy of a people and its subsistence patterns.

These ideal types are continuously developing and changing. The histories of specific societies are related to particular causes. Not only are other social elements reflective of the type of state, but also political traditions are consistent with the distinctiveness of other elements of society. The critical fundamentals of the type of society are size, territory, and population. Climate and geography are contributing factors.

Jean-Jacques Rousseau (1712–1778) believed that the enduring fulfillment and liberty of people rested on a lucid knowledge of natural laws. Through ignorance, people create social orders in conflict with basic human nature. Humans have two conditions: the first is natural and the second is social. The “natural man” is a situation in which a person lives outside society and its influence. If it is decided that a particular social order is inappropriate to freedom, work can be done to change society. This is learned by conceptually removing all the qualities of social derivation until only the “natural foundation” remains. The natural foundation is human nature. The “state of nature” is the essential psychological makeup of the personality. This fiction promotes the understanding of what sort of society would allow individuals the maximum freedom to maximize their full potential.

To understand human needs, it is first necessary to conceive what a person uninfluenced by society would be like. All traits must be removed that have any social or cultural starting point until all that is left is the essential human nature, centered upon unaffected underpinnings. In an imaginary state of nature, there would be a balance between the basic needs and resources at the disposal of the person in a natural state. These uncomplicated and modest needs are for food, rest, protection from the weather, and a mate.

Harmony and satisfaction are easily achieved. Theft, brutality, and supremacy are not a part of human nature. Without society, humans are uninterested in the needs of the community. People can feel sympathy for other people because the imagination is part of human nature.

Society originated with families. The individual was no longer isolated, because numbers of people and complicated relationships required people to work together. As more families lived closer together, natural equality within the community slowly eroded. With the advent of agriculture, division of labor encouraged an inequality between families to develop. The prosperous would be called upon to lend assistance to the unfortunate. In return, the poor had to submit to the dominance of the wealthy. Resentment toward this injustice would threaten the security and safety of every member of society. Governments were created to protect property, the source of all wealth. Without a government, pandemonium, belligerence, and obliteration awaited everyone.

Society, made up of individuals, was also perfectible. It was morally wrong and against natural law for the lucky minority to be avaricious with irrelevant embellishments, while the hungry, overworked masses lived in constant unremitting need for the meager requirements and rudiments of life. Through the general will, liberty would require a new measure of excellence. Free and equal individuals would voluntarily form this contract. In small communities, democracy would work. In the larger society, a benevolent and educated aristocracy would coordinate the smaller democracies.

The Enlightenment began to look at history as an evolutionary process. "Primitives" were no longer considered to be degenerate forms of humanity fallen from grace. When Europeans looked at other cultures, they now saw their own past. While Europe held the most enlightened and most advanced of all people, one form of racism replaced another. Yet now science at least was being developed and offered a hope of someday understanding other peoples.

Romantic Conservatism

The Enlightenment unfolded and provoked the pervasive confidence in the prospect of humanizing the human condition through political progress, as well as freedom of and from religion. The revolution shaped a new Europe based upon the point of reference of rationalist philosophy and political beliefs. The difficult position of modern conservatism was one of looking backward to a romanticized past. In the face of constant rationalist innovation, conservatives were often forced to adopt a merely defensive role, so that the political initiative lay always in the other camp.

The main relevance of the Romantic conservatism movement was an aversion to the 18th-century rationalism of the Enlightenment. This included a love of nature and revival of

the value of the aristocratic "Middle Ages." The French Revolution and Napoleonic Wars had a profound impact on antimodern and conservative intellectual thought of the day. This brought about a strengthening of idealist philosophy.

Romantic conservatism viewed society as a natural synchroization with divinely inspired internal principles that embraced deep traditional roots that are historical and time honored. Society itself is always ethically greater than the individual. It is society that creates individuals and God who created society. Social relationships and institutions create society, and the individual is but an abstraction created by what is real—the social community. All parts of society are mutually dependent and intimately interconnected. Civilization, customs, beliefs, way of life, organizations, and institutions are, in actual existence, intertwined in a web of associations. Challenges to these traditional bonds threaten the moral fabric of society. Human needs are fixed, eternal, and divinely created. Social institutions are created by God to meet these needs.

This was one of the universals for all of humanity, with Christianity serving as the most positive reflection of this truth. Anything that allowed an individual to stray from God's plan could not be tolerated. Society, made up of smaller groups like the family and village, was brought together to complete God's plan. These smaller groups consisted of people who gained the support needed to live. Revolution, civil liberties, democracy, and individualism led to the moral disintegration of society. Only by uniting all of Europe, and ultimately the world, under a single Catholic faith could God's will be done. Under this doctrine, humans needed ritual, ceremony, and worship rather than rationalism and science. Status and hierarchy, controlled by the church and sovereign, were necessary for society to survive.

Friedrich Wilhelm Joseph von Schelling taught that human desire for power and carnal lust is more powerful than the rational or the good. This was Adam's fall from grace. When God became human in the person of Christ, this deception of man was overturned. This creates two possibilities and the result is freedom of choice. God is self-defined by self-conscious projections toward the peoples of the world.

Nature and the human mind formed a shared correspondence. According to Schelling (as cited by O'Meara, 1977), nature is the unconscious mind, and mind is unconscious nature. Through art, nature—the unconscious—is united with the spiritual or conscious. Through art, it can be shown that the *absolute* communicates openly as the harmony of the subjective and the objective. Freedom of humanity allows for good, as well as evil, and the irrational was at least as real as the rational.

Friedrich von Schlegel, another character of significance, integrated a unique notion of Romanticism with imaginings of medieval Christianity. As a Romantic, his philosophy was the result of the most straightforward interpretation of the major convictions of the character of the

church in the Middle Ages. His ideas were a reaction against the scientific rationalization of the study of nature. Schegel emphasized a devotion to vigorous feelings as a source of aesthetic experience, and thus creativity. By introducing new emphasis on such emotions, humans were seen as basically emotional and irrational, and that was a good thing if humans accepted the authority of the crown and the throne. Conservative Roman Catholic legitimism is a common strand in the romantic generation that dominated the conservative thought of the 1820s.

Joseph de Maistre was a most important champion for legitimism. He took a position opposing the principles of the French Revolution, democracy, and separation of church and state. He approved a united monarchical and ecclesiastical authority. Most of all, Maistre was counterrevolutionary and opposed the secularization of society. Traditional authority was a necessary precondition to security and the threat of liberal concerns for civil liberties. Traditional elites were central to the smooth, everyday sanctuary of a healthy society. Maistre created a depiction of humans as being fundamentally weak and emotional creatures born in original sin and given to a life of indulgence, chaos, and wickedness. This state could only be overturned if jointly controlled by the throne of the sovereign and the ecclesiastical altar, and if surrounded by a tough political structure restrained by a fixed monarch, priests, and the ubiquitous intimidation of the executioner. In fact, Maistre is most remembered for disapproving of the Enlightenment and social revolutions of the 18th century for having undermined the supremacy of traditional religion. The reestablishment of the rule of time-honored elites was essential to reestablish order. He granted reverence to the public executioner who was the primary guardian of a divine and sacredly endorsed social hierarchy. Maistre promoted the need for the dominion of Christianity, the unconditional leadership of both the monarch and the papacy, and the institutionalization of public executions as not only necessary, but also God's will.

Louis Gabriel Ambroise taught that God gave language to humanity and the meaning contained within the use of words is divinely predetermined by revelation. In the end, society must be founded upon the laws of God or it will suffer the consequences. The individual learns the will of God only by living in the community of God led by the church. Knowledge or culture could be learned only by tradition, ritual, the declaration of religious dogma, and revelation. In this doctrine, God stands outside of time and nature, and God is the author of the universe. God also governs humanity as part of this creation. The liberal revolution was God's punishment for rationalism, science, and other liberal ideas.

The Romantic reaction led to a reintroduction of the book of Genesis as the only history of our ancient past. Only Christianity carried the key to progress and happiness. Non-Europeans, then, were sinners fallen from grace.

Reaction to the Reaction

Hegel and History

For Hegel (1807/1967), reason was integral to the very process of historical development. What is rational is real and what is real is rational. Reason is an indwelling core of the universe, remaining within the historical recounting of the universe. History is the continual unfolding of reason as it evolves toward the absolute. According to Hegel, reason objectifies itself in every single creation through the blending of inborn contradictions. Each new fusion produces a new thesis with a new set of contradictions, which resolves itself with new amalgamation with its own inconsistencies. Each new idea then has its own reality, which is the thesis. This has a limited time frame within history, and the innate contradictions destabilize any consistency. Born out of this conflict is a new thesis and the process continues in a new historical setting. Within each thesis is its own antithesis, and the antithesis has its own set of contradictions.

Hegel's concern was based on the idea of *essence of being*, which states that something is negated in the process of creating something new, which leads to the *sum of essence*—the end of the previous historical setting. The new essence is only an appearance of being as revealed by the absolute. Each new conclusion is only temporary and fleeting. This development, Hegel asserted, is completely conditional on a specific historical setting. History is only a specific manifestation of an approximation of being. The resulting contradiction is the negation of the negation of the essence of being, leading to the actuality of a more advanced harmony. This brings together essence or “real meaning” with “existence.” At each stage in this process, Philosophy is moving closer to the absolute.

Hegel's assertion that human history follows the same pattern as one epic replaces another, right after the one before it, results in the continual unfolding of the world spirit. History, and not a specific social structure, becomes real. This is important for anthropology and sociology because this leads to a historical, instead of a functional, study of culture.

Young Hegelians, or the Next Generation

Bruno Bauer (1809–1882) was a leader of the left-Hegelian movement, developing a republican interpretation of Hegel, which combined ethical and aesthetic motifs. His theory of infinite self-consciousness, derived from Hegel's (1807/1967) account of subjective spirit, stressed rational autonomy and historical progress. Investigating the textual sources of Christianity, Bauer described religion as a form of alienation, which, because of the deficiencies of earthly life, projected irrational, transcendent powers over the self, while sanctioning particularistic sectarian and material interests. After the defeats of 1848, Bauer repudiated Hegel. He predicted a general crisis of European civilization,

caused by the exhaustion of philosophy and the failure of liberal and revolutionary politics. New prospects of liberation would, he believed, issue from the crisis. His late writings examined the emergence of Russia as a world power, opening an era of global imperialism and war.

In the early 1840s, Bruno Bauer wrote this salient examination on both the gospel of John and the synoptic gospels, which were seen by him as self-aware expressions of a community responsive to the spirit of the time at a particular stage of development. Thus, the works of Hegel were defined as atheistic, radical, and revolutionary.

Feuerbach sets the tone by outlining humans as having the capacity for reason, determination, and love. These are central to our human willpower and the human condition. We create God out of our own imagination and thus become alienated from who we really are. Feuerbach understood the Christian mysteries to be no more than symbols of the human alienation of creative resources unconditionally redefined as divine attributes, thereby crippling the individual through faith. To regain our freedom and human essence, we need to become aware that humans created God and not the other way around. We become powerless and passive in the presence of our creation, God, and rely on figments of the imagination to give us strength to accept what we can change.

The political repression in Europe was not only intense, but also mounting, as radicals had every intention of carrying the liberal revolutions to the next level in opposition to both the liberals, who made peace with the authorities, and the romantic conservatives. Arnold Rue made the accusation that introspective reason was to downgrade philosophy to the acquiescence of obtainable circumstances, thereby strengthening the status quo.

One group of young Hegelians believed that objective detachment, or value-free social science, in philosophy was necessary to understand existing conditions. This group included Max Stirner and the Bauer brothers. Another group believed that theory was, at its core, advocacy and active political engagement. Most noted in this second group was Karl Marx.

The historical materialism that Marx established took a position against the idealism of even the materialist philosophers. Marx addressed the principle that the basis comprising the relations of production, both the forces and relations of production, coordinate the superstructures. The superstructures would include not only political, legal, organizational, and cultural institutions, but also religion, philosophy, and ideology. The various parts are interrelated and historically specific. The movement that exists between the various functions among these areas of configuration, contained by the entirety of any historical era, need to prevail over the contradictions inherent in the society in question. Action of the individual players could be progressive, by easing the transition to the next epic in history, or reactionary by trying to slow down this change. This materialism was intended to be

linked to the continuous polemical interaction and intersecting challenging issues, widespread, for the duration of the succeeding history of any social movement.

Utopian Socialists: The Other Rebellion

In 1817, Robert Owen outlined what he saw as a design for a new society. He believed that people were a product of both their social circumstances and what they learned. In poverty, and without any hope, people are educated to survive at any cost. Humanitarian virtues were undermined with the concerns of immediate survival. This was the fault of a society that was structured in a way that benefited the wealthy and powerful.

The dominant theme of powerful individuals in a society is motivated by the wealth and power of the few. The indisputable source of prosperity is the labor of the poor. The poor, as Owen saw them, were denied any real options in life and were reduced to misery and wretchedness. Both the powerful and the powerless were corrupted by this arrangement. Because the ones bound in servitude are denied freedom, the threat of insurgence in these lowest classes also reduces the freedom of those who have control over the lives of others.

For Owen, happiness of the individual reaches its summit in the happiness of everyone in the community. By expanding the joy of everyone, even the rich find their own personal contentment increased. Owen used ethical arguments to explain his economic theory.

Children are born with many possibilities, are taught either to be selfish or generous, and are capable of either. Children learn from which they are exposed. The human nature with which we are born is molded through learning. The values and goals we embrace as adults are reflections of our early childhood education. Education begins within hours of birth, as the infant becomes aware of its surroundings. By teaching the child about other people existing in its world, the child learns to have concern for others. Owen saw this as the beginning of the development of an ethical code. When a child is raised in an environment in which these other people intend injury to the child or its kin, the moral programming is impeded in its instruction.

Owen contended that a person's happiness is closely tied to the satisfaction of every other person in the individual's homeland. Contentment is attached to well-being, confidence, heartiness, and serenity; it is the only real prospect for peace. For Owen, this is not speculation, but has been proven repeatedly through practice where given a chance. If properly educated to teach compassion and set up a social enterprise, where empathy is rewarded, then kindness and understanding become a pleasure. Education in the right surroundings becomes a part of everyday life and is enjoyable in its own right.

Because people are a product of their social background, Owen asserted that they become what life has taught them to become. Most laws are irrational, for they punish ignorance.

Reeducation is more sensible than retribution. Reeducation is but the first step. The criminal is also a victim—a victim of a scandalously immoderate society. Dispossessed people gain knowledge of survival by learning criminal activities. Owen viewed law enforcement and criminal courts as founded upon a desire for vengeance and not upon an attempt at solving the problem of criminal behavior. Harming others for personal gain is criminal when practiced by the down-and-out. It is good business routine when put into practice by the select few and the advantaged. Owen calls on society to actively create a community in which goodness is rewarded. Then it is possible to teach children virtue. When integrity becomes the norm, then decency is easily achieved.

Because the desire for happiness is the chief motive of the decisions all people make, the failure to achieve universal happiness is behind global evil. This colossal disappointment is the result of not observing that only when the powerless are empowered can national security mean anything. Only when the poor and the disposed reclaim what is rightfully theirs, Owen asserted, can the privileged and the wealthy reclaim their abandoned joy. Through changing how people are educated, and allowing working people control over their workplace and communities, crime will disappear within a generation because the social causes of crime will disappear.

Claude-Henri de Saint-Simon (1760–1825) believed that human thought evolved from the theology of paganism to the metaphysics of Christianity and now was to be replaced by science. The study of society must be based upon the same scientific principles as the rest of the sciences. Science would replace religion and scientists would become the new natural elite, replacing both the clergy and the nobility. Science and industry would replace the church as the origin of social values. There were three classes seen by de Saint-Simon in this new society. The first were the elites made up of scientists, artists, and “men” with a liberal education. The next class was the property owners: the former elite in the old order. This was the class of conservatism and could be counted on to oppose the new elite. The last class was the vast majority of everyone else. The lower class could be expected to support the new elite, rallying around the cry for equality. Yet the new elite must never relax control over the mob. What was needed was a shared social ethic that puts the needs of society above the special interests of a single class. This social ethic becomes obvious through science and positive philosophy; objective principles lead the leaders. Laws are natural, discovered through both scientific observation and rational analysis.

Marx and Sociology

Marx and his many followers united the inspiration of the young Hegelian and utopian socialist. Marx claimed there are real regularities in nature and society that are independent

of our consciousness (Marx & Engels, 1970). This reality changes, and this change has patterned consistencies that can be observed and understood. Tensions within the very structure of this reality form the basis of this change. These changes add up until the structure itself is something other than the original organization. A new entity is then formed with its own tensions or contradictions.

When studying a society, Marx instructed, the research should begin with a people’s interaction with nature (Marx & Engels, 1970). Humans, through their labor, produce the means of their own survival. The environment—natural and social—in which people provide the basis for their own survival becomes central to the analysis of a society.

Through the means of production, which includes technology, environment, population pressure, and work relationships, people are able to take from nature what they need to survive; this in turn creates what is possible for the various parts of the *superstructure*. Any study of the historical change of a people must assume economic factors will be of first importance. The economic primacy is not absolute, however, because each of the various parts of a society has its own continual influence on the social whole.

Researchers who study noncapitalist societies become aware that major differences do exist between individual noncapitalist societies. One major difference noticed by social scientists is the degree of complexity in social structures between one society and another. It is argued that the differing degrees of complexity of the social relations are directly related to different productive levels, including how efficiently a technology can utilize a particular environment to support the people of that social structure.

With changes in the organization of labor, there are corresponding changes in the relationship to property. With the increasing complexity of technology and social organization, changing societies move through diverse variations to a more restrictive control over property, and eventually, with a state society, develop restrictions on access to property, based upon membership in different economic classes.

A social system is a dynamic interaction among people, as well as a dynamic interaction between people and nature. The production for human subsistence is the foundation upon which society ultimately stands. From the creation of the specific methods of production in an economic system, people in turn establish their corresponding set of ideas. People are the creators of their social ideology. People are continually changed by the evolution of their productive forces and by the relationships associated with these productive forces. People constantly change nature, and thus they change themselves in the process.

In Marxist thought, the study of history begins with the material or objective organization of people living their everyday lives. This is set into motion by means of a people’s relationship with nature, as expressed in their social and cultural life. Through these relationships, humans produce their own *means of subsistence*. Each generation inherits and reproduces this means of subsistence, and then

changes it to fit their changed needs. This historically and culturally specific setting shapes individual human nature. This means that how people are organized and interact is determined by production.

Production molds all other social relations. This includes the relations of one nation to another, as well as the internal social structure of a single nation. With every new change in the forces of production, there exists corresponding change in the relations of production. These changes lead to changes in the division of labor. With changes in the division of labor, there are changes in the property relations of the nation. Ultimately, this brings ideological changes as well.

Marxism identifies the first historical act as the production to satisfy material life. Following the first historical act is the production of those new needs that are the practical result of satisfying the needs of material life. People reproduce themselves, their families, and their culture daily. These acts of production and reproduction are prearranged by the historical past of a people, but this very activity changes both the people and their culture. With these changes, the needs of a people are changed; old needs are redefined or eliminated and new needs are created. With these ever-changing needs, the development of human life is both social and natural. Humans are both the animal creations of nature and the social creations of society. With this, each society creates its own social organization based upon its own historical *mode of production*. The nature of society is based upon the mode of production and consciousness. People's relations to nature mold their relations with each other. Peoples' relations with one another affect their relations to nature.

Social Evolution in the 19th Century

At the same time the young Hegelians and the utopian socialists were struggling to find a way out of the quagmire of Romantic reaction following the waves of revolutions, a new evolutionary view of humanity challenged the biblical account of human history. Jean-Baptiste de Lamarck (1744–1829), among others, began to advocate an evolutionary model of characteristics acquired from adapting to changes in the environment. What was seen as true for biological heredity would also explain cultural change. Many of these early writers speculated about why there were so many differences among human cultures. Biblical scholars looked upon non-Europeans and non-Christian peoples as being the result of degeneration, both physically and culturally, from the white race brought about by their separation from God's plan.

The evolutionists challenged this religious view by speculating that nonwhites were a more primitive variety of humans. Science was superior to religion. Monotheism was superior to either polytheism or animism. European civilization was at the apex of evolutionary development.

All other cultures were somewhere along the evolutionary trajectory from early apelike hominids to modern Europeans. Humans started their history as savages, and savages could still be found in the 19th century. Some of these savage groups had advanced to the next stage called barbarism, and barbarians could still be found in the 19th century. Civilization eventually replaced barbarism.

Sir Edward Burnett Tylor (1832–1917) maintained that all peoples evolved from simple to complex societies. Change of course happened at vastly different rates, thus the survival of savages and barbarians. Simple primitives were similar to stages the civilized Europeans had already passed through.

Lewis Henry Morgan became a defender of the land rights of the Iroquois of western New York; his interest in primitive peoples led to the publication of *Ancient Society* in 1877. He also divided peoples into savages, barbarians, and civilization. Dividing savages and barbarians each into low, middle, and high stages of development further refined this model of evolution. Marriage, family, religion, and political organization reflected the stage of technological development. Morgan speculated that the family evolved through the six stages of savagery and barbarism until the family of civilization emerged. The first was the promiscuous horde without any sexual prohibitions or real families. Middle savagery was marked by a group of brothers who were married to a group of sisters. Brother-sister mating was still permitted but not mother-son or father-daughter. Third stage brothers and sisters were not allowed to mate but group marriages were still practiced. Lower barbarism was described by loosely paired male and female couples who could end relationships easily or have sex with other partners. This was followed by male-dominated polygamy. The last stage was one of monogamous families, in which one wife and one husband were married and were comparatively of the same rank.

The problem with Morgan's conclusions was that recent studies failed to support his views on families among other societies. For example, in general, no society permitted group marriage or tolerated brother-sister mating.

Following Morgan, Herbert Spencer (1820–1903) believed that human nature was an ever changing and evolutionary process. This progress followed universal laws of development. Societies that did not adapt to changes in the environment died out. Savages stood in the way of progress and should be eliminated. It was Spencer, not Darwin, who coined the expression, "survival of the fittest."

For Spencer, humans gradually specialize, beginning with biological evolution, toward self-sufficiency and individuation, reflected in liberal capitalism. This innate tendency was revealed in the natural quality of rational self-interest. Those societies and individuals who make the most of this principle survive; those who are slow in learning this truth become extinct. Ethically, individualism was "most important," and individual growth was "egoistic." Society and all associations with others were largely made

up of instrumental and contractual agreements between individuals. Government should then protect the equality of freedom, and not interfere with a policy of *laissez-faire* in economic matters. Equality in control over economic resources or in the distribution of rewards undermined efficiency and was therefore wrong.

Evolutionary theory was trapped in a European mind-set of development from simple to complex, from primitive to the advanced. A return to the view of the racial and cultural superiority of Europe, held by scholars of the 18th century, carried with it the same pitfalls of distortions and the same limitations of bad science.

Historical Particularism

In an earnest response to the judgmental mind-set and assessment of 19th-century social evolution, a school of thought called historical particularism came into being. Universal evolution was seen as unscientific because any theory that places “European civilization” as the apex of social evolution was in fact theological and thus began with a preconceived conclusion and then arranged the data to support the subjective and predetermined deduction. With this as its basis, Franz Boas (1963) and his followers in American anthropology went to live with people whom they studied for fairly long periods of time. Through their observations, they collected considerable quantities of actual cultural data. They developed a research method called ethnographic studies in the field. Based on meticulous data, researchers described a specific culture. They were not interested in broad-spectrum theories (e.g., evolution) that relate to all societies and cultures.

Whereas Boas focused on individuals in his research, and deemed such information as a vital source in his cultural investigations, Alfred Kroeber (as cited by Boas, 1948) alleged a society changes consistent with its own internal laws. This cultural feature was the superorganic, where individuals played only a minor role in cultures. Culture could only be explained by bearing this objective force of the superorganic in mind.

Rebirth of Evolutionary Theory in Anthropology

Cultural Ecology and Cultural Materialism

What became apparent was that anthropologists were working with diverse historical settings and needed a way to reflect that. Borrowing from Marx, the concepts of production, human needs, population pressure, and change help us understand social ecosystems. The various human communities found in social and ecological associations are both historically and culturally diverse. To aid in this understanding, Julian Steward (1976) coined the term

cultural ecology. This was an extension of his theory of multilineal evolution—a search for regularities in cultural change. Cultural laws are then defined as a way to explain these changes, by searching for outlines of historical change that follow patterns of an interaction between the parts of a society and the larger environment. Cultural traditions have distinctive elements that can be studied in context. Similarities and differences between cultures are meaningful and change in meaningful ways. The evolution of recurrent forms, processes, and functions in different societies have similar explanations. Each society has its own specific historical movement through time.

Cultural ecology studies the adaptation of a unique culture adapted historically in a distinctive environment. Using this explanation, Steward (1976) appraised a creative process of cultural change. Steward focused on recurrent themes that are understandable by limited circumstances and distinct situations. This helps to establish specific means of identifying and classifying cultural types. *Cultural type* is an ideal heuristic tool designed for the study of cross-cultural parallels and regularities. This analytical instrument allows assembling regularities in cultures with vastly different histories. This type of classification is based upon selected features. With this, it is important to pick out distinctive configurations of causally interdependent features of cultures under study. The researcher chooses specific physiognomies that have similar functional interrelationship with one another.

For example, economic patterns are important because they are more directly related to other social, cultural, and political configurations. Universal evolutionary stages are much too broad to tell us anything concrete about any particular culture. The changes from one stage to another are based upon particular historical and cultural ecological arrangements unique for each society. Exceptionalism, then, is the norm. Global trends and external influences interact with a locally specific environment, giving each society a unique evolutionary trajectory.

Cultural ecology looks at cultural features in relation to specific environmental circumstances, with unique behavioral patterns that relate to cultural adjustments to distinctive environmental concerns.

Cultures are made up of interrelated parts. The *cultural core* is grouped around subsistence activities and economic relationships. Secondary features are more closely related to historical contingencies, and less directly related to the environment. Cultural ecology focuses upon attributes immersed in the social-subsistence activity within the specific environment in a culturally directed fashion. Changes are, in part, alterations in technology and productive arrangements as a result of the changing environment. Whether these technological innovations are accepted or not depends upon environmental constraints and cultural requirements. Therefore, population pressure and its relative stability are important. Also, internal division of labor, regional specialization, environmental tension, and economic surplus create

the cultural conditions in which technological innovation becomes attractive, leading to other cultural changes. These social adaptations have profound effects upon the kinship, politics, and social relations of a group.

Culture, according to Steward (1976), is a means of adaptation to environmental needs. Also, social relations reflect technological and environmental concerns. These social relations organize specific patterns of behavior and their supportive values. A holistic approach to cultural studies is then required to see the interrelationship of the parts.

The researcher begins with the study of the relationship between technologies of a people and how they exploit their environment for their survival. To use these technologies within an environmental setting, certain behavior patterns are established. The interaction between labor (behavior patterns) and the connection between technology and the environment has a reciprocal relationship with other aspects of culture, including ideology.

Leslie A. White (1969) looked at culture as a superorganic entity that was understandable in cultural terms. The three parts of a culture are the technological, the social, and the ideological. All three parts interact, but the technological is the more powerful factor in determining the formation of the other two. Thus, cultural evolution has all three parts playing important roles: The technological influences the sociological to the greater degree, and the sociological in the end shapes the ideological. Culture becomes the sum of all human activity and learned behavior. It is what defines history. Through technology, humans try to solve the problem of survival. To this end, the problem arises of how to capture energy from the environment and use this energy to meet human needs. Those societies that capture more of this energy and use it most efficiently are in a more advantaged position relative to other societies. This is the direction of cultural evolution. What decides a culture's progress is its capability of harnessing and controlling energy. White's law of evolution claims that a society becomes more advanced as the amount of energy harnessed per capita, per year, is increased, or as the efficiency of putting the energy to work is increased. This is cultural evolution.

Marvin Harris (1968, 1974, 1977, 1980, 1998) expanded upon cultural ecology, and called his approach *cultural materialism*. Human communities are fused with nature through work, and work is structured through social organization. This, Harris has asserted, is the basis of the industry of all societies. Social science must reflect this if it is to understand the deeper underlying connections between specific social actions and global trends. Industry, commerce, production, exchange, and distribution establish the social structure, which in turn gives birth to the ideological possibilities of any culture. Along these lines, socioeconomic classes are determined by the interaction between technology and social organization in a particular environment. The needs of every society and the individuals in that society must be met; this in turn creates its own ideological

support. With the development of capitalist society, for example, science develops to meet the needs of its economic requirements. Even more important, science is established as the integrating principle of modern industrial capitalism. This is possible because the principle ideas of any class society are that of the ruling class. Workers are subject to those ideas, while the dominant ideology reflects the dominant material relations of the society. In this, Marxism, cultural ecology, and cultural materialism have similar thoughts on the subject.

The complex relationships among the material base of technology, the environment, population pressure, and the ideological superstructure are a constant factor in studying social change. The social consciousness, while being the product of real material relations of society, in turn has an impact on those social relations. This feedback loop is central to understanding the historical dynamics of society. Social consciousness becomes the collective reflection of social relations. Through social consciousness, people become aware of and act upon nature and society. Even though forms of social consciousness reflect a specific social existence, this social whole is not a static or passive relationship. The ideological superstructure is different in each community and changes as the economic relations of society are changed. The ideology of a society reflects the social conditions of its existence. The superstructure and structure are ultimately molded and limited by the infrastructure. The infrastructure sets the limits of what is possible for both the structure and superstructure.

The interaction between social organization (structure) and the use of a technology within an environment (infrastructure) can be used to understand many particulars about the total culture. The evolution from band-level society to tribal-level society, tribal to chiefdom, and chiefdom to state-level society has to take into consideration changes in the organization of labor, including the growing division of labor, and, ultimately, changes in the technology used by a people. With changes in the organization of labor, there are corresponding changes in the relationship to property. With the increasing complexity of technology and social organization, societies move through these various stages to a more restrictive control over property, and eventually, with a state society, restrictions develop on access to property, based upon membership in economic classes.

Marxism, cultural ecology, and cultural materialism all agree that a social system is a dynamic interaction between people, as well as a dynamic interaction between people and nature. The production for human subsistence is the foundation upon which society ultimately stands. In producing what people need to live, people also produce their corresponding set of ideas. People are the creators of their ideology, because people are continually changed by the evolution of their productive forces; they are always changing their relationships associated with these productive forces. People continuously change nature and thus continually change themselves in the process.

Cultural Core

Cultural core is the central idea of cultural ecology. Current scholars in the field add the use of symbolic and ceremonial behavior to economic subsistence as an active part of the cultural core. The result of cultural beliefs and practices leads to long-term sustainability of natural resources. The symbolic ideology becomes as important as economics in the cultural core. Through cultural decisions, people readapt to a changing environment. This opens the door for a critical anthropology; the anthropologist can act as an advocate for groups threatened by corporate agricultural concerns. This humanistic approach does not negate anthropology as a social science. Instead, the new anthropology has a new activist approach by recognizing that different agents may have competing interests in resource management. Any historical analysis of important issues must then include indigenous knowledge to maintain not only long-term sustainability, but also to protect the rights of those most vulnerable.

Eric Robert Wolf

Eric Robert Wolf (1982, 1999) spent his professional career describing and expounding on peasant society, state formation, development of capitalism, and colonial expansion. He worked with the Marxist concept of modes of production as a conceptual tool to study the historical and materialist consideration of people in a cultural and ecological context adapting to a changing environment. Modes of production were looked at in a cultural ecological setting, as a specific adaptation to a particular social and physical environment. Interconnecting relations with other cultures in different environmental settings was a modification of this adaptation.

In the mode of production theory, Wolf, in *Europe and the People Without History* (1982), classified historical cultures into three basic modes of production: kin-ordered, tributary, and capitalist. Kin-ordered relates to band and tribal societies or stateless societies. In tributary modes of production, the direct producers possess the means of production. The elite expropriate the surplus product by political or other types of noneconomic means. Wolf stated that all precapitalist states were tributary. Asiatic is an example of a strong (centralized) tributary state, while feudal is a weaker (decentralized) one; these two replace one another over time. Europe, from the 16th through the 18th century, was not capitalist but a mercantile tributary (centralized) state, with capitalism emerging in England in the late 18th century. Labor was enlisted under capitalism through the buying of labor power, leaving the workers with nothing left to sell but this labor power. Liberal political revolution, the industrial revolution, and free trade came together in England partly because of its unique history and geography. England then became the homeland of capitalism, which divided the world to meet the interests of the British capitalist.

Through comparative studies, Wolf (1982, 1999) examined peoples of Latin America and the Caribbean who combined Marx's concept of modes of production with Steward's (1976) cultural ecological adaptations. This developed a working model of world markets and imperialism with a history of colonialism and U.S. economic domination of the region.

In *Envisioning Power: Ideologies of Dominance and Crisis* (1999), Wolf investigated the history of ideas, power, and culture and how they interact. He argued that power is important in shaping cultural evolution. Ideology incorporates power, but ideas reflect cultural input. Actual power and belief about power converge through culture. Societies face tensions posed by ecological, social, political, economic, or emotional crises, and use conceptual answers drawing on commonly unique, historically rooted, cultural understandings. In case studies of Kwakiutl Indians of the Northwest Pacific Coast, the Aztecs of pre-Hispanic Mexico, and national socialist Germany, Wolf analyzes how the ruling ideology, together with power, sanctions the significant relationships that govern social labor.

Conclusion

Anthropology is concerned with the study of humanity, putting together and testing hypotheses (provisional explanations of observed occurrences). From this procedure, theories slowly develop. In doing this, anthropologists ask how human life within society is possible. Humans are both animals and socially defined beings that are both creative and created.

Theory is a working model that organizes concepts of the empirical world in a systematic way, to help guide further research and analyze the findings. All theory is based upon empirical and variable facts. The strength of a theory is the skill with which it arranges information that can explain complex information in a manageable form. It must contain empirical statements that can be tested, and explain a complex interaction of observable phenomena. Theory is not a guess; a guess is a hypothesis. Theory is a factual statement.

From the *American Heritage Dictionary*, theory is defined as follows:

A systematically organized body of knowledge applicable in a relatively wide variety of circumstances, especially a system of assumptions, accepted principles, and rules of procedure devised to analyze, predict, or otherwise explain the nature or behavior of a specified set of phenomena. (p. 1861)

As such, we carefully study myth as a source of data and not the conclusion of our studies.

Myth is a nonrational and sacred, or intact folk explanation, for the origins or creation of natural, supernatural, or cultural phenomena. These explanations are a matter of

faith and not subjected to scientific or empirical inquiry. To end with a myth and begin with a myth is teleology, which happens when we begin with a conclusion and arrange evidence to support this conclusion. Teleology can be defined as explaining phenomena by final causes, or being directed toward an end shaped by a preexisting purpose. Science, then, is anti-teleological.

Social science is that application of the scientific method used to study people and society. It is the systematic pursuit of knowledge by recognizing a problem, formulating a question in a way that can be stated in a hypothesis and empirically verified or rejected.

Anthropology takes an approach that is holistic and evolutionary (i.e., historical). In this, anthropology is similar to sociology. Anthropology is global and comparative. Cultural anthropologists compare one culture to another in order to examine similarities and differences, and explain them.

In this chapter, culture is the sum of all shared knowledge, learned behavior, patterns of attitudes, and perceptions of a people. Humans adapt to their ever-changing environment through culture. While adapting to their environment, both social and natural, they change their environment; thus people are constantly readapting and changing their culture while doing so.

Culture and society stand as interconnected, grouped jointly into a single whole. Society is the social organization of any defined group that interacts through patterned communal association of individuals.

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IDEOLOGY AND ANTHROPOLOGY

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This chapter looks at hermeneutic and Marxist theories of ideology in anthropology that link the concept to underlying social processes and material conditions that work to sustain relations of power and dominance in a given society. It employs the example of religion as an aspect of ideology for illustrative purposes. *Religion* as used here does not refer to some supernatural or theological category at a universal level. Rather, it is looked at as an aspect of ideology in all of its historic and synchronic connections to an already existing society to provide the knowledge needed to constructively understand it. The chapter is arranged accordingly. Karl Marx's approach to the study of ideology is first introduced. Next, Louis Althusser's concept of ideology as social praxis and as part of a particular social and economic formation is given. Then a review of relevant theories on religion as an aspect of ideology in hermeneutics and anthropology is made. Included in this review are the works of three anthropologists (Talal Asad, Stephan Feuchtwang, and Abdul el-Zein) who are deemed to be exceptional. They are the only anthropologists, as research to date has shown, who have successfully combined concepts from hermeneutics, cultural Marxism, and Althusserian structuralism in their investigations of religion. This is followed by a discussion of recent trends and future directions of research pertaining to the study of ideology and society.

Introduction

The French word *ideologie* was first used in Western academic discourses in the year 1796 by Pierre Jean George Cabanis and Destutt de Tracy who used the term to refer to the science of ideas in contradistinction to ancient mysteries. Then onward, the word was employed in epistemology and linguistics until the 19th century, when Marx and Engels used it in a new way in *The German Ideology* (1847/1972). Tom Bottomore (1983) explained this as a reaction to two divergent lines of philosophical thought in their exegesis, namely, that of Feurbach and Hegel, respectively. Unlike Feuerbach and Hegel who did not link religion to an actually existing society, however, Marx and Engels took the unprecedented step of referring religious inversions and metaphysical distortions back to their material and social conditions. In other words, they explicitly looked at the relationship between misplaced forms of consciousness and the material conditions of human society. They argued that most problems confronting humans are not caused by mistaken ideas but by social contradictions. That is, subjective forms of objective realities are intricately interconnected. So, distorted notions and false consciousness can be a problem and cause of human suffering but they are, in turn, caused by material conditions. Bottomore (1983) stated, "It is this relationship (between thought and material social reality) that the concept of ideology expresses by

referring to a distortion of thought which stems from, and conceals, social contradictions” (p. 219). Ever since, the word *ideology* has been used primarily by creative Marxist scholars with a critical and negative connotation referring to distortions of thought that conceal, in obscurity, the social contradictions in which they are founded.

Marx, in his early work, criticized Hegel and Feuerbach’s thesis that thought determined the course of social change in history. Like Vico before him, Marx argued that we make our own history. Robert Murphy (1971) explained that Marx turned the theoretical perspective of Hegel and Feuerbach right side by proposing, “History was not the history of the mind but the history of humankind and its institutions, begotten by labor upon nature” (p. 98). In other words, thought is not divorced from society. Rather, it works its way through human institutions and changes them, as it is changed, in the process. Marx put it this way:

The chief defect of all materialism up to now, is that the object, reality, what we apprehend through our senses, is understood only in the form of the object of contemplation; but not as sensuous human activity, as practice; not subjectively. (Marx & Engels, 1970, p. 197)

Marx sought to demonstrate that human beings misrepresented their social practices and material conditions of existence, while thinking about them. He developed his concept of ideology on the basis of such mistaken, symbolic notions in the human mind. Marx analogized:

Consciousness can never be anything other than conscious existence, and the existence of humans is their actual life-processes. If in all ideology, humans and their circumstances appear upside down, as in a camera obscura, this phenomena arises just as much from their historical life-processes as the inversions of objects on the retina does from their physical life-process. (Marx & Engels, 1970, p. 14)

In other words, men and women interpret their human practices and circumstances in society in their thoughts, and these thoughts inform and drive social action. Hence, in a class society, Marx used the term ideology to explain how the ruling classes were able to rationalize their position of dominance and persuade the other classes to serve them. However, Murphy (1971) stipulated that this is not the only source of inverted ideas and illusions. Ideology also comes from the limited and restricted character of human relationships with nature and other humans (p. 99).

Marx first alluded to the concept of ideology in his critique of religion and of Hegel’s conception of the state. While Hegel argued that it was the idea of the political state that manifested itself in the empirical world as an absolute universe that determined reality, Marx countered that ideas were inverted to conceal the real character of society. He also challenged Feuerbach’s interpretation of religion. Although he agreed with Feuerbach that religion was a human invention and that the idea of God as our creator was really an inversion, Marx argued against

Feuerbach’s conclusion that religion was therefore an illusion. Rather, Marx (1974) showed that religion served to disguise irrationalities of the system of production, and he predicted its demise once men and women enter into rational relations with one another.

From this perspective, religion acts as an opiate of the people by concealing social contradictions that bring about suffering in the world: It serves as a palliative for unintelligible life circumstances and natural calamities. It provides a solution outside the realm of the present moment to account for the contradictions in the life experiences of people, individually, and as a group. Yet, it is important to remember that Marx analyzed religion in the context of the times in which he lived. Alternatively, as is illustrated by the emergence of liberation theology in the late 20th century, religion can be used to encourage people to face their problems through direct, nonviolent means. Participants in this movement seek solutions to their problems through Bible study, prayer, and reflection. But, they also confront their social, economic, and political problems head on by using tactics such as collective planning, decision making, and pressure techniques in negotiations with employers, landlords, development agents, and government officials.

These strategies inherent in the movement of liberation theology, however, are in keeping with Marx’s basic tenet that as long as men and women do not actively work to solve perplexing problems in a practical manner, they will imagine solutions in the form of ideological distortions that conceal those contradictions. In so doing, such ideological forms of consciousness will be passed down from one generation to the next, and they will continue to further the interests of the dominant classes. For Marx, the conscious act of bringing social contradictions into the light of human awareness through debate and criticism, however, is not enough to resolve them. It is only through sustained collective action that men and women can effect real, concrete change.

Bottomore (1983) explained that Marx, later, in *Capital* (1867/1974), added a final element to his concept of ideology. Through his analysis of capitalist social relations he concludes that the relationship between “inverted consciousness and inverted reality is mediated by a level of appearance that is constitutive of reality itself” (p. 220). This level of appearance is the economic infrastructure of a society that determines, in the last instance, its logic and motion. For example, in a society dominated by capitalism, the level of appearance is competition and the market. That is, it is through the sphere of circulation and exchange that the economic and political ideologies of the ruling classes in Western European and North American capitalist societies are generated. However, Marx did not mean by this that all societies are departmentalized into separate functioning parts whereby the economy becomes obviously visible, as it is the case in capitalist societies.

Under European and North American capitalism, the unity of society and economy is achieved through bureaucratic channels whereby society becomes differentiated

into discretely functional and separate institutions such as the family, education, religion, politics, and business. Hence, relations of production are enacted in the economy and one can easily see how the economic instance becomes the basis upon which other spheres of social life are made possible. But, in precapitalist societies, relations of production and corresponding forces of production governing distribution and exchange are often carried out through interpersonal relations embodied in social organizations, such as the family or religious system. In other words, in precapitalist societies, the economy is not readily seen. As in capitalist societies, however, ideology works to conceal the underlying contradictions of social life in these societies by focusing on the way in which economic relations appear on the surface as will be illustrated and discussed again later in this chapter.

In summary, Marx used the word *ideology* to refer to a double inversion in consciousness and reality. Ideology works to conceal the hidden reasons why economic relations appear on the surface in different ways in diverse societies and cultures. For example, if in precapitalist societies kinship or religion dominates social life, then productive and redistributive networks are founded in kinship and religious systems (Godelier, 1978). That is to say, the external form that the relations and forces of production take are—themselves—constituted by the sphere of circulation and exchange, which perpetuates ideological forms. Economic, political, legal, educational, familial, and religious ideologies are all interconnected in various ways and reproduced within a total social and economic formation, and these ideologies cannot be studied apart from the particular society in which they are situated. Marx's conceptualization of ideology provides a wide range of opportunities for further sophisticated inquiry, and it is to a discussion of Louis Althusser's formulation that we now turn.

Louis Althusser: Concept of Ideology

Ted Benton (1991), in his article titled "Louis Althusser: An Appreciation," suggested that a full appreciation of Althusser, who passed away in 1990, has yet to be realized. Althusser challenged dogmatic tendencies in Marxist theory. He opposed the use of Marxist dictates by communist parties and bureaucratic arms of state in communist and socialistic societies of his day. While doing so, he demonstrated that the alleged incorporation of Marx's ideas in the politics of communism in what was then the Soviet Union and Maoist China, for example, had no real basis in the writings of Marx. Althusser chided his iconoclastic and dogmatic communist colleagues for not promoting an environment that was conducive to the development of a creative Marxist social science. He specifically blamed the ideological and repressive state apparatuses of the Soviet Union, including the Eastern European block, for initiating the repression of creative scientific Marxism.

Without going back any further, we can say that this crisis was blocked and sealed up for us in the forms of Stalinist-state dogmatism, which doomed all who tried to approach the problem to condemnation and political isolation. Today—and this is a novelty of considerable importance—the forms of this blockage are breaking up, and elements of crisis are—even in their dispersion—becoming visible to the popular masses (Althusser, 1990; Benton 1991).

Indeed, Althusser was ahead of his time. He predicted the breakup of the Soviet Union, end of the Cold War, and reunification of East and West Germany more than 10 years before the actual events occurred.

Benton (1991) explained that for Althusser, the Marxism crisis in the late 20th century could only be rescued by subjecting Marx's work to rigorous criticism. This is because leaders of anti-imperialist revolutions had used his ideas and work as politics, rather than as an impetus for developing new and innovative courses of action that went beyond Marx's own thought. This post-Marxian stance is well supported in the work of Peter Worsley (1984) and Eric Wolf (1982), in that, they too argued that the early Soviet leaders dogmatically misconstrued Marx's concept of mode of production as forming the revolutionary core of their theory. In so doing, party leaders set a precedent for what Worsley called "a deformed socialism" (p. 337). Althusser explained that Marx was not in a position to realize that his ideas would become twisted and stagnated in the communist party's state apparatuses. Although he credits Lenin, the founder of the Soviet Party, for turning Marx's dialectic into a revolutionary method by analyzing current situations, he opposes Lenin's successors for blindly applying Marx's formulation to preexisting content (Althusser, 1990, p. 179–180). That is, subsequent party leaders had wrongly given determinant primacy to political ideas over people, rather than to the relationship between them. This began a long line of misconceptions of ideology in theories influenced by Marx that were credibly challenged by the French Marxist anthropologists (Godelier, Meillassoux, and Terray) under the influence of Althusser.

Bottomore (1983) explained that one of the reasons why early students of Marx misconstrued the term ideology was because they did not have access to Marx's *The German Ideology* until it was first published in 1920. These students (e.g., Lenin, Antonio Gramsci, Georg Lukacs) defined the term in two ways: to refer, first, to the social consciousness, or the ideological superstructure, of a society and, second, to the political ideas of particular classes. Althusser's (1990) point was that both conceptions of ideology ran the danger of being misused to refer to ideology as a separate abstraction that could exist in isolation from a living society (p. 170). Instead, he provided the following alternative definition of ideology.

Ideology is the lived relation between humans and their world, or a reflected form of this unconscious relation (e.g., a philosophy, etc.). It is distinguished from a science not by its falsity, for it can be coherent and logical (e.g., theology), but by the fact that the practico-social

predominates over the theoretical, and over knowledge. Historically, it precedes the science produced by making an epistemological break with it, but it survives alongside science as an essential element of every social formation including a socialist and even a communist society (Althusser, 1990, p. 252).

Althusser (1990) is exceptional because he argued that a preceding theory is needed before sociocultural transformation—of a domain in which a Marxist theoretical practice does not yet exist—can occur. In the study of other cultures and societies outside of Marx's *Capital*, the Marxist theoretical practice of epistemology, for the most part, remains to be constituted. Marxist anthropologists of other societies are not lacking, but Althusser explained that they do not have the revolutionary practice of *Capital* behind them. In other words, their practice needed to be set on a correct theoretical basis that was grounded and constructed in the context of real social life. He insisted that the theory of dialectical materialism was an apt method for this task. As Althusser (1990) argued,

A real understanding of materialism reveals that the researcher's labor is not a labor of the universal, but a labor on a pre-existing universal, a labor whose aim and achievement is precisely to refuse this universal the abstractions or temptations of philosophy (ideology), and to bring it back to its condition by force; to the condition of a scientifically specified universality. (p. 183)

That is, the use of dialectical materialism is not a matter of applying its formula to preexisting content. Rather, the method clarifies goals as it guides the researcher's analysis of a particular subject in all of its specificities. Although Althusser's methodological distinction between science and technology is controversial, Bottomore (1983) pointed out that, at least, he distinguished them. Moreover, since the anthropologist of precapitalist societies and cultures is essentially moving through uncharted territory in dialectical materialism, the primary research instrument is still the anthropologist, not theory.

Althusser (1990) explained that Marx's theory was not fully developed in his youthful work. Then, Marx was concerned mainly with questions of alienation and self-realization in the newly industrializing world. Although Marx criticized Hegel's ideas, his split from Hegel's thought was not complete. Marx chided Hegel for being guilty of the fallacy of abstraction. He argued that the egocentric individualism existing in the bureaucratic arms of European society obviated the Hegelian notion that the bureaucracy of the modern state was a universal class whose purpose was to realize the universal interest (Jessop, 1982, p. 4). However, Marx's basic proposition that humanity was the author of its own history and destiny was still very similar to Hegel's fundamental thesis that the world created itself according to some universal spirit (Bottomore, 1983).

Later, however, Marx (1964, 1982) radically broke away from Hegelian epistemology to develop a science of dialectical materialism. The mature Marx was interested in the

theory of social formations and their histories in all of their conceptual and structural variations. From this time forward, Marx never again viewed history as a series of stages unfolding along some unilinear pathway. Instead, he saw history everywhere as variable and subject to tireless investigation. Althusser (1977) was one of the first Marxist thinkers who emphasized the importance of this epistemological break with Hegel's thought in the development of Marx's ideas. Even Carl Boggs (1984) in his review of Gramsci's two revolutions in Marxism (scientific and revolutionary) does not mention Marx's key shift from Hegelian thought as Althusser does in his work. Neither does Jay (1984), in his exegesis on the concept of totality in Marxist theories, adequately differentiate Althusser's concept of the social whole from that of his predecessors Gramsci and Lukacs. This is because Jay concentrates only on Althusser's aversion to collective notions of the social whole, which is an aversion, shared by Gramsci and Lukacs, rather than on the detailed differences in their respective theories of social change. However, Althusser argued that Gramsci and Lukacs were Hegelian Marxists precisely because they aimed to recenter humanity as the megasubject in their theories. In contrast, Althusser's theory emphasized that the social whole was actually decentered, even under the ruling class of communism. Althusser was more focused upon the use of Marx's theory as an impetus to research new possibilities for social change than to use it as some sort of political weapon to be placed in the hands of a class, or coalition of classes, to forge another society along communist lines.

In other words, Marx's concept of the social whole departed in a revolutionary way from Hegel's concept of totality. Hegel's dialectic was dependent on the presupposition of a simple original unity that unfolded within itself by virtue of its own negativity in order to realize its original unity in some ever more concrete totality. However, Marx developed a very different thesis of the social whole. Althusser (1977) explained how Marx insisted that the simple can only exist within a complex structure of dominance. According to Marx, the structure of a given society is made up of two levels: the infrastructure or economic base and the superstructure or political, legal, and ideological aspects. He used the metaphor of an edifice to show how the economic base in the last instance determines the superstructure of a society. Althusser does not reject this metaphor; rather he argues that the classical metaphor of an edifice merely represents Marx's descriptive theory and should not be misconstrued. As Marx (as cited in Althusser, 1977) explained,

The concrete totality as a totality of thought, as a thought concretum, is in fact a product of thought and conception; but in no sense a product of the concept of thinking and engendering itself outside or over institutions or conceptions, but on the contrary, a product of the elaboration of intuitions and conceptions into concepts. (p. 182)

Thus, Althusser cautions to look beyond descriptive theories and rethink them anew in terms of the particularities and

specificities of different cultures and societies. Once this is done, it becomes clear that Marx's model is not reductionist in regards to the relationship between the economic base and superstructure. That is, ideology cannot be thought of in abstraction to its positive and negative connotations and relationships to a dominant mode of production in relation to other modes of production in an actual social formation.

Althusser (1977) defined a social and economic formation as a decentered totality made up of the forces and relations of production, the economy, superstructure, state, and ideology. He refers to ideology as the imaginary relationship that people have to their real conditions of existence. In other words, ideology is inscribed through human practices, and its existence is material. Even when a person's ideas do not exist in those practices, they give credence to other ideas that correspond to those actions. In Althusser's words, "ideology has no history" (1977, p. 150) because particular ideologies express class and regional positions that always pertain to particular histories. That is, in contemporary societies, ideology is realized as a result of a continuous and bitter struggle between classes with the ideology of the ruling class exercising its hegemony in and over the repressive and ideological apparatuses of state.

Many anthropologists and social theorists (e.g., Baudrillard, 1975; Sahlins, 1972; Ulin, 1984) are critical of the Althusserian perspective for being functionalist and outdated. They fault him for being too rigid in his theory of a social formation as having an economic base and political, cultural, and ideological superstructure. However, Althusser's theory is anything but economistic and iconoclastic. He does not eliminate men and women from his theory and, aptly, defends himself from such accusations in his *Essays in Self Criticism* (1976). Moreover, he paved the way for the emergence of postmodern cultural Marxism. Was it not Althusser who showed how culture might be seen in institutional terms? Did not the culture theories of his critics arise in debate with him?

Later in this chapter, the work of several anthropologists of religion who have significantly advanced Althusser's theory of ideology (Asad, 1983; el-Zein, 1977; Feuchtwang, 1984) will be reviewed. Before doing so, a discussion of the theoretical work of Ulin (1984) is provided because he brought together late 20th-century Marxist and interpretive ideas in anthropology. His scheme provides a way to transcend the ideology of positivism in anthropology, which is an important first step to study ideological variation in diverse cultures.

Hermeneutics and Ideology

Robert Ulin (1984) explained how hermeneutical approaches to the study of historically remote texts are equivalent to the anthropological method of fieldwork in that an anthropologist also seeks to make the customs and beliefs of distant peoples intelligible (p. 92). Both the anthropologist and the

textual scholar seek to understand what is essentially foreign to them. Although anthropologists can enter into dialog while questioning their subjects, deciphering the meaning of cultural products, behaviors, rituals, and codes resembles the process of interpreting an alien text. This complementary relationship between the hermeneutical problem and anthropological problem rests upon the disguised nature of appearances—they are not always as they seem and need interpretation to understand them.

The interpretivists—Hans-George Gadamer (1975, 1979), Paul Ricoeur (1979, 1986), and Jurgen Habermas (1971)—contend that the old, positivist notion that the social scientist should remain neutral and free of bias in the field is neither practical nor possible. Anthropologists should be aware that their traditions, including academic ones, filter into dialogs with subjects of study. By recognizing the inexplicable nature of their own traditions, anthropologists can better come to grips with the traditions of their subjects. Gadamer (1975, 1979) suggested that anthropologists can only come to know their subjects through language. That is, it is only through language that human existence can be made intelligible. However, Ricoeur (1979, 1986) stipulated that only a small part of human existence is reflected in language.

Roger Keesing (1979) also pointed out that it is fallacious to make a dichotomous distinction between linguistic knowledge and cultural knowledge. Linguistic knowledge includes more than knowledge of linguistic rules; it also includes knowledge about the culture of its speakers. That is, to communicate competently in a conventional sense, the people involved need to understand social rules, apperception of contexts, and of what is not—and need not—be said. At the same time that Ricoeur and Keesing challenge Gadamer, they also call into question Clifford Geertz's (1973) thesis that symbols exist in the mind of the actor to provide an individual with strategies for possible courses of action. They suggest that Geertz's theory ends by dividing thought and action.

According to Ricoeur (1979), symbols find their origin in some prelinguistic bios, rather than in culture or convention. He refers to *bios* as energy or desire in Freudian terms, and to the sacred in religious language. Ulin (1984) further explained that Ricoeur seeks to transcend a positivist tradition that divides nature from culture by rethinking them dialectically (pp. 105–109). Gadamer (1975), likewise, criticized Western positivism, which has developed an absolute notion of the science of reason. Ricoeur slightly diverges from Gadamer's view, however, in that he argues that symbols are not merely cultural constructions arrived at through intersubjective consensus, rather they unite individuals to cosmic space. His method of looking at metaphors from this double view can be distinguished from Gadamer's theory of the meeting of horizons through discourse. Like Gadamer, however, Ricoeur contends that it makes no sense for the social sciences to follow the methods of the natural sciences, for it is in the science of semiotics that human activity becomes objectified in the

external world. In contrast, the anthropologist Maurice Bloch (1977) arrived at a somewhat different conclusion than that of Gadamer or Ricoeur. He considers that it is within the relation between nature and culture that new conceptions are developed since they cannot come from a social structure defined as a shared system of meaningful categories. That is, it is not in language-like processes that human activity becomes externalized. Bloch (1991) brought forth an alternative theory of connectivism to show how new ideas result from a process of associating visual and mental images with a rapidity far greater than a mere sentence-logic model would allow.

Despite individual differences and shortcomings, Ulin (1984) found hermeneutic theories to be liberating because they offer alternative views of humankind. They can be used as a kind of guide to policy because they provide a wide range of possibilities for the future. However, he suggests that interpretive anthropology is lacking something that creative Marxism has to offer (p. 104). For example, the theories of Ricoeur and Gadamer do not account for how underlying historical processes within a social system are produced. Ulin explains that neither one of them accounts for how power relationships can confine human interaction and behavior, which is a point of contention also made by Habermas (1971, pp. 105, 108). Jay (1984) explained that Habermas improved upon theories of Ricoeur and Gadamer by integrating hermeneutics and critical theory. For example, in *Knowledge and Human Interest* (1971), Habermas expanded interpretive descriptions of the whole to include room for a study of oppressive dimensions. He challenged positivism in Western Marxism and the Frankfurt school's weak notion of Hegelian reason. Habermas borrowed techniques from psychoanalysis to develop a socioanalysis that could uncover meanings in communication processes found in situations of dominance and exploitation. He synthesized ideas from many of the social sciences in his call for a dialogic enlightenment of society. However, Habermas's theory is shortsighted because he concentrates only on the intersubjective realm of human experience and communication. Jay (1984) explained that by making the goal of speech perfect communication, Habermas's theory runs the risk of becoming an abstract philosophical anthropology divorced from its concrete basis in a given society (p. 497).

Ulin (1984) amended the hermeneutic theories of Gadamer, Ricoeur, and Habermas by way of what he called a materialist dialectic of social being. He develops his approach by criticizing and revising Althusserian structuralism to include concepts from cultural Marxism and interpretivist anthropology. In his scheme, the reproduction of inequalities in communicative action take place within the repressive and ideological apparatus of state. Ulin's model is sophisticated theoretically, and supplements Althusser's work. Many of Ulin's ideas are repeated in the following discussion of the works of Asad, Feuchtwang, and el-Zein. As mentioned in the introduction, their works are selected for consideration because they have successfully brought together a combination of

concepts from hermeneutics, cultural Marxism, and Althusserian structuralism in their perspectives.

Religion as an Aspect of Ideology

Talal Asad, in his 1983 essay "Anthropological Conceptions of Religion: Reflections on Geertz," took Geertz to task for misdefining religion. He suggests that Geertz is guilty of the fallacy of equating religion to culture. Culture, which can take the form of religion, stated Geertz (1973) is "an historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men and women communicate, perpetuate, and develop knowledge about their attitudes toward life" (p. 89). Asad critiques this view of religion as culture (system of shared meanings) for being one sided in considering only how people communicate and develop their attitudes toward life, rather than looking at how the conditions of life also affect human experiences (p. 239).

In place of Geertz's paradigm, Asad (1983) offered an alternative approach for the study of power and religion to account for the ways in which religion is conceived, reproduced, and transformed as a result of historical processes. He exemplifies his mode of inquiry by focusing on the history of Christianity, selecting Christianity for study because he claims that Geertz conveniently ignored this in his theoretical discourse on religion. Asad suggests that Geertz's omission of a discussion of Christianity is symptomatic of a general tendency in anthropology to view Christianity as irrelevant, or marginal, to the study of other religions (p. 238). However, to Geertz's credit, he did allude to Christianity upon occasion (see Geertz, 1973, pp. 110, 125). Also, since writing his exegesis on religion, Geertz (1980) has changed his views and become less positivistic and more antiscience.

Asad (1983) criticized Geertz for looking at religion in terms of modernization theory. Geertz's scheme for looking at religious experiences of non-Christians resembles that of unicultural development theories of the 1960s. He seems to exhibit an ethnocentric prejudice when he concludes that the degree of the articulation of the religious experience is less in modern societies. He presents a picture of religion as if it were some amorphous whole that is destined to be surpassed eventually by modern science (see Geertz, 1973, p. 125). However, this part of his theory is an easy straw man to knock down because it derives from now defunct modernization theory. Asad's analytical critique is most interesting when he explores an alternative way of looking at religion (p. 237). He wants to explain how power constitutes the conditions that formulate religious ideology. He raises the important question of how certain symbols become established and how they are changed. Asad's point is that the dominant symbols and classifications accepted in society are part of the ideology of the leading classes, or leading fraction

of a class in a classless society such as a hunter-gatherer society. That is, according to Cricks (1982), dominant symbols are “constructions which are imposed and pass as knowledge only because the symbolic imposition is accepted as an act of power” (p. 303).

Asad (1983) focused on the history of Western Christianity because it provides a rich store of documented sources from which to formulate questions to study other religions. His basic argument is that the many varied denominations and assemblies that Christianity takes today are quite different from the form it took in medieval times. In those days, power was defined differently and it had different results. Religiosity worked its way through different human institutions and notions of self that constructed, legitimated, and distributed different categories of knowledge. One of the effects of this variable distribution of power is that religion is a result—not a cause—of the historical processes that shape, perpetuate, and transform it. Thus, there can be no universal definition of religion. In other words, religion needs to be investigated in all of its historical specificity.

Asad (1983) indicated that there were no real attempts to systematize a universal definition of religion until the 17th century, precisely, because the attempt was an expression of the repressive and ideological conceptions of certain relations of power and knowledge. Religion then came to be abstracted from its context and universalized with subtle and explicit force. However, in actuality, the definition of religion was a mere referent to established rules and practices that were developed to screen, oversee, and authorize certain relations of power and knowledge from a singular papal source.

Asad's thesis is supported by el-Zein in his 1977 essay “Beyond Ideology and Theology: The Search for the Anthropology of Islam.” In it, he reviewed five different studies of Islam, by Geertz, Crapanzano, Gilsenan, Burjra, and Eickelman, respectively. Here, we look exclusively at el-Zein's review of Geertz's *Islam Observed* (1968). However, it is noteworthy that Asad faulted all five case studies for beginning from the point of a singular definition of Islam as if it were some abstract category of meaning that existed at a universal level. He argued contrarily that there is no such unity of religious meaning in the category of Islam as expressed locally in context. From this perspective, religion—whether Islam, Christianity, Buddhism, or Hinduism—cannot be viewed as an amorphous, theological, or ideal category divorced from its relationship to a particular society and culture.

Supporting Asad's contention that Geertz mistakenly begins from the false premise of an overriding notion of religious experience and meaning within an Islamic tradition, el-Zein (1977) simultaneously focused on the variability in the context of religious experience acted out in daily life. Geertz mistakes religion as referring to a system of shared symbols and meanings, which synthesizes a worldview and ethos. Worldview and ethos are then seen as constitutive of the essential reality of nature, self, and society.

They are transmitted from one generation to the next through the agency of powerful, sacred symbols.

As el-Zein (1977) explained, for Geertz, religion is not static, and religious symbols react to the constant ebb and flow of history (p. 230). He defines history as a perpetual process of the sedimentation and change of meaning. There are certain restrictions placed on the continuum of meaning in history that are learned during the formative stages of human growth and development. Religion reflects an underlying tension, namely, between humans striving to create new symbols and meanings and their intention to solidify meanings in symbolic forms. The power of religious beliefs can lessen in the face of change, or it can be increased to abnegate change. Religion is a form of culture that can be understood by a so-called higher-order culture: science. In other words, Geertz reifies both culture and science. He reduces the Indonesian and Moroccan social formations in his study to two different versions of the culture of Islam (orthodox and folk). Islam can be understood in all of its variations through a process of thick description that Geertz refers to as science, but the type of science that Geertz refers to is the spirit of positivism or scientism. That is, through thick description, an anthropologist holds his own cultural biases in abeyance in order to look at the whole process of human experience to explain religion in context. Therein, the researcher discovers the intricacies of human expression and makes them intelligible to others. However, Geertz's reduction of religion to mere reflections and local variations of a universal category of religious meaning is not a satisfactory explanation for the diverse expressions of Islam.

Instead of assuming Islam to be a set of positive terms from which to begin to study it locally, el-Zein (1977) proposed an alternative way to study religion. He recommends that scholars conduct their research by first thinking of religion as a result of articulations of structural relations. This approach to the study of religion is a variation on Marx's second-level scheme. It would allow the researcher to start from an indigenous framework of Islam to investigate the relations that produce its meaning. There would be no separate, analytical category of Islam, and no autonomous entities (e.g., religion, economics, history) from which to start with; rather, researchers would begin their studies from a hermeneutic perspective. He forwards a viable premise that anthropologists and their partners of study inevitably share in an underlying logic rooted in both culture and nature. The anthropologist's job is to uncover this logic in the different contents of specific religions in various cultures and social formations. There are no strict standards of truth against which to study religious expressions in other societies and cultures. Instead, objectivity is grounded in the dialogic mode of both the anthropologist and her local partners of study. However, there is more to religion than making logical sense of religious content. The researcher also needs to account for the subjective realm of religion in connection to its concrete material conditions and structural relations in a given social and economic formation.

Feuchtwang, in his 1984 “Investigating Religion,” provided a useful model for the empirical study of religion as ideology at the concrete level. Following Althusser, he refers to ideology as part of a specific social practice and part of a particular social formation (p. 68). As Althusser (1971) put it, “Ideology represents an imaginary relationship of individuals to their real conditions of existence” (p. 162). That is, it is through ideology that individuals are constituted as subjects, and they are called into action in relation to a cluster of relationships in the concrete society of which they are part. Feuchtwang critiques the work of several 20th-century anthropologists (Dumont, 1970; Firth, 1964; Spiro, 1966; Worsley, 1970). He chides Firth for being guilty of the flaw of functionalism, even though Firth aimed to improve upon earlier functionalist theories (p. 64). That is, not only does Firth continue to look at religion as an institution alongside other institutions, in terms of its fit in relation to a Western conception of a departmentalized society, but Firth also commits the double fallacy of assuming that a postulate of suprahuman action is a universal text.

Likewise, Spiro (1966) is faulted for incorrectly defining religion as “an institution consisting of culturally patterned interaction with culturally postulated human beings” (p. 96). Spiro begins his definition from the basis of the projected existence of supernatural beings and defines religion as consisting of subjective ways in which different cultures and their peoples enter into relation with them. Spiro mistakenly takes the reality of supernatural beings as a given in his definition, rather than as a postulate that needs to be explained. He tries to be obviously logical, but this leads him to oversimplify the world into distinctly separate variables of analysis. Spiro reduces religion to an institution that functions to fulfill a universal, psychological need to explain what seems to be unexplainable, but he does not do this psychoanalytically. Furthermore, as indicated by Feuchtwang (1984), some people need no such explanations (p. 63).

Worsley (1970) was taken to task by Feuchtwang (1984) for using categorical distinctions from Western science to define religion—distinctions that may not be in the minds of the individual believers. Mary Douglas (1978), however, cautioned that the question of whether, or not, anthropological categories can be valid if they imply meanings not implied by their actors and actresses remains a subject of controversy in anthropology. Worsley, to his credit, confronted many of the problems inherent in earlier functionalist theories of religion by looking at what religion means to believers in local contexts, and at its indigenous effects. Feuchtwang’s point is that Worsley’s proposal to look at the believer’s subjective ideas about the existence of the supernatural realm, and at how that supernatural realm, in turn, influences their behaviors, is an empirically untestable proposition. It is not that Worsley refers to religion as the belief in the realm of the superhuman powers and spirits. Rather, he borrows Western notions such as the *nonempirical* and *technical domain* to distinguish the supernatural

realm from the earth-bound world of human experiences and meanings (pp. 310, 311).

In contrast, Dumont (1970) is criticized for reasons pertaining to method, not theory. Dumont does not make the same kinds of mistakes in his study as Firth and Spiro by employing some universal category of religion. Rather, Dumont begins his investigation of religion from the ground of an ideology specific to a given society. However, he commits some of the same misnomers in his methodology that Firth and Worsley do in their theories. Dumont divides for analysis the ideological (conscious ideal) aspect of society from its nonideological (social) part. Although he can be credited for seeking to understand the relation between ideology and its exterior expressions, locally and contextually, he falls short due to the determinant primacy he gives to ideology over society. Feuchtwang (1984) stated, “No sooner is the contemplating subject separated out as part of the independent variable or social life, then social reality becomes an appearance to this subject, not a system of a social formation” (p. 67). That is, Dumont proposes that the order of India comes from ideology, rather than from the human combination of relationships that make up the Indian social formation. In other words, Dumont takes a literal interpretation of the religions of India, without considering that ideology often takes on a life of its own in the minds of theologians that has no connection to infrastructural phenomena.

Instead of looking at religion in terms of subjective idealism, Feuchtwang (1984) argued, “The peculiar property of ideological practice is the formation of subjectivity” (p. 81). That is, the researcher of religion in other societies and cultures needs to look at religious ideas not only as thought, but behavior. Ideas and thought are inscribed in practice, and help to shape as they are shaped by what has been produced before, and this process unfolds in relation to the existing relations of production.

Feuchtwang (1984) called for a Marxist theory of social practice to research religion because it is a theory from which all other forms in a society are derived. Such an analytical technique can differentiate between different social formations. That is, practices are repeatable and so too are societies in all of their detailed variations. Since Marxist analysis neither seeks nor starts from the basis of some universal categories existing at a supreme level, it can explore different social and economic systems to produce knowledge needed to understand them in a constructive manner. He defines religion as ideology and its set of shared symbols and meanings. That is, religion as a form of ideology is always attached to the category of the subject. Men and women think and act in relation to their circumstances as they define them, and it is by means of ideology that they are culturally constructed as individuals or some other subject. Feuchtwang elaborates on his concept of religion as ideology by way of the following example of ritual toasting behavior from Taiwan (p. 72).

Ritual feasting is a common means through which collective decisions and bargaining are made in contemporary Taiwan. The feast serves to ritually bind members in association and seal their agreements. An association becomes formally recognized by means of a toasting ritual, but a person drinks only when they recognize in another a common identity of name, ancestral village, work, school, or military service. In Taiwan, they usually toast one another before an incense burner that they believe acts as a medium to a patron deity (e.g., an ancestral craft, scholar, or heroic military god). There is a given deity who represents the unity of the association and before whom partners are sworn in solidarity.

The ritual of toasting between humans and their gods in Taiwan finds its counterpart in the guilds of late Imperial China. Feuchtwang (1984) explained that the present religious ideology of ceremonial feasts reflects some of the ideology of the dominant division of class in late Imperial China, which defined the conditions of hierarchy for the rest of society (p. 69). An ideology, at another level, represented their moral order of heaven as emperor and its consortium of landlords, military generals, and government literati over a purgatory of disarrayed spirits. The religious ideology and its ceremonies are the obverse side of real positions within the hierarchical and geographical array of the Chinese imperial empire. Even though contemporary Taiwanese ritual feasts are related to other ideologies such as capital, Feuchtwang finds their underlying logic is continuous with a Chinese past.

Late-imperial China was an agricultural society, which formed a pyramid-like social structure with a large peasantry at its base and the gentry at its peak. Peasant farmers needed to maintain the minimum unit of land necessary for their own reproduction, while gentries concerned themselves with owning enough land to support their livelihoods from the rent they collected. Although the social organization of the peasantry was contiguous with the boundaries of their particular village, the associations of the gentry cut across many villages and cities. Villages were linked together by exchange networks in an extensive and periodic system and through commercial centers for accumulating and processing surplus products. Merchants organized the market, while the imperial bureaucracy controlled large tax monopolies. Landlords organized public works.

The reproduction of the collaborating elites, unlike the peasantries, did not depend on the reproduction of the basic agricultural unit of production. Rather, it depended on the reproduction of the political order. Elites constituted themselves into extended families and lineage organizations—to ensure the survival of their next generation—needed to withstand threats from partitioning inheritance rules and competitive succession into office. They strategized through such means as affinal networking, extended-family budgeting, and setting up trusts that were excluded from laws of partition. Since small farms, once they reached

a stage in the domestic cycle of the stem family, were divided between sons it was unlikely that small farmers could ever move up the hierarchy. However, they could join a lineage association to increase their family's opportunities over the long run. By means of a lineage association, a small farmer could send his son to school, and even hope to see his child sponsored under its auspices. These kinds of opportunities for the advancement of small farmers reinforced their acceptance of the descent organization and its ideology (Feuchtwang, 1984, p. 75).

It was in the lineage organization that the forms of feast ceremonies connected to a common ancestor were formed. These feasts were used by the powerful for their nonideological projects (infrastructural development, trade, and political mobilization) in explicitly ideological ways (marriage customs, ancestor worship, filial piety). The lower class aspired to the ideology of the leading class, largely, by modifying it. Otherwise, they could not afford the high costs of dowries and feasts to promote their alliances and lines of descent. Even though the living conditions for the masses, during Imperial times, did not change substantially as a result of their participation in the lineage associations of the elite, they were sustained ideologically due to their hope for upward mobility.

In short, Feuchtwang (1984), Asad (1983), and el-Zein (1977) all recommended that researchers begin their studies from the viewpoint of the underlying conditions and assumptions that allow subjective expressions of religion. Their approach challenges many of the categorical assumptions born of Western science. Like many of the traditional units of study in anthropology such as ethnicity, kinship, and the individual, supernatural categories that exist at some superhuman level are not universally given. Rather, their definitive existence needs to be determined through analysis of the historical and structural context of the subject of study and in relation to a particular social formation.

Conclusion

Interpretive anthropologists and cultural Marxists continue to argue for a materialist and dialectical approach to the study of ideology into the 21st century. The concept of ideology is not an abstract category of meaning that exists at some universal level. Rather, it is grounded, contextually and structurally, in the contemporary globalized world in which we live. For example, religion as an aspect of ideology needs to be examined in its historic and synchronic relations to an already existing social and economic formation to provide the knowledge needed to understand it constructively. Otherwise, students of ideology run the risk of losing contact with their subjects of study by creating theories that have no concrete relation to them. Or, they risk identifying with their subjects of study to the point of misconstruing their indigenous

beliefs and philosophies in terms of an abstract theory. Finally, a lasting insight from anthropology for the study of ideology is to begin from the point of view of the defining social subjects themselves who are the makers of their own history. Ideology cannot be defined definitively because human communities are constantly changing and adjusting to their changing circumstances in a global world.

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ENLIGHTENMENT AND SECULARISM

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In the broadest sense of the word, *enlightenment* refers to the development and dissemination of the arts and sciences. Enlightenment entails secularism to a great extent in the Western intellectual tradition, though the two terms are not interchangeable. The entailment of secular ideas distinguishes the European Enlightenment from that of other traditions of the same name, namely the Buddhist Enlightenment of a much earlier period. However, enlightenment can also be described as transcendence, and in this regard, the Western Enlightenment is much less distant from its Buddhist counterpart. Indeed, transcendence is a key component of both enlightenment and secularism. This chapter describes the key components of enlightenment and secularism, and the relationship between the two concepts, as they have developed in the Western intellectual tradition, and as they continue to develop in our time.

In 1784, the German philosopher Immanuel Kant (1724–1804) accepted the challenge of defining the elusive concept of enlightenment in an essay titled, “What Is Enlightenment?” Already a renowned figure of the 18th-century Age of Enlightenment, which will be discussed ahead, Kant responded to the question with the following opening, provocative for its age:

Enlightenment is man’s emergence from his self imposed nonage. Nonage is the inability to use one’s understanding without another’s guidance. This nonage is self imposed if its cause lies not in lack of understanding but in indecision and

lack of courage to use one’s mind without another’s guidance. Saper Aude! Dare to Know! Have the courage to use your own understanding is therefore the motto of the Enlightenment. (as cited in Durant & Durant, 1967, p. 540)

Kant’s insistence on the importance of using one’s own mind without another’s guidance is a central theme of enlightenment. The implications are perhaps greatest for humankind’s relationship with religious establishment. Individual thought and reasoning are closely linked to skeptical inquiry, and the application of skeptical inquiry is the basis of secular thought. In light of the implications, the challenge posed to religious orthodoxy is considerable. The conflict between free thought and religious orthodoxy has been, and in many respects continues to be, an enduring theme of history.

Concisely defined, *secularism* is the affirmation that government institutions and religious institutions and beliefs exist in separate spheres, if not in practice then in theory. Although the term is of relatively recent origin, the concept was not unknown to the ancients. George Jacob Holyoake (1817–1906), British author and philosopher, is credited with coining the term *secularism* in 1846. Holyoake described secularism as the kind of knowledge that relates to the “conduct” and “welfare” of this lifetime. Secular knowledge is that which can be tested and understood through human reasoning. Secularism thus places emphasis on rational thought. The connection to science and scientific methodology is implicit.

Insofar as state and society are concerned, secularism entails the neutrality of government on matters concerning religion. The debate on the meaning of this, and on the question of degree, has been prominent throughout the history of Western societies and persists worldwide today. In the United States, the debate over the separation of church and state has perhaps never been more pronounced than at present. The implications are particularly significant in the realm of scientific and medical research, and government support thereof. To recognize the importance of these debates, their implications, and their future direction, it is necessary to turn first to their origins and development. The following pages provide a rather concise sketch of enlightenment and secularism from some of the earliest speculations on humankind to the present debates.

Speculations on Humankind

There is little doubt that human beings in societies across the globe have speculated on the nature of humankind. Such speculations can be the simplest of questions and yet can have the most complex answers, if they can be answered at all. The struggle to comprehend the unknown has given rise to numerous creation myths, many of which have long perished while others endure. While a reliance on supernatural explanations for understanding the universe persists, the development of science over time has unquestionably diminished popular faith in myths. Inherent in the emergence of scientific methodology is the application of skeptical inquiry. In this regard, the scientific revolution was not without its forerunners.

The period of secular philosophical achievement in the world of ancient Greece spanned more than five centuries, from the materialist philosopher, Thales, to the atheistic philosopher, Carneades (214–129 BCE). The earliest documented secular thinkers of the Western intellectual tradition were pre-Socratic materialists and skeptics (Sophists). The most notable include the mathematician Pythagoras (582–507 BCE), perhaps an early forerunner of Newton, who conceived a mathematically based universe absent the Homeric gods. The philosopher Protagoras (490–420 BCE) opened his treatise *On the Gods* with a candid denial of humankind's capacity to know whether or not gods exist. This subversive language led to perhaps the first recorded incident of a public book burning. Socrates (469–399 BCE) placed emphasis on inquiry and doubt with his famous Socratic method, intended to challenge traditional assumptions. Plato (427/428–348 BCE) and Aristotle (384–322 BCE) expanded on these notions and developed their own metaphysical approaches to understanding the universe. Aristotle in particular championed scientific inquiry and the possibility of an infinite universe. Ancient Greece was hardly lacking in religious orthodoxy, and polytheistic belief was pervasive throughout the Mediterranean world, yet a culture of speculation clearly prevailed, without

which, it is safe to say, modern science and enlightenment would not have become possible.

The Romans triumphed more in the art of war than in the science of enlightenment. Notwithstanding, significant contributors made their mark, drawing on the intellectual traditions of Athens and Alexandria. Rome's "golden age" of intellectual achievement during the 1st century BCE witnessed several notable enlightened thinkers. The orator Cicero (106–43 BCE) published works expounding the importance of skepticism and inquiry in determining truth. His contemporary, Lucretius (99–55 BCE), promoted Epicureanism in his *On the Nature of Things*, an epic poem that encourages the use of logic over superstition and appeals to humankind to overcome the fear of death. Indeed, humankind's so-called fear of death has been a recurring theme prevalent among enlightened thinkers throughout time, often articulated as a source of popular belief in religion. The hope of an afterlife existence can be said to undercut the anxiety over the termination of existence in the present.

The conversion of the Roman Emperor Constantine in 312 CE signaled the legitimization of Christianity, already pervasive throughout the Mediterranean world, as the official religion of the Roman Empire. The tendency toward religious homogeneity and the consolidation of papal authority after the fall of Rome in 476 effectively stifled the types of free thought so prevalent in Greek and early Roman civilization. The tendency toward monastic lifestyle and a Manichaean worldview furthered this trend at the expense of enlightenment. Although secularism was a concept nearly extinct in practice during the period known as the Middle Ages, the characterization of the period as a continuous "dark ages" has been contested by modern scholars. Several "renaissances" flowered in Europe before the scientific revolution, such as the Carolingian Renaissance at the time of Charlemagne, but these were generally limited in scope and not secular in nature. The Italian Renaissance beginning in Florence in the late 14th century began to witness the enduring revival of Greco-Roman ideas. A climate of interest in the arts and sciences, and the humanistic speculations on humankind inherent in such interest, was certainly more favorable to ideas of scientific inquiry.

The Scientific Revolution(s)

In 1543, Nicholas Copernicus (1473–1543) published *De Revolutionibus Orbium Coelestium (Concerning the Revolutions of the Celestial Spheres)*, challenging the existing notions of the universe and of humankind's position in it. In this major work, the Polish astronomer challenged the Ptolemaic theory of the solar system, hitherto accepted as accurate, proposing alternatively his own heliocentric model. Copernicus maintained that the sun is at the center of the universe and that the earth rotates on an axis and

revolves around the sun. The Copernican revolution generally marks the advent of the scientific revolution because of the tremendous implications of heliocentrism. In replacing the earth with the sun as the center of the universe, Copernicus revolutionized humankind's understanding of science and religion. Indeed, the Copernican revolution marks the beginning of the disagreements between science and religion that would quickly become a persistent theme of history thereafter. The science-versus-religion debates have increasingly developed as a struggle between conflicting worldviews, of enlightenment versus orthodoxy.

The notion of an infinite universe, with untold number of planets, moons, and even suns was met with disdain by religious authorities, both Catholic and Protestant. The reformer Martin Luther (1483–1546) dismissed heliocentrism and chided its supporters. The Roman Inquisition sought to make an example of the Italian philosopher Giordano Bruno, a well-known supporter of heliocentrism who also elaborated on its precepts, by condemning him to death on the charge of heresy. Bruno was burned at the stake in 1600. The Italian astronomer Galileo Galilei (1564–1642) and his contemporary Johannes Kepler (1571–1630) further developed the laws of heliocentrism, planetary motion, and optics. Galileo twice defended himself before the Roman Inquisition, the latter occasion recanting his speculations. In spite of this dubious recant, Galileo's research helped to bring the new laws of astronomy and physics to a much wider audience than ever before. Speculations on the configuration of the universe and the role of humankind increasingly became a source of debate during the 17th century.

The application of a scientific method to investigate problems and acquire knowledge did not originate in the 17th century. The ancient Egyptians and Greeks both applied methodology to investigate phenomena. The Muslim scientist, Alhazen (965–1039), developed a scientific method that emphasized the testing of hypothesis using experimentation. Francis Bacon (1561–1626) therefore drew upon the work of predecessors when he developed his own system of logic, the Baconian method. His most notable work in this regard, *Novum Organum* (1620), is in fact a direct reference to Aristotle's syllogism, as the title suggests.

Mathematical principles were employed by the French philosopher Rene Descartes (1596–1650) in his development of a "method of doubt" based on deductive reasoning. In *Discourse on the Method*, Descartes arrives at the famous maxim, "I think, therefore I am" (*cogito ergo sum*), concluding that the process of doubting in and of itself proves existence. Descartes nonetheless maintained deeply held religious beliefs, discounting any inherent contradiction. Fellow rationalist Baruch Spinoza (1632–1677) proposed a more pantheistic interpretation of God, rejecting all supernatural phenomena such as miracles and demons. Like many freethinkers of his day, Spinoza sought refuge in the Dutch republic, where such views were tolerated to a greater extent than in the adjacent nations. All of Spinoza's published work

was placed on the Roman Catholic Church's *Index Librorum Prohibitorum* (List of Prohibited Books).

The long development of scientific methodology is an important part of humankind's pursuit of enlightenment. The transition from trust in supernatural phenomena and mysticism to the application of a scientific method for understanding the universe is a central theme of enlightenment. Indeed, it was only a matter of time before religious beliefs would undergo the scrutiny of scientific inquiry. Early scientists, or natural philosophers, attempted to fuse science and religion, minimizing fundamental disagreements. In the Age of Enlightenment, even this synthesis would be challenged. The contributions of Francis Bacon, Thomas Hobbes (1588–1629), Rene Descartes, Baruch Spinoza, Pierre Bayle (1647–1706), and a host of others set the stage for modern secular and enlightened thought, even as they maintained religious beliefs, and certainly disagreed widely.

The Age of Enlightenment

The skeptical inquiry that emerged as a dominant theme of the scientific revolution was soon applied to other spheres, especially political and social. This development coincided with the emergence of a public sphere in Europe. A gradual development in the truest sense, the rise of a public sphere entailed the dissemination of the written word, and the proliferation of venues at which ideas could be discussed. This process can be traced at least back to the development of the printing press by Johannes Gutenberg around 1440. Necessity gave rise to invention with growing literacy rates and increased demand for the written word during the Renaissance and Reformation. The proliferation of venues for discussion of ideas included coffeehouses, freemasonic lodges, debating societies and salons, to name a few. The circulation of pamphlets, journals, letters, and later, newspapers all contributed to the level of discussion and certainly to the exchange of ideas. Historians debate the question of how "public" the public sphere was by the Age of Enlightenment. It can safely be said that the level of discussion and the number of participants had never been greater. The notion of a public opinion, virtually unknown during the Middle Ages, became something increasingly important for the arts and for politics.

These developments are of profound importance to the spread of enlightenment and secularism. The emergence of a public sphere meant that critical ideas would reach a broader audience. The transfer of a monopoly on enlightenment among a select number of elites, to a broader enlightened society, was for the first time possible. The idea of human progress, of the progression of humankind to a better existence, gained many adherents. In the 18th-century Enlightenment, science, and especially medical science, came to be seen as the greatest hope for humankind. Critics of the Enlightenment denounced what they considered to

be a naive or excessive faith in the human capacity for progress. Enlightenment thinkers, for their part, disagreed widely on a variety of matters, but maintained in common a confidence in human reason as the most reliable means to understanding the natural world.

It is no wonder then that Enlightenment thinkers viewed the English physicist Isaac Newton (1643–1727) as the culminating synthesis of the scientific revolution, and a key transitional figure to the Enlightenment. Enlightenment philosophers embraced the philosophical notion of determinism, the Newtonian conception of the universe whereby fixed, “natural laws” could be applied to describe phenomena. In his *Principia Mathematica*, Newton formulated laws of motion that put to rest doubts about heliocentrism. Newton contributed immensely to the field of mathematics in order to demonstrate his laws. Enlightenment thinkers applied the concept of natural laws to other fields of human knowledge, including economics and politics. The transition of philosophy from cosmology to agnosticism thus took an important step.

Though there is no consensus on the precise beginning of the Age of Enlightenment, scholars generally look to England’s “glorious revolution” in 1688 as an approximate starting date. This development preserved parliamentary democracy in England and circumscribed the powers of the monarchy. Enlightenment principles were concurrently advanced by key early-Enlightenment figures. Notable among them was the English empiricist philosopher John Locke (1632–1704). Locke’s influence on epistemology and political philosophy was enormous. His ideas on liberty, toleration, and the social contract can be seen in both the Declaration of Independence and the Constitution of the United States. Indeed, these principles remained a central theme of the Age of Enlightenment, emerging from theory to practice in the American and French Revolutions at the end of the 18th century.

The secular tone of Enlightenment philosophy increased as the geographic center shifted from London and Amsterdam to Paris. The former cities were known for their comparatively tolerant atmosphere, and thus the premier destination for freethinkers in exile. Paris, however, was the center of an absolutist-monarchical regime, where freethinkers could be sent to the infamous Bastille-fortress prison for publishing works critical of throne and altar. Though critical books were frequently banned in France and printing presses closed down, the Bourbon regime could not prevent the large number of publications from being smuggled into the country and disseminating. These works included a variety of subjects produced on a wide range of medium. The tone of Enlightenment work was largely anticlerical, especially in societies such as France in which clerical officials were ubiquitous. The monarchy too bore the brunt of much critique. The marriage of church and state, and the concept of “divine right” of kings to rule, came under heavy scrutiny by those who promoted the concept of natural, unalienable rights.

The public intellectuals who produced much of the provocative literature of the age called themselves *philosophes*. Unlike traditional philosophers, for whom theory is predominant, the philosophes were public intellectuals who sought progressive change through the application of theory. They used satires, plays, novels, poems, operas, and many other venues to express criticism of superstition, dogma, and tyranny, in their different forms. Though the term *philosophe* is French, these public intellectuals of the “Republic of Letters” lived and wrote throughout Europe and later, the early United States. They included figures from Pierre Bayle to Thomas Jefferson (1743–1826), the latter an example of the movement of Enlightenment philosophy across the Atlantic. An incomplete list of the most prominent and influential philosophes would also include the Baron de Montesquieu (1689–1755), Francois-Marie Arouet, better known as Voltaire (1694–1778), Julien de la Mettrie (1709–1751), Denis Diderot (1713–1784), Jean-Jacques Rousseau (1712–1778), David Hume (1711–1776), Benjamin Franklin (1706–1790), Thomas Paine (1737–1809), Immanuel Kant (1724–1804), and Mary Wollstonecraft (1759–1797). Many of these thinkers contributed to Diderot’s *Encyclopedie* (1750–1765), which contains numerous Enlightenment topics.

While certainly many Enlightenment thinkers were theist, atheist, or agnostic, the 18th-century Age of Reason is also well-known for the triumph of deism. Deists believe in the existence of a deity (from which the word derives) but maintain that this belief is purely based upon reason and observation rather than faith. Deists uphold natural law as opposed to divine revelation or supernatural explanations for the universe. Given the contributions of the aforementioned thinkers, who built upon one another, it is easy to see how and why deism emerged when it did. Inherent in deism is a pronounced skepticism of religion, especially in dogmatic forms. Strongly influenced by Newtonian physics, deists believe in the God of nature who designed the universe as a great machine set in motion according to natural laws. Often referred to as “the grand architect” or “divine watchmaker,” the deistic God created the universe, but does not intervene thereafter. This interpretation renders all supernatural events such as prayer, miracles, and prophecies as illusory and holy books such as the Bible and Koran as human-made. In spite of its 18th-century prominence, the word *deism* fell out of popular usage by the beginning of the 19th century. The concept, of course, has endured and evolved in a variety of forms.

The Evolutionary Framework

By the dawn of the 19th century, secular and enlightened thought had made considerable advances. Humankind’s desire to investigate and examine the natural world proved to be the underlying impetus for the spread and development of enlightenment. The intellectual culture of skeptical inquiry

that emerged during the 17th-century scientific revolution, and developed during the 18th-century Enlightenment, affected nearly every field of human thought. Belief in supernatural explanations diminished as humankind developed a greater understanding of the universe. Of course, new questions emerged and old ones remain unanswered. However, more people came to accept the idea that science was the best means to understanding our world. Though literal interpretation of religion was increasingly undermined by science, the origins of life remained a mystery. As such, even Enlightenment thinkers, often highly critical of religious orthodoxy, could not conceive of a universe without a creator. It would take the application of skeptical inquiry to the fields of biology and geology in particular, and the emergence of anthropology, to piece together the origin of species.

The idea that species evolved over time was not unknown to the ancient Greeks. Philosophers and naturalists in different civilizations have suggested evolutionary ideas in relation to organisms long before the emergence of specialized scientific fields. Scientists in the 18th century, or natural philosophers as they were then called, began to formulate biological mechanisms for how evolution of species might occur. Pierre Maupertuis (1698–1759), Erasmus Darwin (1731–1802), and the Comte de Buffon (1707–1788) all made important contributions. The French naturalist Jean-Baptist de Lamarck (1744–1829) developed the idea of inheritance of acquired characteristics, also known as *Lamarckism*. This hypothesis purports that physiological traits or characteristics may be transmitted to offspring. Lamarck maintained that organisms adapt to their environment over the course of their existence, developing characteristics that are passed on. While the basic concept of Lamarck's proposal is today largely refuted, his ideas nevertheless influenced the most important figure in the field of evolutionary biology, Charles Darwin (1809–1882).

That Darwin's ideas built upon the work of predecessors in no way diminishes the revolutionary nature of his contribution. This is equally true of Newton and Copernicus before him. As with Newton and Copernicus, Darwin's ideas had vast implications for humankind. Also like his revolutionary predecessors, Darwin formulated his theory carefully over many years before publication. The famous voyage of the HMS *Beagle* between 1831 and 1836 was followed by more than two decades of thoughtful examination. In *On the Origin of Species* (1859), Darwin proposed his theory of evolution by natural selection and the notion of common descent of species. The book provides an overwhelming mass of supportive evidence, much of it accumulated during the *Beagle* voyage, but also collected from colleagues in the various related fields of science. Darwin's proposal was indeed startling: The diversity and differentiation of species was not the result of the 6-day creation of a powerful deity, as had been taught and largely accepted for centuries, but rather is attributed to the gradual, organic process of natural selection. Very succinctly put, this process entails the

passing of genetic traits (characteristics) beneficial to survival from parent to offspring, over many successive generations, causing the emergence of new species. Adaptation to environment is, of course, an essential component of natural selection. Charles Darwin's theory of evolution by means of natural selection quickly became known simply as *Darwinism*.

In 1871, Darwin published *The Descent of Man, and Selection in Relation to Sex*. In this work, he elaborated on what *Origin of Species* had already implied regarding the origins of humankind. Human beings were certainly no exception to evolution and in fact, argued Darwin, are the most developed product of natural selection. The consequences of the Darwinian revolution are a comprehensive rethinking of the nature of humankind and of our relationship to the natural world. Humankind's understanding of religion was also thoroughly affected. Evolution and the principle of common descent demolished the scientific plausibility of creation and design for the universe. Even the existence of a deity was put into serious question and for many, marginalized almost entirely as a possibility. Indeed a multitude of philosophical, theological, and historical debates emerge from Darwinism. The belief that human activities should be based on evidence and verification absent the influence of religion was greatly boosted by evolutionary theory. Today, the evolutionary synthesis is uncontested among credible scientists of all related fields. However, evolution remains an active source of debate in many societies due to the fundamental contradictions between religious interpretation and scientific investigation. The sections ahead provide greater detail on these important debates and the new conceptualization of humankind.

The Emergence of Anthropology

The origins of anthropology can be found in antiquarianism, colonialism, and to some extent, travel narratives primarily between the 15th and 19th centuries. The field crystallized following the development of scientific methodology, evolutionary biology, and later, a holistic approach to understanding culture. Early forerunners include the Greek historian Herodotus (484–425 BCE), the Venetian traveler Marco Polo (1254–1324), and the Muslim scholar Ibn Khaldun (1332–1406). However, these prominent figures were not anthropologists in the modern sense because they did not inquire on the nature of the observed, merely recording observations. Like all of the social sciences, the necessary ingredient in the formation of anthropology was the development of a systematic approach. It is not an accident that anthropology emerged out of the Enlightenment.

Antiquarianism broadly refers to the prescientific interest in ancient civilizations. Often this took the form of hobby for affluent gentlemen, or artifact hunting in the pursuit of

profit. The subfield of archaeology especially is rooted in the 18th-century interest in antiquity—Greece, Rome, and Egypt. Early archaeologists focused on the Mediterranean world, and prior to the mid-19th century, often searched for ruins associated with biblical events. The gradual inclusion of methodology and systematic approaches to conducting research soon transformed the field.

Colonialism is not entirely distinct from antiquarianism, and was for at least four centuries the primary means by which Westerners came into contact with other civilizations. European colonists, explorers, Jesuits, and naturalists often transcribed their observations, which were, of course, generally based upon their own perspective rather than that of the observed. It was for many years through these accounts that most Europeans understood non-Western cultures. These early observations naturally gave rise to many assumptions, questions, and preconceived notions about the “other.” Traditional assumptions could also be challenged through comparative analysis, such as the notion of Christian universalism. Taxonomy and the invention of racial categories flourished in the 19th century alongside notions of “inferiority” and “superiority.” In the 20th century came the practice of observers actually immersing themselves within another culture in order to attempt an objective understanding of the observed.

Anthropology is very much an interdisciplinary study, emerging from the synthesis of knowledge gained in multiple fields that developed in conjunction. These include social sciences and natural sciences. In the case of the latter, developments in the fields of physics, geology, and biology, and their many subfields have collectively dealt a mighty blow to religion. It is an understatement to say that the emergence of evolutionary biology, and the theory of natural selection in particular, fundamentally transformed anthropology. It would not be possible to understand the origins of humankind, or what it means to be human, without evolution. Indeed, much of science would simply make minimal sense absent this fundamental theory. Anthropologists have pieced together much of our distant past through research and excavation work during the last 150 years. Distant hominid ancestors have been unearthed and dated using a variety of means. While many questions certainly remain, today we have a reasonably good understanding of the course of human evolution.

The Controversy of Science Versus Religion

The relationship between science and religion has been uneasy throughout much of history. Revolutionary scientific developments such as the Copernican, Newtonian, and Darwinian revolutions all significantly strained the relationship. The source of this unease has been the reliance on opposing methodologies to understanding the universe, and the fundamental contradictions that have emerged in the cumulative knowledge of science over time. Religion

in the Western sense rests upon what has been revealed to humankind by or through a deity. The term *religion* itself is problematic. Some “religions” practiced throughout the world are absent a deity or divine revelation. In that case, they may be referred to as philosophies or “codes of living.” Religions that have become defunct or extinct in terms of popular practice may today be referred to as mythologies. The major revealed religions—Judaism, Christianity, and Islam—are fundamentally based upon sacred texts that increasingly came into question by scientific inquiry. Religious orthodoxy has been in a position of defense in the West at least since Copernicus, as we have seen. Historically, this relationship between science and religion may therefore be characterized as one of advance of the former and retreat of the latter.

Sacred texts such as the Bible and the Koran have long come under intense scrutiny with the advance of scientific knowledge. Literal interpretation in particular has become impossible if one is to accept the results achieved by scientific research. Consequently, many believers have sought compromise between two seemingly opposed worldviews. Philosophers and theologians in the 17th and 18th centuries wrote texts arguing for allegorical meaning. Enlightenment thinkers such as Voltaire and Diderot questioned the authenticity of sacred books. The emergence of deism as a substitute religion can be seen as an outcome of this skepticism of divine revelation, yet reluctance to abandon the notion of a prime mover. While few 18th-century thinkers were willing to take the bumpy road from deism to atheism, in the 19th century this was much less the case.

Darwin’s publication of *On the Origin of Species* in 1859 added tremendous fuel to a conflagration. The theory of evolution by means of natural selection presented a major crisis between science and religion, as it undermined the Judeo-Christian-Islamic story of creation. Darwin’s assertion of the antiquity of humankind also suggested that the earth is significantly older than previously believed. This substantiated the findings of the geologist Charles Lyell (1797–1875), who argued in his voluminous *Principles of Geology* (1830) that the earth is much older than the 6,000 years calculated by the Christian theologian, Archbishop James Ussher. Lyell was a proponent of *uniformitarianism*, the theory that slow, gradual natural processes have shaped the earth (and other planets) over the course of time. In the 20th century, British geologist Arthur Holmes (1890–1965) built upon these principles with the publication of *The Age of the Earth* (1913) in which he used radioactivity to estimate the age of the earth as at least 1.6 billion years. Today, evidence from radiometric dating suggests that the earth is approximately 4.57 billion years old. Geologists have organized this immense span of time into a detailed geologic time scale. A vast span of time would be necessary for the theory of plate tectonics and continental drift, among many other geological propositions.

During the 150 years subsequent to the debut of natural selection, numerous advances in knowledge have been

made that authenticate evolution and the antiquity of the earth. Important contributions have been made in the fields of genetics, chemistry, paleontology, geology, molecular biology, physics, and of course, anthropology, to name a few. New fields and numerous subfields have also emerged. The contributions made in these fields converge in support of Darwin's theory. Perhaps the most notable, albeit unknown to Darwin at the time, was the research in genetics by the Augustinian cleric Gregor Mendel (1822–1884). Mendel's work was rediscovered in 1900, after his death. Mendelian genetics were soon embraced by scientists and have become an integral component of the modern synthesis of evolutionary biology. Consequent to these developments, many people of religious faith have sought to find synthesis between religion and science. Many Christians, Muslims, Jews, and Hindus have modified their interpretations to accommodate scientific findings. The Roman Catholic Church, perhaps mindful of the embarrassment caused by the treatment of Galileo and Bruno, has acknowledged that evolution may indeed be accurate, without explicitly endorsing or opposing the notion.

Despite numerous advances in knowledge of the arts and sciences, and particularly in the natural sciences, the theory of evolution has many detractors. The “Scopes trial” (*State v. Scopes*) in Tennessee in 1925 highlighted the division in American culture over the issue of evolution. The trial helped to create a lasting impression in the United States of the rift between two opposing approaches to finding truth. While many people of religious faith have found compromise, often by opting for nonliteral interpretation of sacred text, fundamentalists among Christianity, Islam, and Judaism, as well as other faiths, remain a potent and vocal force in the modern world. In the United States, many critics of evolution embrace the concept of intelligent design (ID). The basic premise of this concept is that organisms are simply too complex to have evolved, and therefore must have been designed by a god. Scientists, court rulings, and even some theologians have dismissed ID as pseudoscience and a religiously based critique of evolution. The concept is nonetheless popular in many Islamic countries, as well as in regions of the United States.

The Triumph of Scientific Naturalism

The 20th century witnessed a remarkable increase in the secularization of the human world. As has been heavily implied, this pattern has occurred in conjunction with the spread of enlightenment, or the progression and dissemination of the arts and sciences. Humankind's greater understanding of the natural world has affected popular belief in supernatural phenomena at an inverse relationship. The pace of revolutions in scientific knowledge has increased to the point that, today, we may speak of a concurrence of multiple scientific revolutions developing

simultaneously. Notably, the ongoing DNA revolution, the use of stem cell research, genetic engineering, transhumanism, evolution, space exploration, and of course, the computer and Internet revolution, all attest to the triumph of scientific naturalism and of humankind's ability to use nature for the cause of improvement. Of course, use of the term “improvement” in this regard is not without controversy. The question of ethics as it relates to scientific research is a persistent source of debate. The purpose of scientific research and of the ongoing revolutions noted in this chapter is to increase humankind's knowledge and awareness of the universe we live in, and insofar as is possible, to improve the human condition.

The field of genetics has seen a revolution on multiple fronts. In 1953, geneticists James Watson and Francis Crick identified the double-helix model of DNA structure. This solved the mystery of how genetic instructions are passed on from parent to offspring. Knowledge of the structure of DNA propelled research in drug development, human identity and brain activity, medical uses such as organ transplantation, stem cell research, and especially in evolution by natural selection. In the case of the latter, no longer is it necessary to research human evolution purely through identification of the fossil record, but also through identification of genetic lineage traced using the DNA of living peoples. Recently conducted DNA analysis shows humans and chimpanzees to be 99.4% identical. This has raised questions about our genus classification, suggesting that perhaps humans and chimpanzees should both be classified in the genus *Homo*. It is now through multiple facets of scientific research that we are able to recognize our distant ancestors and discover what it means to be human.

While it took many years for the popular acceptance of the heliocentric model of the universe and planetary motion, among many other great scientific revelations, in time these truths were universally recognized. Evolution indeed has functioned in a similar manner in terms of gradual popular acceptance. The overwhelming convergence of data in support of evolution by natural selection has made reasonable dismissal of the concept difficult. Resistance predominantly persists in geographic and cultural zones less affected by secular humanism. Religious fundamentalism often incorporates the concept of *denialism* in regard to scientific findings. Politics too can be affected by fundamentalist religious views and by the pressure from populations resistant to perceived assaults upon traditional orthodoxy. Scientists, for their part, maintain that good science knows no agenda—political, ideological, or otherwise. The purpose of scientific research is the pursuit of truth and the improvement of the human condition. To that end, research in evolutionary biology is ongoing. Broad acceptance of evolution and a growing acknowledgment of a cosmic perspective, including support of the cosmological model of the big bang theory, are much more pervasive today than at any other time in our past.

The Secularization of the Human World

In 1846, British writer George Holyoake (1817–1906) coined the term *secularism*. As we have seen, the concept of free thought was nothing new by this time; nevertheless, religion remained a potent force in government and society even in Great Britain. Holyoake, himself subject to persecution for blasphemy, set upon defining and articulating the concept that had already crystallized in theory more than in practice. In his 1896 publication titled *English Secularism*, Holyoake described the concept as such:

Secularism is a code of duty pertaining to this life, founded on considerations purely human, and intended mainly for those who find theology indefinite or inadequate, unreliable or unbelievable. Its essential principles are three: (1) The improvement of this life by material means. (2) That science is the available Providence of man. (3) That it is good to do good. Whether there be other good or not, the good of the present life is good, and it is good to seek that good. (p. 36)

Holyoake's definition is broad, incorporating nontheists of many different stripes. For many, secularism simply entails the promotion of social organization and justice separate from the sphere of religious belief. Secularism is therefore not intended to be an assault on or dismissal of religion. Others are actively critical of religious influence in government and society, and may therefore deem it appropriate to challenge such influence. At the heart of secularism is the view that tolerance and skeptical inquiry should be the underlying principles inherent in a free society.

The neutrality of the state on matters pertaining to religious belief is a question of central concern for many theists and secularists alike. So important was the issue for the authors of the Constitution of the United States that it is addressed in the First Amendment. Largely influenced by the Enlightenment discourse of the 18th century, the authors sought to emphasize the neutrality of the government—prohibiting Congress from either making laws promoting or prohibiting religion and the exercise thereof. Interpretation of this clause has been a source of disagreement between secularists and religious fundamentalists since its inception. Contemporaneously in France, revolutionary events began to unfold that would make the issue of secularism a theme of central concern to the present. France and Turkey are two examples of nations with an official separation of church (religion) and state. Many other nations worldwide officially or unofficially have a secular-based relationship between church and state to varying degree. Critics often argue that secularism is discrimination against religion, or even a form of religion itself. Proponents associate secularism with enlightenment and the principles of freedom and tolerance. They note that the most progressive and prosperous nations in the world are typically secular, suggesting an evident link. Conversely, secularists maintain that theocratic societies enjoy less freedom and prosperity.

The worldwide trend during the course of the last century has been one of increased secularization.

Prominent variants of free thought include agnosticism, atheism, and deism, the latter described previously. Though often portrayed as a middle ground between theism and atheism, agnosticism is rather a philosophical position than a belief system. It entails that metaphysical and particularly supernatural claims can be neither proven nor disproven, and are therefore ultimately unknown to humankind. British biologist Thomas H. Huxley (1825–1895) first used the term *agnosticism* in the 1860s. Huxley (1896) described agnosticism thusly:

Agnosticism, in fact, is not a creed, but a method, the essence of which lies in the rigorous application of a single principle. . . . Positively the principle may be expressed: In matters of the intellect, follow your reason as far as it will take you, without regard to any other consideration. And negatively: In matters of the intellect, do not pretend that conclusions are certain which are not demonstrated or demonstrable. (p. 246)

Many people worldwide have articulated *agnosticism* before the term itself was coined. Prominent, self-described agnostics include the American orator Robert Ingersoll (1833–1899), British philosopher Bertrand Russell (1872–1970), and German-born physicist Albert Einstein (1879–1955). Today, a substantial number of people worldwide identify as agnostic, particularly in the world's most progressive societies such as Sweden, Denmark, and Japan.

Atheism is the position that deities do not exist, and hence religion in all of its manifestations is spurious. Skepticism is a central component, as atheists tend to doubt supernatural claims for which empirical support is wanting. Prior to the 18th century, the term *atheist* had a markedly negative connotation. It was loosely applied to those guilty of alleged heresy or blasphemy rather than explicit atheism. It was during the Age of Enlightenment that it became relatively more common for a person to identify as atheist. Denis Diderot and Paul Baron d'Holbach were two notable examples. The French Revolution of 1789 to 1799 had a profound influence in Germany, where philosophical discourse during the 19th century was dominated by secular thought. The German philosopher Ludwig Feuerbach (1804–1872) described God in *The Essence of Christianity* as a mythical creation of humankind upon which human qualities are projected. As such, the narrative that God created man in his image is replaced by that of man created God in *his* image. Other influential thinkers of the 19th century who expounded atheism include Ernst Haeckel (1834–1919), author of *The Riddle of the Universe* (1899); Arthur Schopenhauer (1788–1860); Friedrich Nietzsche (1844–1900), author of several books critiquing religion; Karl Marx (1818–1883), who famously referred to religion as an “opium of the people”; and Sigmund Freud (1856–1939), who called religion a “mass delusion.”

The 20th century has undoubtedly witnessed a continuation in the trend of expressive free thought. Secular humanism, existentialism, nihilism, communism, structuralism, and psychoanalysis are but a few examples of the 20th-century philosophical discourse associated with secularism. Many 20th-century thinkers have written on the subject of free thought—certainly more than in any previous century. More significant is the extent to which this philosophical discourse has influenced societies around the world. The transformation of ideas in conjunction with rapid advances in technology has rendered the world of 2000 considerably more secular than that of 1900. Religious institutions once known for staunch opposition to scientific advancement have today, in the face of widespread secularization, modified their dogma to accommodate social changes. Resistance to do so and tension between orthodoxy and moderation has spurred violence at the dawn of the 21st century. Such responses can be seen as a reaction against universal secularization and modernization.

Future Directions

While secularism has spread worldwide at a spectacular rate over the course of the last century, its appearance in each nation has been uniquely dependent on the local social, cultural, political, and geopolitical conditions. Secularism developed quite differently in France, Germany, the United States, and Russia, for example. It is likely that this unique development, contingent on local circumstances, will continue to be the case. In addition, societies must cope with the globalization and mass society of the 21st century. The most noticeable feature of globalization is the spread and pervasive use of the Internet worldwide. A conduit for the exchange of information and ideas on this scale has the potential to usher in a second Enlightenment. The 18th-century Age of Enlightenment became possible because of the rise of a public sphere, in which new ideas could be discussed and debated, eventually eroding the monopoly on information hitherto held by throne and altar. Public access to information was the central indispensable component of the first Enlightenment. Today, in the 21st century, global access to information is unprecedented. The exchange of ideas on such a scale has the potential to challenge religious orthodoxy, traditional assumptions, and inherited beliefs. Those interested in preserving status quo are likely not unaware of this revolutionary potential.

A resurgence of religious fundamentalism and anti-democratic movements worldwide at the beginning of the 21st century has been met with a no less determined movement for secular humanism. Organizations advancing the cause of secularism and enlightenment are active worldwide. In Amherst, New York, the Center for Inquiry and the Council for Secular Humanism are two such examples. Both organizations promote the ideals of free

inquiry, separation of church and state, freedom and democracy, moral education, religious skepticism, the advancement of science and technology, understanding of evolution, and of course, the human capacity for reason. These ideals are today spreading worldwide to an unprecedented degree. The many aforementioned thinkers and writers have, over time, contributed to the ascendancy of reason. Science and technology have fundamentally transformed social institutions in Europe, the United States, and in many other nations. It yet remains to be seen whether the principles of secular humanism will be universally embraced.

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MARXIST ANTHROPOLOGY

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This chapter looks at the contribution of French Marxist anthropology and modes of production theory to the development of economic anthropology. Mode of production theory represents an alternative approach to earlier substantivist and formalist frameworks for the study of economy and society. By the late 1970s, most economic anthropologists agreed that the expanding world's capitalist system had a deteriorating effect on pre-capitalist societies and cultures. What they did not agree on was the question as to how these societies were transformed and changed. Substantivists argued that spread of capitalism disrupted traditional values, agricultural practices, and the social relations of production by forming both new classes and outside alliances that undermined the preexisting system at the expense of the commonweal. In contrast, formalists contended that the capitalist market improved individual well-being by rewarding farmers who adopted new behaviors and farming techniques to maximize yields and profits. This chapter is arranged accordingly. The mode of production concept is introduced. This is followed by a discussion on the substantivist and formalist controversy in the development of economic anthropology. The mode of production concept that countered this debate is then elaborated upon.

Mode of production (MP) as a theoretical framework for the study of socioeconomic systems was never fully developed by Karl Marx, who alluded to the concept here and there in his works. He introduced the idea in *Capital*,

A Contribution to a Critique of Political Economy, and *Pre-Capitalist Economic Formations*. It was from these texts that later scholars, especially Althusser and Balibar in their *Reading Capital* (1979), derived and developed the term for use in social analysis. Marx's work continues to be inspirational for the study of globalization and socio-economic and cultural change in the 21st century. Earlier scholars, like Maurice Godelier (1972) and Eric Wolf (1982), to take two of the better-known examples, referred back to him in constructing their MP concept. This chapter concerns the work of those scholars whose interpretations of Marx's theory are deemed most congenial to current anthropology.

Definition of the Mode of Production Concept

The concept of mode of production has never been definitively defined in Marxist social anthropology from which it derives. During the late 20th century, there were heated debates over this very issue, such as occurred between world system theorists (e.g., Wallerstein, 1974) and MP scholars (such as the French Marxists Godelier, 1972; Meillassoux, 1979; and Terray, 1972). World system theorists contended that global capitalism would inevitably eclipse traditional societies and cultures. MP theorists countered that, while capitalism could lead to the greater polarization between

classes, it also could encourage more divisiveness and stratification within a preexisting class society, as insiders hedged and shifted between capitalist and precapitalist relations in a transitional economy. Marx used the concept of MP interchangeably to refer to both a social formation and an economic system. For example, MP has been used to categorize the evolution of different societies and cultures, from primitive communist to ancient, Asiatic, feudal, capitalist, socialist, and advanced societies, even though a society and MP are two very different concepts.

A society-and-culture is a particular social formation that is made up of several particular and overlapping modes of production. This confusing of the concepts of a society versus an MP formed the basis of an archaic, now defunct, evolutionary scheme through which world history was viewed by Marxists as a kind of evolutionary ladder upon which each historical epoch was marked as being dominated by a particular MP that evolved into a new type through revolution. Yet, Marx (1982) clearly stated, "Events that are strikingly analogous, but taking place in different historical milieu, lead to totally disparate results" (p. 110). Eric Hobsbawm (1964) also defended Marx from those who would use his theory as if it existed outside of history at some superstructural level: "The general theory of historical materialism requires only that there should be a succession of modes of production, though not necessarily any particular modes, and not in any particular predetermined order" (p. 19).

Evolutionary theories of MP have been well criticized by the French Marxist anthropologists and other scholars (e.g., Bloch, 1984; Lukacs, 1968) for being dogmatic and nonscientific. Peter Worsley (1984) argued that they lacked a concept of culture. Louis Althusser and Etienne Balibar (1979) stressed that the MP concept had to be looked at as coming out of a particular MP. They explained, "To think the concept of production is to think the concept of the unity of its material and social conditions" (p. 101). Marx's concept was taken to a new level, by creative and nondogmatic Marxists anthropologists in the late 20th century, to refer to societies, past and present, where several different types of MP could be going on at the same time, usually with one being dominant. The concept of MP came to be used as a tool for social analysis, rather than as a way of delineating certain evolutionary stages. The MP concept came to be contingently defined as that complex of social relations that link human beings together in any production process, and the means of production (tools, technology, knowledge, and skills) around which work is organized to ensure the material survival and reproduction of a particular group.

The MP is constructed of two main components: the means of production and social relations of production. Marx theorized that the MP gave rise to social relations. In other words, the economic base of a society gave rise to its superstructure (political, cultural, and ideological aspects). But, cultural Marxist anthropologists of the late

20th century argued that Marx's MP theory was too deterministic and dogmatic in regards to the relationship of the economic base to the superstructure. They argued for an open-minded and bottom-up approach for the study of other societies and cultures. Godelier (1972), among other cultural materialists, substantially illustrated that, in precapitalist and semicapitalist societies, the economy is frequently embedded in kinship, religion, and politics. While this MP controversy has yet to be settled, most scholars of this school agree that the general logic of social life is grounded in material conditions. That is, the analysis of consumption and distribution begins, as Althusser and Balibar (1979) explained, "at the true site of the determination of the economic: production" (p. 265). The MP approach takes production as its logical starting point; although, in an ongoing economy, all three processes are occurring simultaneously.

The Substantivist and Formalist Debate

The substantivist and formalist debate arose in the early 1960s in response to the question of the place of the economy in society. Economic anthropology, by then, had only recently come into its own as a subfield of sociocultural anthropology. Anthropologists were interested in finding an appropriate methodology for the study of nonindustrialized societies. Their interest came to the forefront after World War II, when there was a widespread interest among nations in theories of economic development. This interest in modernization led to numerous "development" projects in the non-Western world. However, these projects usually failed, because they were implemented without consulting the findings of anthropologists and, perhaps even more importantly, the local people themselves. This debacle advanced a disagreement over the applicability of formal neoclassical economic theory for the study of noncapitalist societies and cultures. The dispute climaxed into what has become known as the substantivist-formalist controversy.

The formalist school (e.g., Eder, 1982; Herskovits, 1968; Schneider, 1989) proposed that neoclassical economic theory was appropriate for the study of human economic behavior cross-culturally. Implicit in this theory was the idea that all humans sought to maximize their individual behavior for their own self-profit. Formalists held that theories of human rationalism, developed for the study of human behavior in Western capitalist societies, could be modified and applied for the study of human behavior elsewhere. In contrast, the substantivists (e.g., Dalton, 1968, 1969; Polanyi, 1957; Sahlins, 1972) argued that "Homo-economus" or the idea that humans "naturally" strove to maximize their behavior for personal profit was a product of a particular society being dominated by the capitalist MP. They defined the economy as the way people make their living from nature and the relationships

between them; and contended that economic systems were not operating in the same way in different societies and cultures and therefore required new methods in order to study them. The substantivists realized that formal economic theory could be useful for the study of some societies. However, it was not a universal theory applicable for the study of all societies and cultures everywhere across the historical horizons.

Contemporary anthropologists still use both formalist and substantivist methods for the study of economic phenomena. However, the substantivist-formalist debate has subsided. From the perspective of MP theorists, both views are incomplete theoretically because they offer only partial explanations for human behavior. On the one hand, formalists attempt to make “institutional rationalism” derived from capitalist societies fit precapitalist societies while neglecting to consider their moral fabrics. Methodological individualism can be criticized for overlooking the dialectical relationship between human beings and their society. In other words, the formalists overlook the idea that people make their decisions in relation to outside social influences. On the other hand, substantivists seek to universalize an alternate theory for the study of tribal and peasant economies while dodging the issue that each society has its own unique culture, which eludes generalization.

Substantivist theory also is problematic because it separates out and sets apart the economy for analysis but then falls back on functionalism to explain it. Both formal and substantivist theories have something to offer, for example, that humans usually act rationally in accordance with their particular social and cultural circumstances, and formal economic theory can be employed to measure economic data in varied settings. The two approaches, whether used separately or in combination, will result in only a partial understanding of a society, because they focus mainly on the acquisition, distribution, and exchange of goods, rather than the entire production process that includes the way goods are produced, utilized, and exchanged, so argue the MP scholars.

Advantage of MP

The study of the economy includes more than the study of the circulation of goods. The economic field encompasses four related processes: production, distribution, exchange, and consumption. It makes good economic sense to begin from the point of view of production, because production precedes distribution and distribution comes before exchange. As Althusser and Balibar (1979) stated, “It is production that governs consumption and distribution, not the reverses” (p. 168). Prior to the rise of the MP school, most economic anthropologists attended, almost exclusively, to the study of the distribution and exchange of goods. In contrast, the MP perspective offered an advantage because it began from the point of origin where goods were being produced, and then looked at the entire production

process. The MP approach lessened the importance of the substantivist-formalist controversy, because it considered the economy as a whole by looking first at production, and then at how goods were being used and transferred. The MP approach, because it was a tool for social analysis rather than a theory, appeared to be more promising than the substantivist or formalist theories.

Anthropologists and the MP School

By the 1980s, there were a number of anthropologists (e.g., the French Marxists mentioned earlier and Joel Kahn, 1981; June Nash, 1979; Carol Smith, 1984; Anne Laura Stoler, 1985; Eric Wolf, 1982) who constructively used the concept of MP for the study of different cultures and societies. Firth (1984) and Roseberry (1988) divided these scholars into two different schools of thought, according to whether they were interested in theoretical issues or classic issues of revolutionary change. However, this categorization gave the impression that the French Marxists were armchair anthropologists above matters of class and social change. However, many of them had built their academic careers around their political beliefs. They were interested in matters of causality in MPs, which included considerations of culture, human agency, and class. The French Marxists used real-world examples to illustrate that, in precapitalist societies, relations of production were enacted through kinship, religion, or politics, rather than through the economic sphere, as is the case in capitalist societies.

The MP school of anthropology was given great impetus by the French Marxist anthropologists (e.g., Godelier, 1972; Meillassoux, 1972; Terray, 1972) who used the concept to go beyond the prevailing substantivist and formalist paradigms to study the economy. They were influenced more by the substantivists than the formalists, since the substantivists contended that the economy was a product of history. However, they considered the substantivist framework to be inadequate, because it overlooked the production process. Initially, the French Marxists were concerned to distinguish themselves from other Marxists who adhered to mechanistic models of MP. Godelier (1972) explained that they were developing a theory “as distinct from the Marxism normally practiced, a Marxism which can very quickly become vulgar materialism” (p. 62). Like Lévi-Strauss, they were interested in issues of structural causality in modes of production.

According to Godelier (1972), when Marx proposed that the economic infrastructure of a society determined the superstructure, he did not mean by this that all societies are divided into separate functioning parts, wherein the economy becomes visible as it does in a capitalist society like the United States or the European Union. In the United States, for example, the unity of society and economy is achieved through bureaucratic means, which allows the society to become differentiated into discrete

and functional institutions (the economy, education, family, politics, and religion, etc.). In this way, relations of production are enacted through the economy, and one can see how the economic instance becomes the basis upon which all other domains of social life are made possible. However, in precapitalist, semicapitalist, or noncapitalist societies, relations of production, and the corresponding forces of production that govern distribution and exchange, are carried out through interpersonal relationships embedded in noneconomic social organizations. In precapitalist societies, the economic instance is not apparent. It becomes, then, the work of the anthropologist to uncover the MP in precapitalist societies, even as they may be in articulation with and under the influence of capitalism.

In hunting and gathering societies (e.g., Australian Aborigines or Kalahari bushmen), the infrastructure and superstructure are enacted simultaneously through kinship relations. In these societies, it is infeasible to study the economy apart from kinship, as if it were a separate domain. Hunters and gatherers in primitive communist societies often control human access to the production process by regulating marriages, which provide a social framework for political and ritual activities. Godelier (1972) explained that kinship relations also function as a symbolic code for expressing relations between humans and nature. It is the kinsmen and women who perform the relations of production in correspondence to the level of development of the related forces of production. However, the notion of kinship in these societies does not stop at the level of the family; rather, it extends through a whole constellation of bands that form a single tribe organized into a system of subsections in relation to the natural environment, in order to ensure their survival.

Transition Debates

During the 1980s, MP theorists (e.g., Carmen Deere, Sidney Mintz, James Scott, and Eric Wolf) entered into another hotly contested dispute over the direction of social change in peasant societies. They argued over whether or not precapitalist traditions would inevitably be transformed into capitalist class relations once capitalism set in, or if peasant MPs were the effects of capitalism itself. This controversy stems back to the Lenin-Luxemburg dispute and the Lenin-Chayanov disagreement. They disagreed concerning whether the peasantry became stratified through its relation with capitalism, or if it was already a class as a whole in relation to other classes in a wider social formation. Ledesma (1982) explained that, from this perspective, the peasantry might be better off if it were a class unto itself, because stratification can lead to the marginalization of some segments of the peasantry. Marginalization gives rise to unemployment, which probably did not exist in precapitalist societies prior to their being dominated by the capitalist MP. Marginalization also

begins a process of the incomplete reproduction of peasant family households through semi-proletarianization, indebtedness, and outmigration. These conditions in the peasantry gave rise to another serious contestation over whether peasant households can still be measured in terms of farm output, rather than in terms of total input from a multiplicity of sources both on and off the farm.

The transition debates, much like the earlier substantivist-formalist controversy, were long and contracted. World-system theorists (e.g., Braudel, 1984; Frank, 1967; Wallerstein, 1974) contended that the precapitalist MP was subsumed into the capitalist mode; hence, relations between them are capitalistic. But the French Marxist anthropologists, especially Meillassoux (1979), argued that Marx studied precapitalist societies only in so far as they pertained to capitalist societies. Elsewhere in his works, notably his reference to the Asiatic MP, Marx suggested a tendency in precapitalist MPs to resist capitalism. Furthermore, contended Meillassoux, the world-system view reduces the relationship between capitalism and precapitalist MP to a one-way process that pays little attention to local interactions. The French Marxist anthropologists agreed that the relationship between global capitalism and precapitalist MP can lead to capitalist relations of production, but that this is not always necessarily so. There is widespread resistance to capitalism, and some rebellions challenge capitalism by calling for its replacement by a completely different MP altogether. Also, the capitalist mode has sometimes encouraged the continuation of precapitalist modes when it is profitable to do so.

Articulation of MP Debates

MP theorists (e.g., the French Marxists anthropologists Joel Kahn, Eric Wolf, and Harold Wolpe) held that precapitalist MPs are not underdeveloped forms of the capitalist MP, as liberal economic theorists portended. They are completely different economic systems that require different concepts and theories to study them. Precapitalist societies have to be differentiated and set apart from capitalist societies because, even if they are changed as a result of capitalism, they can only be understood in terms of the characteristics internal to the MP dominant before capitalism arrived. Meillassoux (1979) argued that capitalism both undermines and perpetuates preexisting MPs in order to ensure itself a labor supply. Wolpe (1980) explained, "The capitalist sector benefits from the means of subsistence produced in the non-capitalist MP to the extent that it is relieved of paying a portion of the necessary means of subsistence by way of indirect wages" (p. 248).

MP theorists, from the 1970s to the early 1990s, critiqued world-system theory, the development of underdevelopment theory, and modernization theory on the basis that there is not only one capitalist system through which, logically, all the others can be explained, but there are also

various coexisting MP with laws internal to themselves. In other words, Mandel (1976) explained that the world capitalist system often gets embedded and transformed through preestablished cultural constructions of inequality. That is, an MP often gets transformed through the formation of class alliances between the dominant classes in each production mode. With the influx of capitalism, the bourgeoisie frequently becomes interested in bonding with the precapitalist, dominant class because it has the power to exact labor. Capitalism, far from replacing other MPs, often dominates and exists side by side with them. As Wolpe (1980) explained, "It is one thing to argue that pre-capitalist relations of production may be transformed into capitalist relations quite another to assume that this is a necessary and inevitable effect of the capitalist mode" (p. 41).

Another debate arose over the question of whether simple commodity production (SCP) is an MP. Carol Smith (1984) and Jacques Chevalier (1983) view petty commodity production as an incipient form of capitalist production, rather than an MP. From their perspective, SCP exists within the logic of capitalism, although they are contentious as to whether or not it is bound to be fully subsumed by capitalism. In contrast, Kahn (1981) analyzed SCP as a separate MP in terms of its own logic articulated together with a few other modes, usually the capitalist MP and subsistence MP. Chevalier (1983) found this way of looking at SCP problematic, because it took a one-sided view of the capitalist MP as being more progressive and dominant, with all other modes being variable. Smith (1984) explained that simple commodity producers might subsume their labor under capital, even in the absence of monetization, because they have to commodify their goods for exchange in a market in order to reproduce their means of subsistence. However, the French Marxist anthropologists interjected that this is not always necessarily so. MP scholars, who analyze SCP as a separate mode, do not necessarily view the influx of capitalism as an overarching structure. They look at it as a subject for investigation, one to be constructed out of the particular social and historical societies in which it is situated.

Concept of Class in Precapitalist MP

Under capitalism, classes are economic groups that account for economic distinctions, but in precapitalist MPs, the relationships between classes are determined by means other than economic bonds. In precapitalist societies, for example, surplus is not extracted from the direct producers by economic means. Mandel (1976) explained that Marx was not seeking universal laws of economic organization in his study of class formation under the emergent capitalist MP of his time: "Indeed, one of his essential themes is that no such laws exist" (p. 12). Marx did not try, as he did for capitalism, to find out the internal

laws governing precapitalist societies and cultures. Instead, he dealt with other societies and cultures only in so far as they bore a relation to the development and origins of capitalism. More generally, however, Marx (1974) intended his concept of class for the study of other societies: "The specific economic form, in which unpaid surplus labor is pumped out of direct producers, determines the relationship of rulers and ruled, as it grows directly out of production, itself, and, in turn, reacts upon its determining element" (p. 791).

The French Marxist anthropologists explained that a concept of class is integral to a concept of an MP, but one must begin a definition of class, not from an MP but in the context of the society and a larger world in which it is situated. This is because, within any society, more than one MP occurs together and one of these modes is usually more dominant. Terray (1972) stipulated that whether an MP is in a dominant or subordinate position is different than what it would be in a pure state. In other words, stated Althusser and Balibar (1979), "The relations of production cannot be thought in their concept, while abstracting them from their superstructural conditions of existence" (p. 177). That is, the classes cannot be divorced from the societies and histories in which they are grounded.

According to Terray (1972), a concept of class can be defined as a "totalizing entity": In it economic, political, and ideological forces of society converge to determine an MP. One needs to account for both the superstructure and infrastructure, because class is a product of these combined structures. The French Marxist anthropologists contended that for each MP, it is essential to construct the concept of class that is contingent upon it. Therefore, a concept of class applicable for the study of all societies and cultures at some universal level does not exist. But, a more basic definition can be given as follows: Classes are social entities formed on the basis of their differing relationship to the means of production, where ownership relations are focally instrumental but not the exclusive determinants of social position.

To grasp the difference between MP, cross-culturally, and the relations of production, contextually, one should proceed by way of class analysis. The concept of class is the motive force undergirding Marx's MP theory. For Marx (1974), usually but not always, there is a discrepancy between two opposing classes: master-servant, aristocrat-serf, and the wealthy-poor. This inequality between classes causes them to struggle for their elevation, thereby causing their own transformation into new social relations that sometimes cause a new MP to emerge. Hence, a discussion of two or more MPs concerns a discussion of classes or groups that need to be accounted for in any theory of articulation. So, late 20th-century MP theorists also reflected and wrote on the totality of classes, their connected class-consciousness, and the relations between classes in particular societies and cultures around the world.

Concept of Ideology and MP

Kahn (1981) provided a framework for a general theory of the formation of ideology in order to look at class alliances and the struggles between classes as they articulate to develop MPs. His model is worth discussing here, because it provides an example for dealing with the complex issue of classes as they are articulated within different MPs in particular societies. He proposed that, in the past, researchers have used concepts, such as vertical alliances, ethnicity, and patronage politics as models for the study of economic systems in peasant societies that were actually concepts of ideology. He defined peasant ideology as *anti-modern* or *antiquarian systems of meaning* that existed in relation to *capitalist rationality*. These aspects of ideology articulate with the capitalist ideology when the peasant modes of subsistence and SCP enter into relation with the capitalist MP. From this perspective, a general approach to the study of ideology is a first step to the study of peasant economic behavior. That is, peasant behavior is not determined mechanically by the infrastructure of the society, because ideological systems are a product of their own internal properties and are outside socioeconomic and political constraints.

Patron-client relationships, vertical alliances, and ethnicity are kinds of “folk models” based on the appearance of social reality experienced through social interactions. Patron clientage is developed through the perception of structural relations of exploitation and political dominance. Kahn (1981) explained that patron clientage becomes a model for human behavior but, at the same time, the social structure is being built up by all the interactions between inferiors and superiors based on their differential access to valuable resources that define their place in the class structure. He stressed that, where patron clientage has become part of the local ideology, it is based on an assumed coincidence between interaction and both economic and political relationships. However, it is important to remember that social and economic structure need not coincide with the folk models or with appearances. Social change moves by way of its own internal ideological volition, not from external structural changes.

Finally, Kahn’s (1981) model for the incorporation of ideological aspects in the study of the articulation of MPs met the challenge of disentangling the relationship between changing class relations and the persistence or disappearance of traditional relations in precapitalist societies, because it considered visible social structure and perceived empirical models of behavior. It began from the premise that a concept of class and contingent class-consciousness is integral to an MP approach. It is a significant rendition of the MP concept that provided a way to avoid some of the pitfalls of generalizing from preconceived models that do not fully account for the ongoing processes of continuity and change.

Future Directions

Research trends in the study of economy and society since the 1970s and 1980s have moved the discipline forward. Evolutionary frameworks, made to measure the level of development of precapitalist societies against the backdrop of development taking place in advanced capitalist societies, have been largely discredited. Early anthropologists looked at MP in terms of a techno-economic base upon which all other aspects of the superstructure of a society are derived. Cultures could then be categorized based on their level of technological development. Post–World War II development specialists used this model, and made theories of world economic change consist of the transfer of technology from richer to poorer countries. These schemes usually did not work, because they failed to account for the social relations of production.

Later anthropologists examined the distribution and exchange of goods from the point where they were produced. Production assumed a key role because, through it, all other aspects of the economy were actualized. Prior to the introduction of the Marxian concepts in economic anthropology, analysis of the economy in noncapitalist-oriented societies was made in terms of substantivist or formalist theories. These theories provided an inadequate definition of the economy. The formalist theory, by focusing only on the formal aspects of the economy, excluded those characteristics of the society that may be more important to the local people; by omitting such characteristics, they could project concepts from their own social-economic system onto those who held no such views. On the other hand, the substantivist theory, by largely limiting itself to the study of the circulation of goods, is only able to obtain an incomplete understanding of a given society.

Marxist analysis became most useful in the late 20th century for the study of the articulation of MPs as they interacted with capitalism. Although this approach went down with the fall of the Soviet Union in 1991—which gave rise to a new school of postmodern scholars influenced by the work of Marcus and Fisher (1986), who critiqued Marxist theory for being outdated—it has since come back into ascendance. Marxist studies are being revisited for the light they bring to bear on contemporary issues of global and local change. Kahn (1981), in his earlier study of SCP in West Sumatra, was able to show how blacksmiths organized their productive relations indigenously and how these were influenced by the market economy, which determined the price range of local goods, since these goods could not compete with factory goods. Meillassoux (1979) looked at how peasant villages often act as a social security system for capitalist enterprises established in less wealthy countries, where underpaid laborers with no social security benefits go home to retire or work on family farms during the off-seasons. The concept of MP in such cases helps to illuminate the nature of globalization and development, and

raises the question of who benefits from such economic development. It could be used to find problematic areas in the articulation of two or more MP in places undergoing transition (e.g., 21st-century China, or, in the future, post-war Iraq) that could be targeted for change beneficial to the direct producers.

Finally, MP studies have paved the way for a hybrid cultural perspective that has contributed significantly to ethnographic practice, because it avoids some of the pitfalls of generalizing from preconceived models that do not fully account for ongoing processes of continuity and change. Studies of MP are equal to the task of looking at social, cultural, ideological, and economic changes occurring in real-life communities, with their own unique cultural configurations resulting from interactions taking place both locally and beyond. What they argue for is the importance of looking at social relationships against the backdrop of the MPs that oriented them.

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AGENCY AND PRACTICE THEORY

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In 1984, Sherry Ortner predicted that practice would be the key symbol of anthropology in the 1980s. Research on practice, agency, structure, and power actually filled not only the 1980s, but also the 1990s and extended into the 2000s as well. Issues of inequality, oppression, and resistance have been a staple of anthropological literature and have influenced its many theories, both before and after the 1980s. However, time, from the 1980s up to and including today, has seen a steady strengthening and thickening of agency-related theories.

The critiques of feminism, postcolonialism, and race and ethnicity studies brought to light the many problems with earlier constructions of agency. Two main lessons were taken from these critiques. First, agency is not interchangeable with the notions of freedom, the human spirit, or autonomy. Second, notions of agency as purely resistance impoverished the complexity of agency and often allowed for ethnocentric slippages into complex situations of actual resistance.

Theoretical perspectives to explain agency are diverse. In this chapter, they are divided into theories of agency and theories of practice. However, in reality, the divide is blurry and the exchange of knowledge and inspiration crosses the border frequently. Yet, there are commonalities in practice theory that separate it from other theoretical models and thus its distinction here. There are also explorations into agency that are not explored here because they are beyond the scope of this entry, particularly those studies

in psychological anthropology. This chapter presents the three most widely cited and most common threads in the anthropological discussion of agency: poststructuralism, language, and practice.

Lessons From Anthropological Critiques

Perhaps the easiest place to begin a discussion of agency is at its definition. However, as has been noted by many of the prominent theorists of agency theory, this is not an easy task. Like other troublesome anthropological terms, such as culture and identity, agency lies at the intersection of what many have taken to be self-evident, and what others have found highly problematic in real ethnographic experience. However, ethnographic experience has brought into focus some aspects of what agency is not, a quality that indicates humanness or only acts of pure resistance.

Agency as Humanness

A frequent misuse of the term *agency* is as a quality of humanness. Often associated with action theorists, a group whose aim is to differentiate action from events, this form of agency is seen as synonymous with free will or the ability to act intentionally versus being a passive receiver of an event. Donald Davidson's essay "Agency" (1971) describes the difference with an example of his morning routine. He pours

himself coffee and accidentally trips on a rug, spilling that coffee. Pouring coffee, Davidson argues, is an action; he intentionally and knowingly made the choice to pour the coffee. Tripping and spilling the coffee, however, was an event that happened to him, rather than an intentional action. On this level, agency seems to be an easily distinguishable behavior that could be easily transported to anthropological theory. However, this simple definition fails to connect the social nature of agency and the impacts of culture on human actions with the internal will of individuals.

To further problematize this understanding of agency, poststructuralists such as Bronwyn Davies (1991) found that humanist discourses that equate agency to humanness also tend to equate agency with “freedom, autonomy, rationality and moral authority” (p. 42). The interchangeability of these terms allows for groups—such as children, women, the insane, the oppressed, and others—to be described as being incapable of having agency and thus less than fully human. Even for those individuals or groups that are classically seen as having agency, such as adult sane men, agency is only seen as legitimate in so long as the actor’s agency conforms to the dominant discourses that determine what is rational and moral.

Intentionality, the degree to which an action and its outcomes are intentional, has been important to action theory, as well as practice and agency theory, for differentiating between actions that are agentic and those that are everyday practices or events. However, some theorists, such as John Comaroff and Jean Comaroff (1992), have called out the overemphasis or obsession with intentions as representing colonialist ethnocentric biases. They found that by imagining agency to be like the actions of a Western hero, who can overcome all obstacles of his cultural context simply through sheer will, social scientists transport Western ideals of resistance and glory into contexts where they are not. This not only distorts the reality of anthropological subjects, but also creates a false impression of the strength of power structures and the abilities of actors to resist and overcome them. In some popular discourses, similar ideas have led to the argument that the dominated remain dominated out of a lack of will rather than out of a lack of power. Comaroff and Comaroff further problematized intentionality by demonstrating how placing focus on the intentions of individuals distorts the complex and unpredictable relationship between actors’ intentions and the social outcomes of that agency. They argue that social outcomes frequently are unintended consequences of agency, rather than the carefully planned, intended consequences of heroic actors.

Agency as Resistance

Rebellion in the face of oppression is a romantic ideal of agency that has been invoked by anthropologists and other social scientists in increasing frequency, particularly as the discipline’s focus on power and inequality

becomes more intense. Even those theorists such as Lila Abu-Lughod (1990), who in her influential article “The Romance of Resistance” denounced this glorification of resistance in ethnography, has admitted to falling prey to the idea in her earlier works. The narrative of the dominating structure being overthrown by the downtrodden underdog, while romantic, fails to portray the lived reality of resistance. One difficulty of equating agency with this form of heroic resistance is that it upholds Western ideals of individualism and transplants them to non-Western contexts. As has been pointed out by Laura Ahearn (2001c) and Comaroff and Comaroff (1992; among others), even in Western contexts, resistance rarely takes this idealistic form.

Resistance is often messy and contradictory, and is played out in a wide variety of forms from foot-dragging to revolution. Abu-Lughod (1990) pointed to her ethnography among the Awlad Ali Bedouins as an example of resistance forms that do not fit the romanticized model. She observed irreverence toward men imbedded in the joking of women, minor defiances of traditional modesty and sexuality hidden in poetry, and subservient acts of women to block unwanted arranged marriages. However, Abu-Lughod argued that casting a light of romanticized resistance over these acts fell short of the reality for the women she observed. The actions were not representative of Western-feminist politics of resistance against male domination. Yet, women were creating power for themselves within the framework of male power in their lives. The contradictory behavior of upholding structures of male power on the one hand, while undermining it on the other, is also incompatible with traditional views of resistance.

To avoid the Western and ethnocentric view of resistance, Abu-Lughod (1990) suggested that anthropologists should study resistance as a diagnostic of power, rather than as a phenomenon indicating human freedom. This analytical switch allows ethnographers to view the various types of resistance in a context of their complex relationship with power structures without privileging one over the other.

Agency Theories

Many schools of thought within anthropology have explored agency. This section explores just two of these. Yet Davies’s (1991) article “The Concept of Agency” and Ahearn’s (2001c) article “Language and Agency” are excellent examples, because both propose new directions for theory, and both thoroughly document prior understandings and known issues that have arisen in agency theory. Both poststructuralism and feminism developed as a response to earlier theoretical models and common trends, as well as assumptions in anthropology. Davies explored how these earlier understandings of agency have influenced anthropological understandings of women’s agency, and then proposed a new model that would take the lessons already

learned in feminism and poststructuralism to overcome these biases. Ahearn, coming from a linguistic background, made a persuasive argument for the importance of language studies for agency, as she found that current theories of agency were insufficient to bridge the gap between social reproduction and social transformation.

Feminist Poststructuralism

In 1991, Davies, a poststructuralist and feminist, wrote the widely cited article “The Concept of Agency.” This article is an outline of the differences between humanist and poststructuralist theories, as well as an outline of Davies’s argument for poststructural understandings of power and agency in light of her feminist background. Davies argued that while humanist theories emphasized the individual as having a complete and independent identity with the capacity for agency, poststructuralism viewed individuals as having multiple identities with each being constituted by the subjective positions of the individual in discourses. Agency, as understood by humanists, is thus illusionary since the individual is forced into “choices” that reflect what is accepted as rational and desirable by the discourses that constitute the individual’s identity.

Davies (1991) disputed the humanist theories primarily because she found that rather than representing the reality of power structure and human agency, humanist theories upheld racist and masculinist power structures. She also argued that humanist theories pit the individual against the collective and force the individual into struggling against the collective in order to obtain an individual identity. Poststructuralism views the individual as constituted by many discourses, with the heroic individualism of humanism as simply one. The model of the essential and continuous self that most individuals view themselves in, Davies argues, is the result of regular positioning in a set of discourses, the use of life-history story lines to string together an individual’s existence into a cohesive whole, the internalization in the body and the desires associated with it, and features such as the male/female dualism that Davies argues are consistent through all discourses.

To escape the power of strong discourses and the male/female dualism, Davies (1991) argued that individuals must recognize the ways they are constituted through discourses and then act as authors to disrupt, contradict, and rewrite the discourses that constitute them. These acts of “authority” represent agency in the poststructuralist model. However, she was quick to point out that while agency exists in the poststructural framework, it is impossible for an individual to escape the discourses that constitute the self. An individual can only recognize the multiplicity of discourses involved in the constitution of the self and resist, subvert, and induce change within those discourses. Thus, agency, in this framework, is the ability to author and have a voice within the discourses one is involved in.

Agency in Language

Ahearn (2001c), in her “Language and Agency” review, argued for greater use of linguistic knowledge in the study of agency. Because agency and culture are so closely intertwined, a study of agency necessarily requires an understanding of the ways it is represented in language. Linguistics, she argued, could build the bridge between social reproduction and social transformation—a bridge, which she argues, practice theory has not yet built.

Grammatical agency, Ahearn (2001c) explained, is created through the grammatical structure of a language. While grammatical agency can overlap with social agency, grammatical agency is different in that it reflects how a language represents the different roles taken by linguistics subjects. Ahearn argued that an understanding of grammatical agency can give insights into social agency. For example, in a 1992 study, LaFrance found that participating English speakers had a bias against women. He observed that when speaking about women, the participants were more likely to make women’s agency “disappear” by structuring their sentences grammatically so that women took more passive roles as subjects. Men were more likely to be portrayed grammatically in more aggressive subject roles.

Linguistic anthropology, more so than other forms of linguistic studies, focuses on language as social action. This means looking at how people use language to reproduce and transform culture. Ahearn (2001c) loosely defined agency as the “socioculturally mediated capacity to act” (p. 112). She found that the study of language as social action, with an understanding of the ways in which language constructs social understandings of the subject, creates important knowledge for anthropological understandings of agency, particularly in the areas of language and gender, literacy studies, and dialogic approaches.

Practice Theories

Practice theory originated in the late 1970s and early 1980s as a response to earlier structural theories and the argument over the privileging of human action over cultural forces, or the privileging of structure over human action. Practice theory aimed to explain the ways that culture was created, sustained, and changed. The early theorists had various emphases on aspects of this aim; however, the overall goal remained. Pierre Bourdieu, a French sociologist, achieved much with his *Outline of a Theory of Practice* (1995) that inspired and became the basis for much of practice theory. Bourdieu focused on both the way that culture was perpetuated over time and the systems of control that influenced human action. Marshall Sahlins’s thin yet rich book, *Historical Metaphors and Mythical Realities: Structure in the Early History of the Sandwich*

Islands Kingdom (1981) focused on how cultural history influenced the actions of people and successfully created a mode for cultural transformation. Anthony Giddens's (1976, 1979, 1981) contribution to practice theory came from his background in sociology and what he lacked in ethnographic experience, he made up for in his observations of the nature of structure and its relationship to human agency and agency's dependence on structure.

Since the early formations of practice theory, anthropology as a discipline has explored new understandings of culture and undergone intensive internal critiques from postmodern influences. From these observations, Ortner (2006) found that three main influences contributed to the growth of practice theory: the "historic turn," the "reinterpretation of culture," and the "power shift." The historic turn, she explained, was a turn from synchronic studies to diachronic explorations into history. Of the three founding fathers of practice theory, only Sahlins (1981) had a truly historical perspective of practice. Ortner (2006) argued that the historic turn made clear the importance of understanding history's impact on practice and that historical perspectives must be included in any true theory of practice. The reinterpretation of culture from a simplistic and essentialist bounded category—from early anthropology to a complex system yet to be fully understood—also impacted practice theory. The power shift, which occurred parallel to the development of practice theory, was propelled by three works identified by Ortner: Raymond Williams's *Marxism and Literature* (1977), Michel Foucault's *History of Sexuality, Part I* (1978), and James Scott's *Weapons of the Weak* (1985). This shift was the result of several critical studies in anthropology including feminism, postcolonialism, and studies of race and ethnicity.

Two recent approaches to practice theory, and the most influential, are William Sewell's (1992) article "A Theory of Structure: Duality, Agency, and Transformation" and several works by Ortner (1984, 1989, 1996, 2001, 2006). Sewell, a diverse social scientist, created a widely cited theory practice, worked from the foundations of Bourdieu (1995), and particularly Giddens (1976, 1979, 1981). Ortner, over a 20-year period, contributed an array of works concerning agency and practice theory, resulting in serious games theory. Together, Ortner and Sewell represent the more recent trends in practice theory and general anthropological theory.

Three Early Theorists

Pierre Bourdieu

Pierre Bourdieu (1995) wrote an *Outline of a Theory of Practice* amid growing unease among social scientists about earlier structural theories, particularly the work of Lévi-Strauss (1969). Postmodernists, particularly from the field of literary criticism, began to question the Western assumption that objective reality existed in a way that

individuals experienced reality similarly or that social scientists could observe it. In an *Outline of a Theory of Practice*, Bourdieu added to and propelled this argument by suggesting that much of observed reality is subjective and that human agents largely control culture, as they create, maintain, and alter taxonomies through practice.

Field, as defined by Bourdieu (1995), is the objective social domain where relationships of inequality take place and where agents, informed by subjective *habitus*, negotiate that inequality. *Habitus*, originally introduced by Marcel Mauss and adapted by Bourdieu, is the internal subjective reality of the individual that is built for them through their encounters with the field or objective reality. *Habitus* contains both the variable array of options available to the agent, as well as the limits to their actions. He described the quasiperfect arrangement of the objective structures of the natural world and the subjective structures of culture as *doxa*, the state where the objective and subjective are fit so well that agents do not question the arbitrariness of it, but rather accept it as self-evident or natural, creating limits on the actions of agents.

However, not all human action functions as *doxa*; subjective reality does not always have a near-perfect fit with the objective field. Bourdieu (1995) argued that dominated agents question *doxa*; he called this process *heterodoxy*. Dominated agents, under Bourdieu's theory, have the capacity for and an invested interest in resisting *doxa* and thus their dominated status. Powerful agents must then defend it; he called this process *orthodoxy*.

Practice, as laid out by Bourdieu (1995), is thus the processes of agents asserting their power by creating, maintaining, or altering symbolic taxonomies. These are enforced by making them appear as part of the natural order that makes up culture. Bourdieu overcame many of the troubles postmodernity had revealed about earlier social theory by providing a framework to observe agency and structure immersed in power and inequality, and by sidestepping the assumption of objectivism.

Marshall Sahlins

Marshall Sahlins's (1981) *Historical Metaphors and Mythical Realities: Structure in the Early History of the Sandwich Islands Kingdom* was influenced by many of the same postmodern sentiments concerning earlier structural theory that influenced Bourdieu (1995) and Giddens (1976, 1979, 1981). Sahlins, however, was particularly concerned with the lack of a diachronic perspective in structural theory. Ferdinand de Saussure and other structuralists, Sahlins argued, had written structural theory in ways that placed structure in binary opposition with history. Sahlins, through his historical ethnography of Hawaiian interactions with the British, aimed to dispel the idea that structure exists outside of history.

Sahlins (1981) argued that agency reflected one's cultural history and cultural knowledge. He presented a

picture of agents filling and acting in their cultural categories until change is brought about by the clash of power struggles, such as between the Hawaiian leaders and the British captains. Each action, Sahlins argued, put structures at risk. Sahlins's work, however, lacked the tragic sense of the inequality inherent in structure that later practice and agency theorists emphasized.

Anthony Giddens via Ivan Karp

Giddens, a British sociologist, wrote in the late 1970s and early 1980s three works on agency and structure that helped shape the work of later practice theorists, such as Ortner (2001, 2006) and Ivan Karp (1986). His works are: *New Rules of Sociological Method* (1976), *Central Problems in Social Theory* (1979), and "A Contemporary Critique of Historical Materialism" (1981, in *Power, Property and the State*). Giddens's achievements in his theory of structuration, while not positioned within anthropology, were nonetheless influential on anthropological theory. However, Karp has noted that anthropologists must take responsibility for relating Giddens's theories to anthropological work, since Giddens's work often "runs aground" in areas of anthropology as he has little appreciation for the fieldwork methods of anthropology. Karp's 1986 review of Giddens's work successfully accomplished this, and thus this discussion of Giddens's contribution to practice theory in anthropology will not be separated from it. Giddens's works make two major contributions to practice theory: the nature of actors and agents, and the process of structuration.

Karp (1986) described actors as individuals involved in action that is governed by rules, while describing agents as individuals engaged in actions of power, where the individual is able to "bring about effects." Giddens's agents were knowledgeable participants in structuration with goals, unlike those agents of Bourdieu (1995) and Sahlins (1981) who were generally ignorant of their position and fulfilled their cultural roles without reflection. This understanding of agents helped to overcome some of the critiques of Bourdieu and Sahlins that accused practice theory of placing too much emphasis on structure over human agency.

Giddens's (1976, 1979) theory of structuration, outlined in *New Rules of Sociological Method* and fleshed out in *Central Problems in Social Theory*, attempted to overcome the divide between structure and agency. Giddens argued that structure, rather than being separate from or in contrast to agency, is constantly created through collective agency and agency takes inspiration and resources from structure for further action. Thus, structuration is the process of agents creating structures that are then used for further agency. Because of this relationship to agency, Giddens argued that structures are virtual, existing in a constant state of becoming rather than being. In this model, power is the ability of agents to bring about change

through agency. Karp (1986) explained that Giddens's work overcame a number of "two-headed monsters" in practice theory, thereby paving the way for other theorists, such as Ortner (1995) and Sewell (1992), who were both influenced by his theories.

Recent Approaches

William Sewell

William Sewell's influential article, "A Theory of Structure: Duality, Agency, and Transformation" (1992), built upon the foundations of practice theory laid out by Giddens and Bourdieu by incorporating the critiques of earlier practice theory, as well as the larger shifts in social theory since the 1970s. He presented five axioms for the future of practice theory: (1) the multiplicity of structures, (2) the transposability of schemas, (3) the unpredictability of resource accumulation, (4) the polysemy of resources, and (5) the intersection of structures. Sewell's arguments create a picture of structure and agency existing as a dynamic dialogue situated within power structures and historical context.

The foundation of Sewell's (1992) theory of structure comes from Giddens, the forefather of practice theory. Giddens (1976, 1979, 1981) argued that structures were dual, meaning that structures both form the practices of society and are formed by those practices. Giddens also postulated that structures were made of rules and resources. Sewell, however, found that this central terminology was insufficiently defined. The term *rules*, he argued, was ambiguous and he, instead, elected for the use of the term *schemas*. Schemas are virtual, generalizable procedures, meaning that these procedures can be observed in a range of situations and contexts, and they cannot be reduced to a single practice, location, or moment. For example, schemas can be etiquette rules, social norms, metaphors, or dichotomies. As defined by Giddens, resources were split into two categories: resources of allocation and resources of authorization. Sewell adopted this portion of Giddens's theory. However, he felt that the concepts would be better understood using ordinary English: nonhuman resources and human resources. Nonhuman resources are objects of both natural origins, such as oil or diamonds, and manufactured origins, such as clothing or money. However, objects only qualify as resources when they have the potential to be used to create or maintain power. Human resources are those that come from within individuals or groups, such as physical strength, emotional connections, or knowledge. Thus, a basic understanding of Sewell's theory of structure could be described as a cycle of schemas creating resources that then reinforce schemas.

Sewell (1992) found that Bourdieu's (1995) habitus fit well with his theory of structure. However, Bourdieu's habitus failed to provide a mechanism for change within the habitus system, which requires schemas and resources

to enforce one another so strongly that structures can only be changed from external forces, such as the example of Captain Cook from Sahlins's (1981) work in Hawaii. To overcome this, Sewell argues that a more flexible and less totalized theory of structure must be created. For this, he argues five axioms for the theory of structure.

According to Sewell's (1992) theory, structures vary widely within and between institutions such as religion, kinship, or class. While some structures may be homologous, as the structures imagined by Bourdieu (1995), Sewell argues that the multiplicity of structures allows for a diversity of schemas and resources that can be accessed and used by knowledgeable actors. Agency, as defined by Sewell, is the ability to creatively apply schemas in new situations and contexts. This is made possible through understanding that schemas are transposable to an infinite number of contexts, and that other actors cannot always predict this transposability. Resources are subject to a wide array of impacts, both from the environment and from human interaction. Sewell argues that it is not possible for actors to accurately predict resource accumulation, and thus successful validation of a schema is also unpredictable. In this lies the potential for change, defined by Sewell (1992) as follows:

If the enactment of schemas creates unpredictable quantities and qualities of resources, and if the reproduction of schemas depends on their continuing validation by resources, this implies that schemas will in fact be differentially validated when they are put into action and therefore will potentially be subject to modification. (p. 18)

Since Sewell argues that agency is the ability to creatively apply schemas in new contexts and that resources are the embodiment of schemas, it is necessary to understand resources as polysemous (i.e., that they are able to carry multiple meanings). This allows actors to reinterpret and mobilize resources to enact schemas in new ways. To further add to the potential for change from within the structural system, structures overlap in social life, which creates the ability to easily transport, reinterpret, and enact resources and schema. These five axioms transform Giddens (1976, 1979, 1981) and Bourdieu's (1995) theories of structure in order to create space for internal change and a more specified view for ethnographers seeking to observe structure and agency.

Sherry Ortner

In 1984, with her article "Theory in Anthropology Since the Sixties," Sherry Ortner began 20 years of practice-theory publications. She explored the meanings of history, practice, and agency in her 1989 book *High Religion: A Cultural and Political History of Sherpa Buddhism*. She approached the problems with resistance studies in her 1995 article, "Resistance and the Problem of Ethnographic Refusal." In 1996, she presented serious games in *Making Gender*. She defended Comaroff and Comaroff's (1992) work and

explored different kinds of agency in her 2001 article, "Specifying Agency: The Comaroffs and Their Critics." Finally, in 2006, Ortner published *Anthropology and Social Theory*, which outlined and examined her previous works in practice theory, as well as aimed to summarize her arguments about practice theory, structure, agency, and serious games. "Theory in Anthropology Since the Sixties" contained first an outline of the general trends of anthropological theory during the 1960s and 1970s, and then her observations of the growing trend toward understanding social action. Practice theory, she stated, would be the key symbol in 1980s anthropology.

In *High Religion*, Ortner (1989) aimed to describe the components of practice theory: practice, agency, actors, and history. She defined practice as social interactions that involve inequality. She defined structures as being far less rigid than her predecessor, Bourdieu (1995), and instead aligned herself with Giddens's (1976, 1979, 1981) flexible, integrated idea of structure. Finally, she defined actors as individuals that partake in practice. However, Ortner also argued that past definitions of actors placed too much emphasis on intentionality and aspirations of power, including some of her prior work. Therefore, she introduced the idea that actors are influenced by structure and power relationships, but not exclusively. History, both individual and social, she argued, played a large role in the behaviors of actors. In this work, she also argued for the usefulness of both the political-economy approach, which focused on externalized forces of change, and the ethnographic-history approach, which focused on internal forces of change. However, the most lasting lesson to be taken from *High Religion* is the role of history in practice theory. As cultural transformation is a slow process, Ortner argued that history is the only location that the process can be fully observed, including the complete relationship between practice and structure.

In her article "Resistance and the Problem of the Ethnographic Refusal," Ortner (1995) tackled several issues surrounding resistance theory and its ethnographical use. She argued for a combination of the objective and subjective viewpoints for understanding individual agency, as well as the importance of understanding internal and external political influences on actors. She explains as follows:

In short, one can only appreciate the ways in which resistance can be more than opposition, can be truly creative and transformative, if one appreciates the multiplicity of projects in which social beings are always engaged, and the multiplicity of ways in which those projects feed on as well as collide with one another. (p. 191)

In *Making Gender*, Ortner (1996) fleshed out her ideas on serious games; this theory meant to use the tools learned in practice theory and yet move beyond them to include issues of power and inequality. Serious games theory looks at the ways actors reconfigure their world through their goals and projects. The term "games" was

chosen to represent the intentions, plans, and desires of actors to avoid the overemphasis of conscious intentions imbedded in “projects,” and the scripted and fictitious implications of “dramas,” “stories,” and “narratives.” Serious games, Ortner explained, were meant to embody the notions that social life is constructed with cultural rules and goals, that games are flexible and multiple, and that agency comes from actors who play the games. Ortner stressed that serious games, while at first glance appear to focus on the particular, hold the ultimate goal of understanding larger transformations and forces in social life.

In 2001, Ortner attempted to further “specify agency.” In her article of the same name, she distinguished between two types of agency: agency of power and agency of intention. Agency of power is the objective agency that allows individuals to influence their world and act on their own behalf. Agency of power, then, can be either domination or resistance. She broadly outlined resistance as everything from “outright rebellion” to the “complex and ambivalent acceptance of dominant categories and practices that are always changed at the very moment they are adopted” (p. 78). She defined agency of intentions as being centered more on the subjective individual’s projects and desires. Separating the two forms of agency allowed Ortner to demonstrate that both objective and subjective understandings of agency are relevant and present. She was quick to explain, however, that agency of power and agency of intentions are often inseparable in reality and are for heuristic purposes only.

Ortner’s most recent book, *Anthropology and Social Theory* (2006), draws together her endeavors in practice, agency, and serious games theory. The book encompasses some of her earlier work and some new work, and it also covers a wide array of topics (from the history of practice theory, to class, to subjectivity, and to media). However, the overall theme is a development of Ortner’s serious games theory and the further exploration of agency within it. In her concluding chapter, she identifies three questions for defining agency: (1) Does agency inherently involve intentions? (2) Can agency be simultaneously culturally constructed and universal? (3) What is the relationship between agency and power?

To the first question, Ortner (2006) drew on the work of Sewell (1992) and argued that his “hard” attitude toward intentions aligned well with her understanding of serious games. This hard definition of agency included the idea that agency requires a level of intentions that may not always be conscious or leading to definite goals, but are active and motivated in social interactions. She explained that intentions are the things that separate agency practices (involving desire, creativity, and will) from everyday routine practices. She argued as well that when imbuing agency with intentionality, it was also important to take heed of the warnings expressed by theorists such as Comaroff and Comaroff (1992). They expressed worry concerning the overemphasis of intentions in agency,

which they found to be ethnocentric, individualistic, and lacking in an understanding of the complex relationship between intentions and outcomes. To further soften the “hard” definition of agency, Ortner expressed that agency with intentions and routine practices existed on a continuum, rather than in bounded categories.

Ortner (2006) argued that theorists, such as Alessandro Duranti, Sewell, and Ahearn, generally accepted the universality of agency. Duranti (2004) observed that all languages represent agency in their grammatical structure. Ortner explained that while agency is universal, its frequency and intensity is also shaped through cultural constructions, history, and power.

Ortner (2006) argued that power is intrinsically linked to agency, as it explains the inequality in the system. She found that there were three levels of power in agency. First, the basic level that all agency is power. However, this level is insufficient to explain more complex agency and thus she made the distinction between “agency of power” and “agency of projects.” The former is the agency involved in the domination and resistance dialectic. The latter she illustrated as the agency of “intention and desire” that involves more personal projects and goals.

Future Directions

Agency and practice theories have come far and have overcome many hurdles that have been placed in the tracks of anthropologists. However, there are yet many unanswered questions about the nature of agency and social life. Further studies in agency must explore the influences of power on human action and the structures of society. While theorists have made significant headway on this subject, it is far from complete. Also, larger questions in anthropology—such as the effects of globalization, the nature of identity, and the usefulness of concepts such as relativism—will likely have great impact on the study of agency and practice, which lies at the heart of many of these questions. As anthropologists explore new locations of fieldwork at home and abroad, and dive into deeper understandings of their own subjectivity, ethnographic experience will bring to light new questions on the topic.

Conclusion

Agency, the term that some theorists, such as Ortner and Ahearn, have indicated as one of the most abused terms in anthropology, has a complex history and today has multiple complex definitions and further complex methodologies for finding and understanding it. The critical theories of the last few decades have punctured where the concept was the weakest with holes. These holes formed where biases of ethnocentrism lay hidden in the discourses of agency and its sometimes partner, sometimes nemesis,

structure. Structure, in its most radical forms, obliterated agency, painting human action as little more than another system of control.

Yet, through the careful and thoughtful work of agency and practice theorists, agency blossomed into functional and balanced theories. Old biases were understood, and significant progress has been made to avoid them, by defining agency in ways that avoid making agency a quality of humanness or a heroic and romanticized resistance. The newer understandings of identity and power led post-structuralists to reimagine the workings of agency as positioning in discourses. Linguists, through studies of grammar and language as social action, have found compelling evidence for the way agency is played out and represented in language. Practice theorists creatively found new understandings of how agency and structure work together to create, maintain, and transform social life. In the 21st century, new directions in the field of anthropology will continue to push agency and practice theory from these foundations and into other realms as anthropologists continue to expand the collective ethnographic knowledge associated with human action.

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OPEN AND CLOSED SOCIETIES

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Karl Raimund Popper first suggested the distinction between open and closed societies in his social philosophical work *The Open Society and Its Enemies* (1945/1993). He aimed to formulate a plea for rationality and freedom—one against all kinds of totalitarianism. Popper wrote as follows:

Neither the war nor any other contemporary event was explicitly mentioned in this book; but it was an attempt to understand those events and their background, and some of the issues which were likely to arise after the war was won. (1945/1993, Vol. 1, p. 6)

His considerations are, to a large degree, shaped by the examination of national socialism, as well as Stalinist totalitarianism.

Above all, Popper (1945/1993) radically opposed historicism and broke with the tradition of speculative historical philosophy. *Historicism* means looking at historical events from a metaperspective: The truly important actors on the stage of history are not individuals, but rather the larger nations and their important leaders, or the big classes and big ideas. Understanding the laws of historical developments in order to predict future developments and advise policy decisions is the goal (Vol. 1, p. 31). The simplest and oldest form is theistic historicism: the teaching of the chosen people. Other forms include naturalistic, spiritual, and economic historicism. In each case, there are

specific historical laws that need to be identified and upon which predictions about the future of mankind can be based. According to Popper's convictions, progress and improvement of the living standard are not achieved by collectives, which are empowered by a higher principle, but exclusively by self-reliant and erring subjects. Popper's "critical rationalism" assumes that one may only justify those opinions and values that (at least tentatively) withstand critical examination. Rationality is fallible. Theories, or empirical-scientific systems, still need to be able to be disproven and thus should not be immune to critique; this is not possible in a "closed society," in which dogmas and traditions determine social interaction. In such systems, changes do not occur due to acceptance of critiques, but rather due to new taboos.

Popper considered Plato, Hegel, and Marx to exemplify prophets of such social orders. As an opponent, he pleaded for the model of an "open society," in which the individual finds his place in society through independent decisions. The shape of the open society results from critical discussions about the correct norms and values. "Critical rationalism" is the only reasonable way to make a gradual improvement of society possible. The plea for the "open society" thus not only results from moral decisions, but also from the way Popper sees himself, based on theoretical scientific principles. His demand that theories can be criticized and corrected implies the right to freedom of expression and the reversibility of political

decisions. Thus, “critical rationalism” can be looked upon as the epistemology of a democratic-liberal, dynamic-pluralistic social order.

By linking skepticism with the legacy of Age of Enlightenment, Popper (1945/1993) built a bridge between Anglo-Saxon empiricism and the continental philosophy of conscience. The maxim “liberty, equality, fraternity” guides him. Only liberty enables human beings to bear responsibility; hence, liberty must be defended (Vol. 1, p. 163). Equality results from critical rationalism, while fraternity, in the Christian sense, is the foundation of rationalism in the occidental civilization (Vol. 2, p. 300).

Starting Points

Augustine’s *City of God*

Augustine’s teaching of two worlds divides humanity into two camps: a large camp of sin (*civitas terrena*) and a small flock granted divine grace (*civitas dei*). Neither links to state structures or earthly commonwealths. Real societies exist in a mixed form (*corpus mixtus*), which will only be separated at the time of the Last Judgment. The *civitas terrena* as *communio malorum* is shaped by hollow peace, pride, egoism, and imperiousness. Its objective is earthly peace, whereas the *civitas dei* distinguishes itself as *communio sanctorum* through peace of heart, humbleness, doxology, piety as the highest wisdom, and coexistence. It aspires to heavenly peace. As justice and real peace are only possible in the eschatological theocracy, Augustine concludes they can be neither the basis nor the goal of a state. This can be seen in the selection of politicians; they are chosen not based on individual suitability or performance, but through opaque decisions. Mundane communities are unjust, resting upon a solely pragmatic consensus about their goals. To demand more would mean proposing unrealistic moral claims. In this sense, a state’s ability to act is limited. Its tasks are defence, the preservation of earthly peace, and the protection of the *civitas dei*.

In Augustine’s opinion, politics can improve living conditions gradually at best. Human suffering is basically insurmountable. To make the world a better place, the political order does not need to be altered; rather, the people need to be perfected. The rules for an ideal society are known from Christian Revelation. Incidentally, human beings are themselves incapable of acquiring discernment, as only divine Revelation can guide the way to verity; hence, the political process as a means to find consensus and solutions is redundant.

John Locke’s Two Treatises of Government

Locke (1689/1992), a representative of British empiricism, held the view that all knowledge and ideas are rooted in sensory perception. For Locke, there are only two sources

of experience: (1) sensation, referring to outer, material things; and (2) reflection, arising from internal operations of the mind. The conception of rationality takes a dominant position in Locke’s work; however, as it is limited, rationality is supplemented by faith (“natural religion”).

The starting point for the theory of the state is natural rights, which safeguard life and freedom. The natural state guarantees absolute freedom out of natural principles—self-determination and self-sustainment—as well as the state of equality. The social contract leading to the foundation of a state is a collective decision by a group of individuals to cede their rights to protect their immaterial (life, liberty) and material possessions (property) more effectively against both internal and external attacks. Signing the contract is voluntary and leads to the following outcomes: the election of the ruler, decision making according to the majority principle, the creation of legislative and executive institutions, and the right to resistance and tolerance.

Locke’s (1689/1992) revolutionary idea is that of ensuring the freedom of individuals, who seem to surrender their freedom, but in fact have contractually institutionalized it. What has thus far only been inscribed in the “heart” and “soul” of the people is now a contract. Freedom becomes the decisive criteria of the state’s actions and possesses a normative character for the individuals. Each individual possesses the right to resist, and the power transferred to the ruler by society may be confiscated if the ruler abuses his authority. Despite the honest transfer of power, Locke remains fundamentally skeptical toward the rulers: Security of the individual through the state must be met with security of the individual against the state. Therefore, the state is not given the right to meddle in its citizens’ spiritual affairs.

John Stuart Mill

For Mill (1859/1991a), freedom is the strongest desire of human nature. Plurality facilitates both moral freedom and rationality, and promotes creativity. Freedom is a fundamental precondition for social and intellectual progress. Any intervention intended to force individuals into certain behaviors is illegitimate and must be avoided. Any government should only be judged by how their individuals can practice and develop their skills.

The democratic society is a community whose individuals can freely deploy and apply their skills. Democracy is, above all, justified by the possibility for self-development and individuality. It safeguards individual perfection and is founded upon the principle to limit the freedom of the individual only for the purpose of self-protection or the protection of other members. When democracy is jeopardized due to the suppression of individual differences, minority opinions, and minority cultures, it needs institutions that build strong, resilient characters. An outstanding role is therefore given to education policy, since it provides the preconditions

for elites and education, as well as the basis for the acquisition of personal freedom.

Intellectual elites are needed to counter the “tyranny of the majority” and “collective mediocrity.” The representative democracy possesses a class-based suffrage supported by the acquired education. For Mill, only educated personalities are eligible and would wield multiple votes. Democracy lives off the assumption that all citizens are interested in political participation and the shaping of society. Thus, society does not have the right to oppress the individual’s opinion. If an opinion is correct, then discussions enable the accepting of these positions as “secured” truths. If wrong, then one can gain a better and deeper understanding of the truth through falsifiability. As a result of the free competition among ideas, incorrect ideas are eliminated and errors corrected. There are no fixed truths, but in a forum of competing opinions, “No light that could be thrown on the matter from any side is shut out” (Mill, 1867/1991b). Ideas and actions must face critical assessment in the marketplace of ideas. Still, they only have temporary validity, as the debate is unfinished. Thus, individuality is not only a precondition for personal happiness, but also for others’ happiness. Sameness and uniformity threaten with decline or stagnation, thus impeding both scientific and social capacity for innovation.

While Mill is a utilitarian and aims at the maximization of happiness, Popper’s objective is the minimization of suffering.

Society and Community

The terms *open system* and *open society* were first used by Helmuth Plessner (1924/2001) and Henri Bergson (1932), respectively. Bergson distinguishes, in his philosophy of the organic life (*The Two Sources of Morality and Religion*, 1932) between closed and open societies. The “social instinct” is always targeted at the former for the purpose of the traditional community, but mankind must soar to the level of an open society (global society) in order to continue the creative *élan vital*. Plessner approaches the differentiation between open and closed society anthropologically, placing it in an area of tension between society and community. Hence, he borrows F. Tönnies’s (1991) conception and W. Wundt’s (2007) psychology of people, which differentiates between state and tribe. Three considerations about the open society precede Plessner’s reflections: (1) an ethnic-historical one, which traces back to Wundt’s differentiation between state and tribe; (2) a sociological one, which Tönnies has shaped with the terms *society* and *community*; and (3) an ethical one, which results from the demand to abandon the closed society in favor of an open one. Plessner distinguishes the closed society between a community of familiarity and a community of rationality, nationalism, and communism, respectively. He states, “Today the dictatorship is marching, either Bolshevik or fascist” (p. 43). Its power is legitimized

by the *ethos* of the community. In his book *The Limits of Community* (1924/2001), he socioethically examined the individual positions he himself faced by the constraints of the community, that is, the attachment by blood (tribe) or matter (things of the world), and the freedom of the community (i.e., the mode of social affairs). Plessner (1924/2001) explained further:

This open system of intercourse is segregated into individual, peculiar spheres, depending on the requirements of specific value classes, for law, the customs and education, the state, the economy, and the “intercourse” in a more narrow sense. (p. 93)

Existentially, human beings are placed in an area of tension between society and community. Due to their eccentric position, they have to balance the roles (function) they take in society—their “masks,” their intrinsic existence, and their position in the community. This balance is equally a game between “diplomacy” and “tact,” and it is shaped by “prestige” and “ceremony.” Plessner (1924/2001) elaborated as follows:

All public positions rest on the principle of mutuality. Everyone gives one another as much scope as he would claim for himself; only out of the conflict of individual measures can the enlargement of one scope result—at the expense of another one. In every instant, the opponents are in control of themselves due to this just mode of playing, until the logic of these matters has decided. The harshness of the principles of life is thereby not alleviated, only the danger of a violent outburst at the expense of human dignity is eliminated. (p. 101)

Plessner’s theory of masks as a social theory of “limits” is also found in Niklas Luhmann’s (2002) theory of social systems.

Community and Nation

The concept of community arose in the second half of the 20th century from the critique of modern civil society. Until the 18th century, the term *community* was a synonym for *society*. Only as a result of the clash between the economically founded civil society and authentic, inner social stratification did the term gain lasting coinage and become a politically charged term for utopian solidarity and conservative, revolutionary ideals. In the romantic perception of a political system, the term assumed an emotional meaning, contrasting with a contractually and individually founded society. Tönnies (1991) distinguished community as an internally connected organism from society, based on exchange and contract. The historical process of modernity is the transition from community to society, from collective to individuality. The opposing movement is shaped by collectivization (Max Weber), in which action is based on subjectively felt togetherness. The concept of community culminates in the national

community, marked by an anti-individualistic, normative-political holism. The term community becomes a rallying cry in the sense of an action group against the civil order in Germany in the 1920s. It was later borrowed ideologically by the national socialists (1933–1945), as well as by the socialists (1945–1989). All socialist utopias aim for the abolition of the civil-capitalist society.

The principle of nation-states is developed parallel to the concept of community. The stages of development include Wilson's principle of national self-determination, the resistance to Napoleon's invasion, Rousseau's concept of the general will, Herder's vision of a natural national border, Fichte's "identity through language," and Hegel's belief in authority. Hegel's philosophy and Ernst Haeckel's Darwinism are the foundation of Friedrich Nietzsche's teaching of the *Übermensch* (overbeing), which directly led to the national socialist racial doctrine. As Popper (1945/1993) explained,

The biological superiority of the blood of the chosen race explains the course of history, past, present and future; it is nothing but the struggle of races for mastery. In the case of Marx's philosophy of history, the law is economic; all history has to be interpreted as a struggle of classes for economic supremacy. (Vol. 1, pp. 9–10)

From this, Plessner (1924/1991) further added,

As Nietzsche was a conscious opponent of society because of aristocratism, so does Marx appear hostile toward society due to the mobilization of the instinct of the masses. The individualist resolves society in favour of the big individual, whereas the socialist resolves it in favour of the community. (p. 34)

For Popper (1945/1993), the source and trigger of modern historicisms is above all the German idealism, particularly the historical philosophy of Hegel; the Marxist extreme left wing, as well as both the conservative center and the fascist right, founded their political philosophies upon it (Vol. 2, p. 39). Hegel is equally a link between Plato and modern forms of totalitarian ideas. Still, Popper interprets Plato one-sidedly, as he reads him only in a personal, rather than an institutional, context. Especially in the *Politikos*, the dialogue that serves as the link between *Politei* and *Nomoi*, Plato makes relative his one-sided, person-oriented view: *Politei* describes the theoretically perfect state, whereas his later works deal with the best practical approach to the ideal state. Essential are the institutionalization of the issuance of laws, the participation of various groups, and the abidance of the laws by everyone. Nevertheless, the rule of law is not sufficient to prevent the abuse of power. Therefore, Plato resorts to an older device—the mixed constitution. It combines—institutionally—monocratic, oligocratic, and democratic elements into the polity's political foundation. To prevent the abuse of power and protect the freedom of the citizens, various societal forces are engaged. In *Nomoi*, Plato fundamentally readjusts his

thinking toward an institution-oriented political theory, which has not been considered by Popper.

For Plato, the Spartans developed the best domestic solution to the problem of power abuse with their mixed institutions. Hence, Plato sees the political system of Sparta as an example for all other states. Plato compares the "real constitution" of Sparta with Persia and Athens: The unmixed Persian monarchy imposed too heavy limits on the freedom of the people, while the unmixed Athenian democracy left its citizens too much freedom. For Plato, the right mixture between democracy and monarchy is crucial.

Athens or Sparta

Sparta was considered to be the second most powerful polity—behind Athens—of the Greek states. The cities embodied two different social systems and constitutional models: military state and democracy. Sparta's political stability and military clout were idealized by contemporaries and attributed to the public education system. Xenophon praised its military virtue at the beginning of the 4th century, and Plato believed the Spartan education and discipline enabled humans to lead better lives. Eventually, in the 4th century, Aristotle elevated Sparta to the model of a "mixed constitution"—possessing monarchic, as well as aristocratic and democratic, elements (kings, *gerousia*, people's assembly). In this form, it later became exemplary for the Romans. Even today, Sparta is considered the epitome of a statutorily, strictly regulated, and exclusively military-oriented state. The "equality" of the Spartan citizens, expressed by the term *hómoioi* (equal), has fascinated thinkers in both antiquity and modernity.

The notion of a strict regulation of all areas of life and its focus on the state has been expressed by the 20th-century name "Spartan commonwealth." This includes the commitment to common values and the state-sponsored education of young men to obedience and conscientiousness. Hence, Sparta epitomizes a myth that should be constantly questioned. How does Popper characterize Sparta and Athens? Which characteristics do the closed and the open society have?

Social Life

Citizens of an open society have a critical attitude toward their social customs. The norms determining everyday life and its institutions are accepted as the work of man (self-determined, worldly, man-made), whereas the closed society is attributed a different genesis. Its norms and institutions are perceived as given by nature (heteronomous, extramundane, God-given). While they can be criticized and changed in an open society, in a closed society, they are static and preserved emphatically. This leads to powerlessness and determinism. Constructive and creative dealings with norms and values do not occur; rather, the system

of values upon which all actions are based is consciously or unconsciously taken over by an authoritative source. The norm-giving entity possesses the monopoly of sense. While the notion of what is desirable is determined by the value of humanity (liberty, equality, fraternity) in an open society, the “highest good” is dictated by a higher entity in a closed society.

Autonomy of Action and Social Differentiation

The character of social customs and the attitude toward societal institutions have consequences on human actions. While absolute autonomy of action prevails in the open society, it is limited in the closed one, as there are no alternatives to the existing rules of (social) life. The only freedom of the individual is to harmonize one’s actions with the effective rules or to fail. In an open society, the individual is free to act in accordance with the predominant rules or not. Thus, one can gain experience and learn from mistakes. This offers great personal scope and leads to individual independence. Nevertheless, individuals are also held responsible for the consequences of their actions and have to be able to defend ethically relevant decisions by using critical arguments. This is not demanded from an individual in a closed society, as long as one complies with the rules.

Popper (1945/1993) marked the closed society as a “semi-organic unit,” upon which the organic or the biological theory of the state can be applied (Vol. 1, p. 173). Its members regard their allocated social position as sacrosanct. Hence, the closed society allows social development to take place only incrementally, guaranteeing stability and order. In the open society, individuals are not bonded by biological-organic relationships. Competition for social positions is one of its most important features; its low social differentiation allows its members high mobility through competition. The structures of differentiation are unstable and versatile. Thus, the open society has an active social dynamic.

Position of the Individual

In the open society, the individual is, while emphasizing independence and freedom, the origin of thoughts and actions and, thus, the origins of the society’s development. The distinction “private-public” guarantees the liberty of personality development and self-fulfilment. In the closed society, the collective has priority over the individual. The individual defines himself exclusively through the collective and realizes his potential as part of the whole by functional association and subordination to the collective. The individual is primarily understood in a social status, rather than as a personal identity.

Tasks of the Commonwealth

No ideal of the state exists in the open society. The social engineering of individual planning rejects the goal

of maximizing happiness and, instead, attempts to resolve the most urgent evils through gradual improvements. In contrast, the notion of an ideal state exists in the closed society. “Common good” means “happiness for all.” It dominates the collective aim in life, and a central-planning mechanism promises collective happiness. As everything that is foreign is perceived as destabilizing, one must be isolated from all foreign influences.

While it is the task of the state to protect the freedom of its citizens and to guarantee their best possible development in the open society, it is the task of the individual to maintain and bolster the stability of the state. The closed society is characterized by appropriation, subordination, coercion, and dictatorship; the open society is characterized by emancipation, maturity, independence, and equality. The consensus in the closed society is forced; a harmony of interests and determinism prevail. The open society is marked by a plurality of interests, voluntariness, and progress.

According to its different concepts, open and closed societies differ particularly in their methods of exercising power. While Plato asked in *Politeia*, “Who should govern?” and replied with his principle of “the rule of the wise men,” Popper (1924/1993) posed the question, “How can political power be controlled?” His response is the principle of democracy. The exercise of power is thus bound to policy and prejudice. Democracy controls the abuse of power institutionally, removes personal monopolies, and facilitates the peaceful dismissal of a government. Governance in a closed society is personal. The elite possess the monopoly of power; the leader, autocracy, and dictatorship are in command.

The principle of critical rationalism shapes the open society. The objective is to approach truth. Existing knowledge must be malleable, and critique is institutionalized, facilitating creative progress, tolerance, and openness. In the closed society, the scientific task of the commonwealth is to pass on reliable knowledge. Its objective is security, certainty, and conveying a binding worldview. In contrast to the open society, knowledge is protected against falsifiability. Hence, a monopoly on knowledge and interpretation prevails, and contradictions are avoided. As a result, dogmatism, ideology, and fixedness shape the closed society.

Summary

To which degree do human beings enjoy freedom in these two societies? In the open society, voluntariness shapes their situation. Various alternatives are at their disposal, and social reality is experienced as a reflection of the human will (convention). In the closed society, their lives are completely determined. They have no alternatives for development. Social reality is shaped by the reflection of practical constraints or “higher” powers (historicism).

In the open society, the individual is at the fore. One possesses a high degree of personal freedom and equal

opportunities. Individual development is shaped by high social mobility and plurality. In the closed society, full attention is paid to the collective. The individual is “unfree”; equality of opportunities does not exist, and social immobility, enforced conformity, and uniformity dominate.

Scientific findings have a tentative character in the open society. They should be falsifiable. Errors are part of the system, and open critique is demanded. Critical rationalism promotes tolerance, openness, and a dynamic development. In the closed society, scientific findings are infallible. Dogmatics, fixedness, and ideology prevail.

The structure of the open society is characterized by (1) the nonviolent dismissal of a government, (2) the freedom of thought and communication, (3) the autonomy and responsibility of the individual, (4) the transfer of rationalism to the society, and (5) the rejection of historicism. The closed society is shaped by determinism, collectivism, and definitiveness.

If open societies do tend to revert time and again to communities, then whether general criteria exist as indicators of transitions from open to closed societies should be examined. What differentiates the closed society from classical theories of totalitarianism? Moreover, attention must be given to anthropological aspects to explicate what impedes the transition from the closed to the open society.

Totalitarianism

When comparing the mentioned structural characteristics of modern closed societies (socialism, national socialism) to classical theories of totalitarianism, it is striking to see that Popper (1945/1993) did not mention any instruments of repression. Eric Voegelin (1993), who interpreted fascism and communism from a socioreligious framework, also argued only according to the principle of the history of ideas: Voegelin understands fascism and communism as political “religions” vying to create the ideal society in the material world. He opines that the belief in immanent promises has been catalyzed by secularization as promoted by enlightenment. For Popper, religion does not define a society—religiously justified social orders more frequently characterize closed societies—and enlightenment has not paved the way for totalitarian tendencies, but has opposed them. Hannah Arendt (1955) interpreted totalitarianism as something historically new that could only evolve against the backdrop of the societal upheavals of the 20th century (the decline of nation-states and rise of mass societies). She finds the correlation between ideology and terror particularly remarkable.

For Arendt, ideology includes the citation of “historical laws” in Stalinism, and the “laws of nature” in national socialism. She associates the actions of the secret police and the erection of the camps with terror. Popper is silent on the repressive implementation of totalitarian ideology. Yet, he and Arendt share common ground on totalitarian

ideology, particularly regarding the theory of history. However, Popper did not consider the mentioned societal model only as a phenomenon of the 20th century. Carl J. Friedrich’s (1957) concept of ruling power and structure is regarded as the most well-known classical societal model. Totalitarianism means an ideology, a party, a terrorist secret police, a monopoly on information, a monopoly on arms, and a centrally managed economy. As Friedrich is strongly oriented toward the instruments of totalitarian rule, there is little common ground with Popper’s understanding, which is more focused on totalitarian thinking. After all, the historian Ernst Nolte (1987) described bolshevism and national socialism as two structurally similar systems of government. Bolshevism not only preceded national socialism chronologically, but also caused its creation as a defense mechanism. Nolte does not reflect on the ideological roots of totalitarianism; as a result, there is also little common ground with Popper’s approach.

Compared with 20th-century-style totalitarianism, Popper (1945/1993) saw a totalitarian social order in Sparta’s social system. His bisection is perhaps too harsh as he contrasts the closed, totalitarian society with an open, democratic society. He does not sufficiently consider the structural peculiarities of totalitarianism as they reside in the scale of the rule, the systematic use of terror, the deliberate manipulation of the masses, and the pseudodemocratic mobilization of the masses. But Popper is most interested in the evolution of the closed society, in terms of the history of ideas, more than in the description of the instruments of power.

The transition from the closed to the open society is even today unfinished. Open societies must be vigilantly defended as they are permanently in danger of devolving. The political and spiritual profiteers of a hierarchic and homogenous social order are not the only supporters of the closed society. A dynamic and pluralist social order poses a challenge to the majority of the nongoverning population as well, a challenge that must be coped with incessantly. While it is difficult to build open societies, it is relatively simple to destroy them. Whether looking at Mussolini’s Italy in the 1920s, Stalin’s Russia and Hitler’s Germany in the 1930s, the German Democratic Republic (GDR) in the 1950s, Czechoslovakia in the 1960s, Chile in 1973, or Latin American dictatorships and communist China in the late 1980s and early 1990s, ignoring all regional and political differences, a list of 10 coinciding aspects for the toppling of a liberal democracy or the flattening of democratic tendencies emerges. Their product is a totalitarian “fascist” system. The *Colombia Encyclopedia* defines fascism as follows:

[a] philosophy of government that glorifies the state and nation and assigns to the state control over every aspect of national life. . . . Its essentially vague and emotional nature facilitates the development of unique national varieties, whose leaders often deny indignantly that they are fascists at all. (as cited by Wolf, 2007, p. 21)

Two criteria unite various definitions of fascism: It refers to a military system that is opposed to democracy and attempts to destroy it ideologically and practically; and, fascism deploys terror against citizens to achieve this goal. Therefore, fascism implies a violent dictatorship instead of a liberal-democratic development of a society. Wolf (2007) explained as follows:

All dictators: invoke an external threat; develop a paramilitary force; create a secret prison system; surveil ordinary citizens; arbitrarily detain and release them; harass citizens' groups; target writers, entertainers, and other key individuals for dissenting; intimidate the press; recast dissent as "treason" and criticism as "espionage"; and eventually subvert the rule of law. (p. 21)

Transition From a Closed to an Open Society

What is the allure of totalitarian ideologies and social systems? Why is the transition from a closed to an open society so painful? The transition itself triggers irritation and disorientation. Popper (1945/1993) explained as follows:

The strain of civilization was beginning to be felt. This strain, this uneasiness, is a consequence of the breakdown of the closed society. . . . It is the strain created by the effort which life in an open and partially abstract society continually demands from us—by the endeavour to be rational, to forgo at least some of our emotional social needs, to look after ourselves, and to accept responsibilities. We must . . . bear this strain as the price to be paid for every increase in knowledge, in reasonableness, in co-operation and in mutual help, and consequently in our chances of survival, and in the size of the population. It is the price we have to pay for being human. (Vol. 1, p. 176)

Popper further described the longing for a guarded and well-regulated life, without facing the challenges of a complex world and the burden of independent actions, as follows:

This dream of unity and beauty and perfection, this aestheticism and holism and collectivism, is the product as well as the symptom of the lost group spirit of tribalism. It is the expression of, and an ardent appeal to, the sentiments of those who suffer from the strain of civilization. (Vol. 1, p. 199)

All aspects described by Popper can be observed among the East German population in the transitional process from dictatorship to open society after 1989. East Germany has been shaped by a long experience with dictatorships. It experienced both German dictatorships (1933–1945 national socialism, 1945–1989 socialism) and had to walk the difficult road to freedom after the peaceful revolution of 1989. In this process, it was an advantage that

the GDR was integrated into West Germany, as it was an economically powerful and successful democracy. What were the challenges and how were they met?

The Totality of the Totalitarian State

How dependent was the individual on the totalitarian state? Did all citizens support the dictatorship? How was the dictatorship enforced? The former GDR had 16 million inhabitants, of which 1.5 million were members of the ruling party, the socialist unity party. About 20% of the population, equivalent to 3 million citizens, actively supported the system and enjoyed more benefits compared to the general population. The overwhelming majority had a passive attitude toward the system; they looked for a niche and lived in a parallel world. How did one behave toward the political organizations and how could one escape the ideology? If one didn't want to risk life and physical health or accept grave disadvantages, one had to compromise. The question posed after the collapse of the system was not if one had made compromises, but rather what the line of compromises looked like, and whether someone had agreed to minimal compromises, or even resisted or rushed ahead, in obedience and support for the system.

The system confronted every individual over and over with decision-making situations, which must be regarded as "ideological examinations." In the case of a positive response, career advancement was guaranteed; if one diverged from the rulers' expectations, then one was set back, criticized, summoned to educational talks, observed, or eliminated. The "ideological barriers" started rather harmlessly with the membership in a youth organization, but they were marked by significant consequences, if military service, party membership, or collaboration with the secret police were concerned. Often the decision was due to the advantages, such as university admission or job selection. It was suggested to individuals that the system's generosity depended on his behavior, for the system as a whole could never be questioned.

Fear of the secret police only played a secondary role in the population's consciousness of everyday life. Further, it only affected those not responding positively to the "ideological barriers" for conscientious reasons, such as conscientious objectors or the political opposition, who in turn became a burden for the secret police. The state party—with its indoctrination, ideology, and militant atheism—was omnipresent and, thus, difficult to resist.

What effect did the accommodating political behaviour have on the organization of democracy after the peaceful revolution of 1989? The schizophrenic education in GDR times (private world of experience vs. political compliance) has resulted in many citizens' lacking of identification with the political system. There are no political milieus, and there is a large distance between political player and low political commitment. Less than

0.5% of the total population of Saxony are members of a political party.

Creativity of Deprivation

It is striking that characteristics of the negative system are perceived retrospectively as positive. Alongside the initially unequal economic situations after World War II, the GDR economy was not set up as a free-market economy, but rather as a planned economy following the Soviet model. This led to shortages right from the beginning, for which it became increasingly difficult to compensate in the time leading up to the economic collapse.

Deprivation led to a constant preoccupation with the provision of material necessities. Experience from economic crises shows that in crisis situations, people continue to live in residences and to eat. The question is: Under which circumstances? In the event of a permanent economic crisis, a shadow economy begins to emerge, shaped by a particular creativity and ingenuity to manage crises and alleviate deprivation. On the other hand, people lived systematically at the expense of the environment and ultimately of the economy itself; thus, the quality of living conditions was reduced to a critical level. In addition, due to the constant preoccupation with the material basis, a deep-rooted and distinctive materialism came into existence. In this regard, open and closed societies mimic each other.

Deprivation possesses the potential to produce motivation and creativity and leads to an intense exchange, and vivid communication; its loss is perceived as a deficit of the open society. Since books were not openly available due to small printings and censorship, they were even more intensively read, exchanged, and discussed. Some books were only available once; that opportunity had to be seized. Thus, reading occurred more systematically and intensively than in an open society. The ban on Western rock music had similar effects. Records were a communication medium. The lack of telephones led to more intense and unannounced visits. Hence, spaces of exchange and friendship were created and their loss after the peaceful revolution was experienced painfully.

Situations of deprivation are meaningful, for they motivate actions that are perceived as useful. Then again, a certain pressure to act is required in order to become creative. Although deprivation causes creativity, how much deprivation is necessary to be creative? What is it that prevents the individual from continuing the positive experiences of the dictatorship in an open society?

The Abundance of Time

The individual experience of time differs significantly between dictatorships and open societies. On the one hand, career opportunities are limited due to the power structure. Therefore, there is seemingly no professional

telos to which one could aspire. The futurity of personal developments collapses back upon a long-lasting uniformity, making the future predictable and hinting at a relative security and stability. As career advancement largely depended on destiny and creative self-fulfilment was only possible to an extent, the heteronomously imposed work time was not considered time spent “living” but as a period of service and, thus, reduced to a minimum. Hence, life was structured by clearly defined rhythms, and a maximum of freely configurable time was available. But this free time was needed to compensate for the scarcity in society. The individual was constantly “organizing.” This led to a paradox known from the psychology of time perception: Unfilled time shaped by boredom is perceived at the time as “stretched” but, in retrospect, as having passed quickly. In contrast, the filled time of the present is experienced as very short but, retrospectively, as long lasting. It is similar when one acts over a period of time: The individual was in a permanent mood of disquietude, seeking to compensate shortages. In retrospect, the elapsed time of restlessness is perceived as filled, in contrast to the open society, where this coming to terms with the present is not needed. Self-motivation for creativity and personal responsibility is required.

Another aspect of time perception deals with the loss of the past and, thus, historic roots. Due to the ideological transfer of knowledge fixed in the history of the working-class movement, the wider historical context had been concealed from GDR citizens. The loss of the historical consciousness caused a detachment from the flow of time; the individual did not regard himself within the tradition or responsibility of the past. As its dangers are unknown, a responsible concept for the future is difficult.

Loss of Power and Empowerment

Societies are shaped by power structures. “Whenever people communicate with one another, the possibility exists that they orient themselves on mutual disadvantages and are thus affected. Power is a cultural universal of human existence” (Luhmann, 2003, p. 90). Thereby, it is not only a matter of the political-representative power of the system, but also of the power to interpret reality (endowment with meaning, ideology), the education system, and the distribution of resources. Their function provides means to sanction and threaten, which can be used as the foundation of power. The transitional process from a closed to an open society is accompanied by a reorganization of power in the entire society. Hence, the transformational process meant a loss of power for the majority of the East German population. This concerns not only the societal elites, exchanged in the wake of the transformation, but also the common man. In an economy of scarcity, those who own the goods or those who participate in the distribution of goods ultimately possess power. A saleswoman possessed the power to distribute, just as the possession of

a car produced jealousy. The loss of power, as a result of the transformational process, led to a narcissistic mortification causing the transfiguration of the past, which cannot be compensated by any following social system.

Furthermore, some social areas lost their influence. The churches, shelter of the opposition and structural counterweight to the dictatorship's monopoly on teleology, must now hold their own in the market of opportunities.

All power transfers are accompanied by injustices and power struggles. Only from the perspective of the loss of power can one explain why—despite material prosperity—a large part of the East German population is unsatisfied with the open society. This applies to the older generations to a greater degree than to the younger ones. The actual power of organizations substantially depends on the influence on careers and the filling of jobs (Luhmann, 2003, p. 104) Due to the change of elites, the typically more strenuous evaluation of East German biographies, and the social attachment of the new elites to their areas of origin, the East German population has been excluded from political and social responsibility over a longer period of time. This still has an impact, even 20 years after the peaceful revolution.

It is remarkable that due to the minimal willingness to compromise by many GDR citizens, who (accordingly) kept their distance from the state, filling the power vacuum seemed impossible after the peaceful revolution, although these citizens would have been capable of filling it. "Power" in the dictatorship was not understood as responsibility but almost exclusively for its abuse. Thus, there was also a responsibility that consequently abstained from power. This had the unsatisfying consequence that those who exerted power in the dictatorship were again pushing pack into social positions after 1989. This fact is one of the reasons for the GDR opposition's reluctance to get involved in party politics. Even mere membership in a political party in a dictatorship brings one close to the political power and is suspicious. This aspect is amplified when one becomes aware that membership in the state party constituted a commitment to atheism and demanded secession from the church. Former GDR citizens do not primarily interpret parties as lobby groups, but rather as groups of identity and power. The GDR citizens' distance from power is frequently misinterpreted as an inadequate adaptability and a lack of support for democracy.

Loss of Sense and Utopia

One of the seductive powers of socialism was its pseudoreligious system to explain the world. Its is based on the assumption that human beings are themselves capable of creating a society in which they can lead a "good life." But the political utopias refer to a rationality dictated to every individual *a priori*. They are fictions of intramundane societies condensed to ideals or deterrents. Above all,

they criticize the existing institutions and political conditions by contrasting them with a rational and comprehensible alternative. Their profane epiphanies consist primarily of concealed religious longing:

They transferred everything, what until then had been embodied by "God" and the "afterlife," into this world and substituted it with words like "reason," "history," "society" or "providence," but naturally not without equipping them with a spiritual—or, rather, metapolitical—content. (Fest, 1993, p. 52)

The two German dictatorships caused the churches to be greatly repressed in East Germany. While about 95% of the population had been members of a church in 1944, membership declined to only 29% by 1989; 80% of the population of East Germany's cities confesses to atheism. This decline of religion is a globally unique phenomenon that only affects East Germany and the Czech Republic.

How does a postreligious society deal with its religiosity? If humans are able to abstract and if causal and transcendental experiences are part of being a human being, then one must ask what they believe in when they don't believe anymore. As socialists and national socialists apostrophized a "new" man, their collapse meant the triumph of anthropology over the historical philosophy of men, as they have always been and will be above all ideals. But at the same time, it becomes apparent that the need of faith or promises to ease the inconsistencies of life is part of the *condition humaine*. With the collapse of the political system, the utopia breaks down as well. The promise of redemption, to which socialism stuck until the end, caused the collapse of their vision of the future to be perceived as a metaphysical loss. What is the substitute that will take its place? Interest in the churches has not gone up, contrary to hopes.

Comparisons of the populations of East and West Germany have shown that the majority of West Germans defend freedom instead of equality, while the ratio is reversed in the East. The utopia of a just society, in which everyone is equal, is followed by the demand for real equality at the expense of freedom. Equality destroys variety and, hence, beauty. This aspect is one of the most fatal consequences of the East German uniformity: The society suffered under "good taste" and beauty in a striking manner. If beauty has not always had a purpose, but rather suggested a dimension that exceeds the mere existence of reality, one encounters the religious dimension. Maybe it is the loss of beauty in the East German society that is the cause of its radical rejection of religiosity. The theologian Hans Urs von Balthasar professed that beauty is a disinterested entity that, once lost, gives the impression of never having existed in the first place. The loss of the socialist utopia has led to a loss of meaning, and the residuum of the demands for equality to suffering under the injustices of the world and material envy. The consequences can hardly be compensated for an open society.

Limits of an Open Society

It was Popper's (1945/1993) desire to show why a functioning democracy is a desirable state, as well as what the open society is not. Thus, he provided a guiding principle that needs to be amended. He has, for instance, not shown what the functionality of a democracy depends on. Otherwise, one might be left with the impression that once democratic institutions are set up, little can go wrong.

According to Luhmann (2002, 2003), the present society is composed of various systemic and communicational cycles, and these function according to their own logic, develop their own language, and are shaped by a specific rationality. Social subsystems include the legal, educational, scientific, and religious systems. Remarkably, there is no connecting, inclusive band around all systems, apart from a generalized communication. In this functionally diversified society, all problems of the open society become apparent.

On the one hand, the open society is marked by disenchantment with politics and a lack of participation. The subsystems tend to become independent and to estrange themselves from the everyday life of the citizens due to their specific rationality. Politics can only set up a framework for the subsystems—not the systems themselves. Hence, politics only possess limited influence on the development of society, although suggesting rational predictability and controllability.

On the other hand, there is no rationality that would be suited as a binding corrective. In Popper's (1945/1993) work, reason and rationality only appear singularly, but they have multiplied in the functional, diversified society. From the perspective of which rationality should criticism be passed? What might be politically reasonable could be economically questionable. Different rationalities criticize one another, for they are based on different premises. There is no binding or absolute rationality, as democracy has just denounced the idea of the absolute.

Moreover, there is no central ombudsman for complaints and criticism. Not only individuals, but also the subsystems are gaining freedom and autonomy in the open society. Yet, while people can be held to account, they cannot be directly addressed in the case of the subsystems.

In addition, the process of the open society does not answer all questions and does not describe the end of history. New anxieties and challenges will always emerge. Something that adds sense to these options—deep structures—is missing. Open societies tend to resolve this gap, which may result in national socialism or religious fundamentalism as apparent ways to give life meaning. Since it is impossible for open societies to revert due to the gained knowledge, they are at risk of veering toward national socialism. Furthermore, open societies depend on the support for their institutions and the belief in their values, as they convey neither a unifying force nor any sense of identification.

Conclusion

An open society requires consistent activity and creativity on the part of its citizens, and the desire to conquer and fill in areas of freedom. But there are also times when people feel comfortable, when they do not try out new ideas, or cannot carry them to their extreme. Instead, they accept and try to adapt. This apparently leads to a retreat to the private domain or the preoccupation with the closer living environment, respectively. The trust in democracy and freedom does not seem to suffice as a motivation to engage oneself in public affairs. The open society had no other perspective than the preservation of its openness. The loss of a motivating vision for the future leads to erosion. Ernst-Wolfgang Böckenförde professes that the open society is living on preconditions that it cannot create itself. It is the great—and probably inherent—flaw of open societies: They do not convey a palpable meaning of life that justifies the suffering and fears of the people. Liberal structures, division of powers, and a market economy, as well as laws safeguarding freedom, are the only mechanisms on which the open society is founded. They are the instruments that guarantee an orderly social coexistence, but not the matter itself.

Democratic institutions are means to facilitate freedom. They must be joined by a codex of predefined convictions, a consciousness about forms and institutions, reason and foresight, reliability, courage, tolerance, and adherence to the law. The conveyance of this codex is one of society's tasks. The individual's task remains to practice the perception of reality without simply accepting it, acting responsibly, and sharpening one's sense for permanent dangers.

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CULTURE AND PERSONALITY

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Perhaps, as George Stocking (1986) has contended, *culture and personality* was but a temporally delimited version of psychological anthropology, with psychological anthropology being the most “historied” of anthropological endeavors. If so, then the appropriate questions one might ask in the current era would concern the legacy of culture and personality or, perhaps less charitably, its relevance. But culture and personality is also perhaps, at least within the discipline, American anthropology’s most mythologized undertaking. If this is so, then culture and personality is likely also central to more argument within American anthropology about anthropology—its purposes, failures, limits, internal disciplinary relations, and so forth—than other anthropological undertakings.

In part, such centrality arises out of the confusing breadth of culture and personality. The major figures discussed in this chapter—Edward Sapir, Ruth Benedict, Margaret Mead, Gregory Bateson, and, but only in passing, A. Irving Hallowell—brought to their work interests in language, culture, personality, and biology. Their work concerned itself with the psychological reality of symbols, hence with living with and within myth.

Sapir (1917, 1949, 1994) played a crucial role in calling anthropology’s attention to the centrality of people in social relations. But individual people living real lives in psychologically real worlds are curiously absent from his work. It follows that so, too, are those symbols or myths that people make psychologically real, both individually

and collectively. Many of his most important essays—“Culture: Genuine and Spurious,” “The Emergence of the Concept of Personality in a Study of Cultures,” “The Psychological Reality of Phonemes, Why Cultural Anthropology Needs the Psychiatrist”—were gathered together and republished posthumously (Sapir, 1949).

Benedict (1922, 1934, 1946), in particular, suggested a notion of cultural selection, inverting thereby earlier ideas of diffusion and culture circles. She and Mead (1928, 1930, 1935) remain widely associated with the idea of pattern or configuration. From the notion of configuration, they derived similar but differing visions of how individuals might be at odds with the pattern of an anticipated or well-formed life locally understood; this they called *deviance*. From this notion of pattern, they also derived ideas about damaged or incoherent societies. Furthermore, Benedict developed a theory on the relativity of significance within and between patterns, which was not a theory of moral relativism per se; her books on race and racism, as well as her late-life project of an anthropology “beyond relativity, beyond pattern” attest to this (Benedict, 1942; Young, 2005).

Mead, along with Bateson (1942), taking her lessons from Sapir and from the psychology of the era, concerned herself with innate dispositions, the accidents of life, and variable cultural forms. To this work, Bateson brought his talents as a photographer and his interests in interactive processes.

Hallowell did not publish much pertinent to culture and personality during its heyday. He did, however, publish

a singular and in some respects curious overview of the sub-discipline in A. L. Kroeber's *Anthropology Today* (1953). Kroeber's volume also contains an overview of national character studies by Mead. Benedict and Mead, especially, attained great stature outside the discipline of anthropology; their position within the discipline was more tenuous. Yet, to varying degrees, they have receded from view, other than perhaps as caricatures, objects of scandal, straw people, or the obsessions of specialists. They have, for many, become icons for this or that position, rather than people engaged with intellectual and scientific projects; hence, they are easily and unfortunately often misrepresented.

A Lattice of Interests and Scholars

Daniel Segal and Sylvia Yanagisako (2005) have recently argued that the distinctly American notion of a four-field anthropology has lost much of its utility. According to their account, anthropology is the last of the great, composite 19th-century disciplines. The other disciplines, such as political economy or natural history, have broken up into smaller, more professionalized units of scholarly endeavor organized around university departments and funding-agency areas of interest. Anthropology, at least the American four-field anthropology, remained intact, partly for reasons of bureaucratic convenience, within universities and partly because of a general, if not always happy and often ambivalent, commitment to a concept of holism.

From this general perspective, the history of anthropology becomes largely a tale of somewhat conditional compromises within the academy set against and responsive to sets of changing circumstances, both in allied disciplines and in the world outside the academy per se.

When, in the 1890s, Franz Boas brought together in uneasy harmony several subdisciplines under the general rubric of anthropology, none of those subdisciplines were particularly well developed. Ferdinand de Saussure had yet to give his famous course on general linguistics; Sapir's book *Language* would come out in 1921 and his essay proclaiming the psychological reality of phonemes for speakers in 1933. The sorts of fieldwork techniques epitomized in the idea of ethnographer as field note had yet to be devised; Mead proved particularly methodologically innovative and has left us voluminous notes among her papers, but she did not start working in the field until 1925. Equally, in the 1890s, archaeologists were only beginning to devise the sorts of methods for recording assemblages in situ upon which all subsequent methodological and theoretical development has relied. William Bateson did not publish his discussions of Gregor Mendel's genetic work until 1902, by which time Boas had already established the department at Columbia University and Kroeber had completed his, by today's standards, very short doctoral dissertation. Theodosius Dobzhansky and Julian Huxley would not publish their studies, bringing Darwin's theory of evolution and

Mendelian genetics together, until 1937 and 1942 respectively. Gregory Bateson (hereinafter Bateson), William's son, introduced Mead to Mendelian genetics in 1933; Bateson and Mead read Charles Darwin's *The Expression of the Emotions in Man and Animals* while in Bali, most likely in 1936. Our current sense of evolution as changes in genetic frequency within reproductive populations, of genomes and the like, are even more recent.

In one sense, then, anthropology as Boas proposed it in the 1890s could only have been a work in progress. His interest, and subsequently that of several of his students and their associates in matters connecting psychology and social life, was likewise a work in progress. Anthropology's internal, subdisciplinary stresses could only emerge as problems, methods, and techniques became refined. Those same stresses could only be exacerbated as the volumes of research increased, as an emphasis upon recent scholarship became more pervasive, as knowledge of pertinent literatures diverged, and as various forms of reductionism—biological, cultural, linguistic—either appeared, came to be feared, or were used by some for other unfortunate purposes. Nor should we forget human qualities, vanity, envy, and resentment being among them.

In perhaps the most interesting contribution to Segal and Yanagisako's volume, Ian Hodder (2005) suggested that we think of disciplines and subdisciplines less and more about a lattice of shared interests bringing scholars together for some projects but not others. It would be ironic, then, that perhaps the most mythologized, if not also the most historied, of American anthropology's endeavors, culture and personality, was just such a lattice of interests and scholars working in a variety of disciplines, notably but not exclusively psychology and anthropology.

Few read the psychology of that era anymore, hence many have lost any understanding of how deeply that psychology—culture and personality—engaged biological notions. Given Segal and Yanagisako's (2005) desire to establish a cultural anthropology dedicated to the study of the operations and consequences of power separable from, or at least not reducible to, biology per se, this earlier engagement with biology poses its own ironies. As many—Derek Freeman, Steven Pinker, and Melvin Konner, each in his own way—have used Mead in particular as a poster child for a rigid cultural determinism indifferent to biological notions or biological processes, Mead and Bateson's specific and very explicit engagements with the psychology and biology of her day multiply the ironies.

Mead and Bateson, working within a lattice of interest and scholars, developed but did not explicitly publish an articulate research paradigm joining ethnographic, psychological, and biological observations and processes; this was their squares hypothesis (on the squares see subsequent section; see also Sullivan, 2004, 2005, 2008). The squares hypothesis was in ways consonant with the holism that Segal and Yanagisako (2005) criticize, yet not hostile to the studies of the operations of power Segal and Yanagisako

advocate. Taken in conjunction with Benedict's late life project of an anthropology "beyond relativity, beyond pattern," a worthy predecessor Segal and Yanagisako were likely unaware of, a reexamination of the premises of what we call culture and personality may revivify interest in a set of lattices consonant with much of the last, great, composite 19th-century discipline. From time to time, anthropologists have returned, in one guise or another, to this particular set of interests in matters ethnographic, psychological, and biological and the associated processes; culture and personality, particularly as developed by Bateson and Mead, has its successors, even if those successors rarely acknowledge or perhaps even know this to be the case (e.g., see Csordas, 1994; Hinton, 1999; Hirschfeld, 2002).

Segal and Yanagisako's (2005) suggestion that American four-field anthropology grew set against and responsive to the internal imperialist expansion of the United States and its consequences deserves close attention. Hallowell (1965) made a similar point in his discussion of the history of anthropology as a particularly and necessarily anthropological problem.

Much, but surely not all, of the work associated with the rubric of culture and personality was undertaken outside the United States and its empire, albeit within other empires. Benedict (1934), however, found consequences of the American empire for the original indigenous peoples of North America embedded in culture and personality's founding notions; people(s) seek coherence, but ways of life may rupture. Regna Darnell (2001) called attention to Benedict's sort of observation, referring not only to what Darnell called the invisible genealogies, which comprise Americanist anthropology, but also anthropology's particular need for a useable past.

But for whom is that useable past useful? For what purposes and to what ends is such a past useful? Of such questions, perhaps Segal and Yanagisako (2005) would approve.

An Original, Dysfunctional Politics

Some of the early arguments surrounding culture and personality were personal, petty, and maliciously destructive.

In 1925, Mead and Sapir had a brief affair that must have moved them both very deeply; Mead said as much later in her letters to Benedict. At the time of this affair, Mead was married to Luther Cressman. She was also preparing to undertake fieldwork in Samoa. Sapir, meanwhile, wanted Mead to leave her husband. Sapir also lobbied Boas, behind Mead's back, in an attempt to keep her from journeying to the Pacific. Sapir's arguments concerned Mead's frailties, but his intent was to keep her close and to secure her as his bride and stepmother for his children. Mead learned of Sapir's approaches to Boas, perhaps through Benedict.

Relations quickly soured between Mead and Sapir. Mead would burn Sapir's letters on a Samoan beach; it is

unclear what happened to Sapir's copies of Mead's letters. Sapir would contend that Mead was an incompetent in his 1929 review of Boas's book *Anthropology and Modern Life* and imply she was immoral in a thinly veiled description, in his article, on the so-called "new woman."

American anthropological circles at the time were small. Sapir was perhaps the leading intellectual light among Boas's first generation of students. Well-known and respected—his eminence earned him positions at Chicago and Yale—he was a formidable enemy. Mead, however, had earned Boas's support, and tangible support at that; Boas found Mead a job, with salary, at the American Museum of Natural History. By contrast, Benedict worked at Columbia's anthropology department, but without pay, until her marriage crumbled sufficiently for her to need a salary. Cole (2003) pointed out that Columbia awarded 20 doctorates in anthropology to men and 19 to women between 1920 and 1940. The other female Boasians were mostly underemployed if not also itinerant.

Benedict—Mead's friend, mentor, and sometimes lover—either could not or chose not to avoid this dispute. Benedict was present soon after Mead arrived in France from Samoa obviously enamored of Reo Fortune, but despite her own disappointments, Benedict sided with Mead, hence perforce against Sapir. Benedict and Mead's conversations on their voyage back from France gave rise to what is usually referred to as culture and personality, or sometimes as the configurationist school, but their work was part of a much larger body of interdisciplinary work (on Benedict, Mead, the *gestalt* psychologists, and the notion of configuration, see Sullivan, 2009).

Darnell (1986) has contended that there was a Sapirian alternative to Mead and Benedict. If so, then during the 1920s, 1930s, and even the 1940s when Mead and Benedict brought out at least one important dissertation, a series of major books, and many articles, that alternative brought forth a sparse literature, mostly by Sapir, from which real people living real lives in real worlds are largely, if not entirely, absent. Sapir's students, younger colleagues, and their students champion his legacy; Darnell belongs to this camp, having studied with Hallowell.

In 1941, Hallowell, Leslie Spier, and Stanley Newman organized a memorial volume for Sapir. In that volume, Clyde Kluckhohn defended Benedict against Sapir's criticism. The organizers of the volume thought Mead irrelevant to Sapir's legacy. They did not think of her as close to him personally. Mead went undefended. Sapir's students and younger colleagues came to dominate the positions teaching psychological anthropology.

Benedict taught for many years at Columbia; of her students, one, Victor Barnouw, made contributions to psychological anthropology; others, notably Sidney Mintz and Eric R. Wolf, seem to have developed aspects of Benedict's late-life project of an anthropology of freedom and power beyond relativity, beyond pattern. Abraham Maslow, a leading American humanistic psychologist perhaps best

known for his theory of a hierarchy of needs, worked with and thought highly of Benedict.

Mead's position at the American Museum of Natural History meant that she had few students of her own prior to the late 1950s. She did employ a considerable number of young anthropologists over the years at the museum. But her legacy derives from her methodological innovations, her books, and the articles she published with Rhoda Metreaux in *Redbook*.

To his students and younger colleagues, Sapir (1994) contended that Benedict's, and by implication Mead's, work was mischievous in that psychology can only come about in the interactions between people. Concerning Mead, this criticism is simply misplaced. Given Sapir's (1949) contention that phonemes are psychologically real for speakers of languages, and his contention that a culture appears to take on the characteristics of the organization of a personality the more one studies that culture, Sapir's (1994) criticism of Benedict on these grounds seems odd at best.

At least within the academy, the Sapirians largely won the day, reproducing themselves and their positions. Sapir's original contribution, however, should not be over- or underestimated.

Edward Sapir

In 1917, Kroeber published his essay on culture as the superorganic in the *American Anthropologist*. Kroeber drew responses from A. A. Goldenweiser and Edward Sapir. Of these responses, Sapir's has had the deepest resonances. Sapir's question was simple: Do we need the superorganic? His answer was equally simple: No.

But the consequences of that answer were not so simple. If culture is not superorganic, then culture, to put matters one way, and social facts, to put matters in another but similar way, must somehow arise in the interactions of individual human beings. That is, culture and social facts must be somehow psychological. Concomitantly, social processes must all proceed through the activities of people.

From 1917 until his death in 1939, Sapir continued to expand upon this initial observation. Effectively, his 1994 criticism of Benedict and, via Benedict, Mead was an extension of his earlier criticism of Kroeber.

Elaborating on J. O. Dorsey's comment, "Two Crows denies it," Sapir (1994) noted that any understanding of a given culture differed depending upon whom one asked about that culture, its institutions, and practices. Thus, the particular version of culture a person expounded would be psychologically real for him or her, but not necessarily for his or her neighbors. There was no psychology of culture as such; ordinary people, regardless of the society in which they lived, would be generally psychologically similar even as they viewed matters differently from one another. Put slightly differently, Sapir held a comparatively weak conception of culture and its powers as psychological stimulus; the individual had to give culture meaning. According

to Mead (1959), Benedict held that Sapir desired to prove that culture does not matter.

Sapir widely read the psychology of his day, writing reviews of significant works by W. H. R. Rivers and C. J. Jung, for example. In 1925, before their relations became frayed, Mead introduced Sapir to Kurt Koffka's (1924) book, *The Growth of the Mind*. Not long thereafter, Sapir made the acquaintance of the American psychiatrist, Harry Stack Sullivan; they became close friends. Sullivan's work with schizophrenics grew out of a sense of crucial points in human lives, especially male lives, when difficulties in relations with others could push a person into mental disease; for Sullivan, perhaps the most significant of these difficulties was a fear that others might think one experienced homosexual desire. On the other hand, successfully navigating these crucial periods of life yielded a sort of mental health. Sapir and Sullivan, along with the political scientist Harold Lasswell, collaborated, developing a broad, multidisciplinary, institutional, and intellectual framework for studying the interrelations of personality and culture. This framework can best be seen in the 1933 Hanover conference and in Sapir's course on the psychology of cultures.

In what must be something of an irony, Mead attended the 1934 Hanover conference devoted to developing the project suggested at the previous year's gathering; she wrote much of *Sex and Temperament in Three Primitive Societies* (1935) while there. Sapir's notes on his psychology of cultures lecture series ended up in Mead's papers.

Sapir (1949) made several arguments for the usefulness of psychology and psychiatry for anthropology. But, he made perhaps his most important claims in a paper discussing the usefulness of cultural forms for individual lives; this was his essay "Culture, Genuine and Spurious" of 1924. Some lives have a genuine and fulfilling relation to the wider social world; others do not, with Sapir's example a hypothetical telephone operator working at a switchboard. These latter lives bespoke malaise.

Maureen Molloy (2008) has placed Mead within the world of small magazines and the concerns of intellectuals, such as Van Wyck Brooks, Herbert Croly, and Randolph Bourne, with a deep complementarity between cultural and individual, especially intellectual, lives. For Brooks, Croly, Bourne, and others like them, America had as yet not developed its own genuine culture. Life, especially intellectual and artistic life, was too passive to be truly manly; such lives risked the malaise of spurious culture. These intellectuals moved in precisely the same circles as the New York Boasians. Sapir's argument for a genuine culture, one that fulfilled the individual in his endeavors, should also be placed in this context.

Ruth Benedict

Ruth Benedict began studying anthropology under Goldenweiser at the New School for Social Research in 1919. She subsequently wrote her doctoral thesis on

“The Concept of the Guardian Spirit in North America” under Boas. In 1922, an essay on vision quests among Plains Indians quickly followed.

In these works, Benedict (esp. 1922) began to substantially turn the studies of the distribution of cultural traits defused across a landscape inside out. No more would culture be Robert Lowie’s thing of shreds and patches, oddly put together by happenstance. The significance of the vision varied according to how it fit with other elements of a given culture; no two of the Plains societies incorporated the vision into their practices in the same manner. Where in one society, for example, the vision quest might have been accompanied by painful ordeal, in another vision it had been bought and sold. Benedict produced an analysis built around a theme (visions) and its variations or, put another way, a nascent structuralism not beholden to or dependent upon a theory of language.

In contrast, Hallowell’s 1926 dissertation only points toward the necessity of such a nascent structuralism. He showed that ceremonies directed toward bears were not coextensive with the ecological range of bears. In the Northern Hemisphere, such ceremonies could be found only among hunting peoples of the arboreal forests, and neither further north on the arctic fringes nor further south. But for all the extensiveness of his scholarship, his reasoning did not extend further. Nor did Hallowell pursue either the internal relations between various elements of bear ceremonial or the relations between bear ceremonial and other elements of culture aside from its distribution.

Mead’s thesis, like Benedict’s and Hallowell’s, was based on library research. Finished prior to her 1925 trip to Samoa, Mead attempted to discern whether or not changes in cultural complexes—canoes, houses, tattoos—could be used as a kind of clock, with some elements changing reliably faster than others, depending upon how they were integrated into the rest of the cultural pattern. Thus, Mead assumed Benedict’s nascent structuralism. While Mead set out regular patterns of difference between and among various Polynesian societies, she concluded that changes in these complexes could not be taken as a reliable guide to how quickly or slowly such complexes changed.

Sapir thought highly of Benedict’s work. Boas brought Benedict onto the Columbia department’s faculty, albeit, as noted above, for some years without pay.

While assisting Boas with a course at Barnard College, Benedict met the much younger Mead. These two, Benedict and Mead, would not long thereafter begin a collaboration that would last until Benedict’s death in 1948. Subsequently, Mead would serve as Benedict’s literary executor and bring out two volumes (Mead, 1959, 1974) on Benedict and her work. The differences between Benedict and Mead, if not often noted, are every bit as important as their similarities.

As with Sapir, Mead introduced Benedict to Koffka in 1925. But it was not until 1927, according to Mead (1959), that Benedict realized that she could explain differences between Amerindian societies of the Plains and Southwest in ways formally and heuristically similar to those she

might use to explain the differences between individuals; in both cases, what mattered were the selections individuals and collectives made or did not make from the available possibilities, and the applications of the selected possibilities toward life circumstances. In her 1934 *Patterns of Culture*, Benedict relied upon and repeatedly stressed this notion of cultural selection, as well as its corollary: Given enough time and freedom, each person and society would seek out its particular coherence, applying disparate and sundry materials to individual or group ends, individual or collective. One should not neglect the echo of Darwin’s epoch-making notions of natural and sexual selection or the anticipation of Lévi-Strauss’s notion of *bricolage*.

Much later, Mead (1959) would write of this formal and heuristic similarity between individuals and cultures with a shorthand: Culture is “personality writ large” such that by implication personality becomes culture writ small; Mead used the quotation marks rather than explain more fully. This trope has gone largely unexplored. Benedict’s (1959) formulations, for example those found in her essay of 1930, “Psychological Types in the Cultures of the Southwest,” stressed the differences of scale and duration between persons and cultures, as much as the similarities bound up in selection and agency.

In a well-formed culture, where for Benedict (1934), one has had time and relatively beneficial circumstances, most people would find the well springs of their own psychological world in the organization of the culture within which they lived. The society’s myths, folklore, institutions, and practices became psychologically real for people as they lived their lives in ways that were consonant with the order of those lives; in Sapir’s terms, such orders would be genuine cultures.

But not everyone would be so lucky as to live in a society conducive to inclinations. Some societies, like that which Benedict described in *Patterns of Culture* (1934) as the Digger Indians, had been devastated, their earlier ways either forbidden or so at odds with the new world that they found themselves, in these earlier ways, to be nonsensical. It was equally possible for individuals to be drawn to behave in ways quite counter to those publically espoused in their society; Benedict’s repeated example was a homosexual living in the United States of her day. In her terms, such a person was deviant; in the somewhat later terms of Erving Goffman, such persons could find themselves having to live with a spoiled identity or a damaged face, itself the consequent of the stigma their behavior drew toward them, if known, and sometimes even if known only to themselves. Such circumstances were also psychologically real; but rather than being fulfilling, they could render the person severely at odds with his impulses.

Deviance and Relativity

Both Benedict and Mead knew of the power of such deviance upon lives from their direct experiences of discreet,

homosexual encounters. Mead (1959) credited Benedict with teaching her to ask about deviance when Mead was working on *Coming of Age in Samoa*. For Mead, however, deviance came to be not so much a matter of behavior as being emotively at odds with one's society's ethos.

From at least 1928 when *Coming of Age in Samoa* was published, neither Benedict nor Mead worked with the idea of a wholly overdetermining culture. Culture provided context and patterns of significance, but in their thought there was always a concern for individuals and agency; social pressure was only almost irresistible. For Benedict (see Young, 2005), this observation of deviance would lead to her concern with freedom beyond pattern, beyond relativity. Mead (see Sullivan, 2004, 2005) would come to describe personality as arising in the conjunction of biological inheritance and disposition (temperament), the accidents of life, and cultural patterns; she preferred to think of the individual in culture rather than to use, save for purposes of easing communication, the phrase "culture and personality."

For Benedict, unlike Mead, the possibilities for the variety of pattern opened up by cultural selection were, if not endless, at least large. There could be many forms of genuineness, of devastation, and of deviance. Benedict opposed her younger colleague's attempts to introduce any small system of variables; in this matter, Benedict's thought was less like that of her first teacher, Goldenweiser, than Mead's was.

This variety of cultural pattern has led many to think of Benedict as a cultural relativist, meaning that all cultural patterns were for her equally valid expressions of humanity. Benedict is not known to have used such a phrase in her published writings. Furthermore, she wrote extensively on racism in ways that not only provided a cultural analysis of the genesis of racist thought, but also extensively critiqued racism. For Benedict, not everything goes. Nor did her position require her to separate culture from politics, as Melville Herskovits had to in his distinction between German culture and Nazism. Rather, Benedict's thought took her more and more into explorations of the cultural conditions generative of human freedom.

In many ways, Benedict's thought was only a partly psychological understanding. Though she would come to write about raising Japanese children in *The Chrysanthemum and the Sword* (1946), Benedict long found her attitude toward dynamic psychologies—such as those of Sigmund Freud and Erik Erikson, which focused on a sequence of bodily zones and a child's developing powers—to be wasteful. Thus, she allied herself further with the analysis of cultural stimulus rather than interior psychological development. Mead (1946) thought Benedict to be the most sociological, the most cultural, in her understanding of the personality within a group of scholars lumped together under the rubric of culture and personality; by contrast, Karen Horney seemed to Mead to almost lack a working concept of culture.

But, as Benedict's work implies, a human interiority is dialectically related to a particular cultural pattern, and Benedict's thought remains psychological in much the way Oswald Spengler's does. For Spengler, psychology develops within and against a particular image or understanding of the world. Soul varied in relation to nature understood as an image of the world, with that image itself shifting and changing with time. Similarly, for Benedict (1934), personality understood as a counterculture varied as historically cobbled together and culturally selected patterns varied in time and space, and also varied as specific individual's relations toward those patterns, those understandings of the world, embedded in myths, folklore, institutions, practices, and the like.

At least from 1927 and certainly from 1928 with the publication of *Coming of Age in Samoa*, Benedict's and subsequently Mead's analyses presume individuals in specific cultures; in Mead's case, this presumption is readily visible in the surfaces of her texts. Their descriptions of specific cultures have been, and indeed should be, subject to criticism, but their theoretical orientation and contributions do not rely on the accuracy of any specific account of a particular culture.

Margaret Mead

Margaret Mead's ethnographic corpus is perhaps the most criticized in all of anthropology. Some of these criticisms, like that of Derek Freeman in 1983 and 1999, contending that Mead opposed all biological explanation favoring, thereby, a radical cultural determinism, are often repeated but also without merit. Other criticisms are essentially leveled at Mead considered as an icon for this or that position, whether she held such a position or not. Given the number of her publications and the sheer volume of her papers—they are the largest collection held by the Manuscript Division of the Library of Congress—serious criticisms of Mead's work have of necessity been the preserve of specialists, either of one or another of the ethnographic areas in which she worked, or of her scientific project, though this latter specialist is more rare.

Mead came to anthropology from psychology and, so she said (1962), stayed within the realms of psychology for the rest of her life. As was common in her day, her dissertation on social stability in Polynesia was derived from library research. At Boas's instigation, she began her first field research in Samoa. Like all of her subsequent fieldwork, her Samoan research, like her thesis before that, focused on a particular problem; this, in itself, was a significant innovation from which much of American anthropology's problem-oriented fieldwork now derives. This focus on a problem, having to do with individual lives in cultural worlds, also required Mead to develop innovative methods to study what she called informal, or unstressed, elements of social life.

In the Samoan case, Mead (1928) studied the psychological adjustment of adolescent and immediately postadolescent girls to Samoan society. In 1999, Freeman contended that she also tried to undertake a separate study of Samoan social structure. While these two aspects of Mead's studies were funded by separate entities, these two matters, adjustment and social structure, are not really separable, as Freeman would have them be.

In 1925, prior to going to Samoa, Mead read Koffka's (1924) *The Growth of the Mind*. In this work, Koffka developed an analysis starting with the active engagement of very young children with a stimulative world. For Koffka, adaptation was an active process, not a passive one.

According to this analysis, both entities—developing child and stimulus—were psychologically powerful. The qualities of the stimulus (e.g., the nipple of a bottle as opposed to that of a woman) shaped the possibilities for the child's experience. But even a young child engaged such stimulus and shaped her responses. What we see and call behavior arose in this shifting conjunction of forces, both stimulative and responsive or adaptive. The *gestalt* psychologists referred to this shifting conjunction of forces as *struktur*, but for reasons having to do with the internal disputes among American and British psychologists, Koffka and his translator chose to use the term *configuration* instead of *structure*.

Benedict (1934) stressed the relations between parts and wholes, the indivisibility of wholes, while Mead (1928, 1930, 1935; Bateson & Mead, 1942) emphasized the shifting processes of the developing configurations or patterns. Both women approached their analyses structurally rather than statistically.

Freeman's error was, therefore, twofold. He separated adjustment from social structure, when the sort of psychological theory with which Mead worked required that these two be considered together. Furthermore, he ignored the biological aspects of the psychology with which Mead worked. Mead and Bateson's friend, C. H. Waddington, would later coin the term *epigenesis* to refer to precisely these sorts of neonatal developmental processes involving both a stimulative world and an active adaptation. In *Coming of Age in Samoa*, several years before she met Waddington in 1934, Mead asked whether among her Samoan interlocutors there were any temperaments at significant odds with Samoan culture. In one sense, this is Benedict's question about deviance and the place of the deviant within a given social order. But Mead derived the notion of temperament from the work of William McDougall, perhaps in conjunction with that of June Etta Downey, where temperament refers to the innate, heritable disposition or the biological constitution of psychology, as opposed to character, which refers to the organization of habit learned over a lifetime. She was asking whether or not any of her interlocutors showed signs of some disposition—itsself biologically based—at odds with the order or pattern or configuration of the society in which the particular interlocutor lived.

Mead would never leave this interest in biology behind, but equally, given the politics of the era, she would not explicitly publish her developing theories. In 2008, Molloy suggested that biology began playing a larger role in Mead's thought following her research along with Reo Fortune among the Omaha, because Mead's theory was unable to account for cultural change. The subsequent section is more concerned with Mead and Bateson's squares theory.

Regarding the Squares

Mead and Fortune journeyed to New Guinea to undertake fieldwork together in 1932, after earlier working together among the Manus and the Omaha. Their relationship was already strained. They set up first among the Arapesh; Fortune was often away from camp, traveling the roads with various men. They stayed briefly among the Mundugumour, before moving to work among the Tchambuli (now Cambri). Bateson was then nearby amongst the Iatmul. All three of these ethnographers had worked among more than one group; they were respectively an American (Mead), a New Zealander (Fortune), and an Englishman (Bateson). They had only each other for anthropological conversation.

Their relations became volatile, leading them to decamp for Sydney. Precisely what happened between them is now the subject of some disagreement. Molloy and Caroline Thomas, Fortune's biographer (personal communication), suggest that Benedict and Mead put around a story that Fortune had assaulted Mead, leading her to have a miscarriage, in order to preserve Mead's reputation and to explain her separation from Fortune. There can be no doubt that Mead and Fortune explained matters somewhat differently, from one another, to his family. While a concern for Mead's reputation could explain a great deal, this concern need not mean that the tale Mead and Benedict put about was inaccurate. Fortune did strike Mead while in Sydney after these two and Bateson departed the Sepik in 1933. The remaining record has yet to be thoroughly examined in print.

It is clear, however, that Mead and Bateson began developing their squares hypothesis; Fortune thought their line of reason racist and increasingly had little if anything to do with it.

Mead had come to New Guinea intent upon studying the regular pattern of female adjustment to society. She began by assuming that men and women, considered as biological and sexual groups, were temperamentally different from each other. Under the influence of (1) Boas's 1911 doctrines about the nonexistence of biological races, (2) a draft of Benedict's *Patterns of Culture* (1934), (3) C. J. Jung's book *Psychological Types* of 1921, (4) Mendelian genetics as explained by Bateson, and (5) the variety of male and female lives found among the Arapesh, Mundugumour, and Tchambuli, Mead came to think this notion of irreducible

biological differences between men and women to be mistaken. Rather, Western notions of appropriate male and female personalities were versions of temperamental, constitutional, or biological types manifest in the personalities of both men and women.

Developing a corollary of Benedict's (1934) idea of cultural selection, Mead suggested that if a society had enough time and resiliency in the face of external and internal stresses, then it could eventually select for, in Mead's terms stabilize, a preferred type or types of personality. The society would have to be relatively endogamous. Its neighbors could not be too overwhelming, or disruptive militarily or economically. Its people had to be well adapted to local foods and diseases.

Unlike Benedict, Mead preferred to think of a small group of dialectically related types. For Mead, deviance increasingly came to mean that a person's emotional life was at odds with the ethos of their society, rather than a matter of behavior as such (on ethos, see Bateson, 1936; Silverman, 2001). Each of her four primary and four intermediate types had a characteristic developmental tendency that would conform variously to the emotional organization of the society into which a given child was born. Hence, given a particular social organization, children of each type would face characteristic difficulties as they grew, assuming they were healthy rather than ill; on this point, Mead and Bateson would subsequently borrow from Erikson's 1937 zonal-modal theory of early childhood development.

Mead's contribution was to recognize that, unlike a feeding bottle, a woman or any caregiver was already enculturated; her work thus extended Koffka's 1924 notions. Likely influenced by Bateson, she held that characterological development was not reducible to some particular technique. Rather, the interactions between caregiver and child were communicative; the caregiver's emotional tenor formed a stimulus enacted in technique to which the child actively adapted in much the matter suggested by Koffka, and subsequently developed by Kurt Lewin (see Sullivan, 2009).

Embodiment

While *Sex and Temperament* (1935) may well, as Molloy in 2008 suggests, largely concern deviance, it also outlines three general developmental sequences, each set against a different kinship system, with its characteristic stresses and strains, and specific preferred personalities. Bateson and Mead's *Balinese Character* (1942) outlines a fourth developmental sequence against the background of yet another cultural order. Properly read, these books draw attention to the processes leading to a human embodiment of culture. Mead explicitly pointed out in her introduction to *Balinese Character* that the book was not about Balinese culture per se, but rather concerned the processes by which Balinese people came to embody that culture.

She made a similar point in her 1953 defense of Geoffrey Gorer's analysis of swaddling among the Great Russians.

In 1950, Lévi-Strauss favorably compared Mead and Benedict's work with Marcel Mauss's concern to show how individuals in society come to manifest those very bodily reflexes provided by society. At the time, Mauss was writing about techniques of the body, Benedict was bringing out *Patterns of Culture* (1934), while Mead, along with Bateson, was developing the squares hypothesis. Lévi-Strauss considered the Mead of *Sex and Temperament* (1935) to be developing a principled doctrine quite similar to that of Mauss, though she did not seek to produce Mauss's envisioned encyclopedic inventory of the uses to which people have put their bodies.

Thomas Csordas (1994), among others, called attention to embodiment as what he has termed the existential ground of culture and self. But at least in the early work he edited, there are only two brief mentions of Mauss; Bateson receives mention in a single note. Mead went unmentioned. The discussions in this work presumed an adult culture, and thus do not take up the processes by which people learn to be embodied in a specific way. Mead, again, goes unmentioned. Thus, the essays in Csordas's volume could easily be criticized for ignoring children, their culture, and their development.

Mead's work championed the study of children and the ways in which they learn to be enculturated human beings, beginning with her second popular volume, *Growing Up in New Guinea* (1930). Far from hating children, Mead pioneered the study not only of children's culture, but also of children in culture. Her works, then, should be understood as an extended study of the processes of education, their discontents, and the reproduction of character.

Gregory Bateson

If Mead left psychology to remain nonetheless always within its ambit, then Gregory Bateson remained within the domain of biology and natural history. Over the course of his career, Bateson developed a science of the convergence of form, communication, and context.

In its mature form, Bateson's (1979) thought considered learning and evolution to be formally similar. Though these processes occur on very different scales, both are stochastic. That is, both involve the interaction of a tautological inlying system and an external environment. Being external to the inlying system, events arising in that environment would be random to the inlying system. Learning and evolution, then, are the inlying systems of adaptation to random developments within the environment. Such adaptations effect changes in the internal relations between parts of the system and, therefore, within the processes by which the newly reconfigured system regulates itself. Because this new configuration arises out of the conjunction of both the system and the environment, that new configuration need not be

predictable and, in that sense, is underdetermined. Conversely, as the inlying system is a part of its environment considered as a system, any change in the internal relationships constituting the inlying system yields a change in its environment. For this pattern of continuing adjustments to persist, the totality has to become self-regulating; an uncorrected progressive change, on the contrary, generates conditions under which the totality and its parts, jointly or singly, can become disorganized.

While one should not underestimate Bateson's own contributions or the originality of his science of form, communication, and context, his developed position owes much to the era in which he collaborated with Mead and learned from Benedict. In a variety of ways, Bateson's mature position drew together Benedict's concerns with myths, folklore, institutions, practices, and the like considered as the environment for life, as well as Mead's attention to individual development within such an environment. He attempted to devise a way of thinking to both explain the generation of difference, as evolutionary theory does, and concomitantly the development of similarity within that range of differences, as cultural theory requires.

The scion of a great British academic family, Bateson studied anthropology at Cambridge, where he knew Reo Fortune. Apparently unimpressed by the functionalism of Bronislaw Malinowski, Bateson would gravitate toward the psychological laboratory of Frederick Bartlett.

Bateson's first fieldwork among the Baining was something of a disaster; his second field project among the Iatmul was not going much better when Mead and Fortune arrived in the area. Bateson's notes consisted largely of lists of clan names.

In addition to his conversations with Mead and Fortune, Bateson was drawn to the *naven* ceremony with its sequence of a triggering action, transvestism, mockery, building emotion, and an eventual consuming climax. The young Bateson, like certain Marxists, believed such building tensions would push Iatmul society apart. To describe these phenomena, in 1936 Bateson coined the term *schismogenesis*, meaning the generation of faction or schism. To analyze these mutually evoked interactive sequences, Bateson developed two notions: *ethos* and *eidos*. By *ethos*, Bateson meant the organization of emotion; *eidos* referred to the parallel but distinct organization of thought. Roughly then, *ethos* concerned matters central to Mead's pursuits, while *eidos* shared some of Benedict's interests. Bateson also wedded his ideas of *ethos* and *eidos* to notions of social organization derived largely from the work of W. H. R. Rivers and A. R. Radcliffe-Brown, extending thereby Rivers and Radcliffe-Brown's ideas in novel ways, as Mead recognized. Importantly, Bateson's analysis did not concern itself with function.

Determined to work together again, Mead and Bateson by happenstance ended up choosing Bali for their next research. Their research proposals suggest lines of study defined by the squares hypothesis. Bateson also took up

the question of controlling schismogenesis and hinted at the use of cinematography.

By the end of September 1936, however, Bateson's research into the control of schismogenesis had been largely abandoned in favor of Mead's focus on the interactions of caregivers and children. Bateson began taking photographs and short films of these encounters and other elements of Balinese life. He also devised ways of integrating these materials with notes taken by Mead and Madé Kaler, their *aide-de-camp*. The result of these efforts was an unusually large and densely organized body of materials, forming the basis of one of the most unusual books in the history of anthropology: *Balinese Character* (1942).

According to Bateson and Mead (1942), the ordinary, well-adjusted Balinese were affectively unresponsive compared both with Americans and New Guineans. This was not a matter of temperament, since Balinese babies were as emotively engaged as any other babies. Rather, this was a characterological development deriving from extensive, if also frustrated, communications between caregivers and children. Furthermore, the institutional arrangements of Balinese society tended not only to defuse tensions, but also to prevent progressive changes such as those associated with schismogenesis. These social arrangements provided the Balinese with prompts necessary for stable, if emotionally distant, lives. As a result, the character of the Balinese—the ways in which they had come to embody their culture—formed a crucial part of Bali as a self-regulating system.

Mead and Bateson's (1942) research in Bali was largely funded by the Committee for Research in Dementia Praecox, a group of leading American psychiatrists funded by the Masons and interested in all matters pertinent to schizophrenia. Bateson and Mead compared ordinary Balinese to American schizophrenics, noting that whereas Balinese culture provided Balinese people with an environment supportive of a successful Balinese adaptation to life, American society did not so provide for American schizophrenics. This formulation did not hold that ordinary Balinese were psychotic.

Conclusion

Sapir, Benedict, Mead, and Bateson were not the only anthropologists interested in the issues gathered together under the rubric of "culture and personality." Ralph Linton, Cora Du Bois, and Clyde Kluckhohn collaborated with Abram Kardiner; Ruth Landes also did significant work. Among the British, Malinowski and others took up the psychological relations between individuals and society, or as Sapir and Mead would both have preferred to put it, the individual in society. The British and Kardinerian projects came to little success.

In the years after World War II, two separate anthologies appeared: Kluckhohn and Murray (1948) and Haring (1956),

the later being revised several times. Both Mead (1946) and Hallowell (1953) published assessments of the field.

Mead thought that the “and” in “personality and culture” had seduced many into a series of primarily methodological befuddlements—themselves more embarrassing than enlightening. Too often, practitioners forgot that the distinctions between culture and personality were matters of heuristic abstraction, useful only insofar as scholars applied them mindfully, avoiding thereby logical errors associated with a false concreteness. Like much of Mead’s thought from this period onwards, here she showed a decidedly Batesonian influence.

Hallowell (1953) recapitulated much of the best of Benedict, Mead, and Bateson’s advancements while mentioning these three almost not at all. By then, as Hallowell explained without putting matters quite this way, the influence of the *gestaltists*, brought into anthropology many years before initially by Mead during the summer of 1925 and elaborated on by others, had become something of a common sense. Part of a system of integrated wholes, culture, personality, and society arose together in real worlds not wholly or merely human. These three—culture, personality, and society—could not really be separated. Heuristically, as Mead (1946) would have had it, scholars could address those processes by which persons adapted to or adjusted to the social and worldly orders in which they found themselves; this had been Mead’s primary focus. Alternatively, scholars could examine culture as an organization of experience typical of a time and place; here Benedict and Bateson had shown a way forward. But Mead, Benedict, and Bateson were no longer within the circles around Sapir and his younger colleagues.

Even more important, by 1953, Benedict along with both Koffka and Lewin had been dead for several years. Bateson had given up anthropology to work among schizophrenics in Palo Alto, California. Mead still did not have a teaching job and, although she continued her busy schedule from her tower office at the American Museum of Natural History, it was some years before she would emerge, as it were, in her guise as grandmother-to-the-world. The circle of anthropologists and *gestalt* psychologists, Bateson, Benedict, and Mead being prominent members, proved to be too weak to persist.

At Harvard, the Committee on Social Relations, partly under Kluckhohn’s influence, began training a new generation of anthropologists, including David Schneider and Clifford Geertz, who would bring a change of emphasis from psychology to semiotics. Mead brought out two books keeping Benedict’s legacy alive, but Geertz and many others would find Benedict more congenial (for a criticism of Geertz on Benedict, see Young, 2005).

During World War II and subsequently, Benedict and Mead had pioneered studies of culture at a distance, but of these studies only Benedict’s 1946 study of Japan has endured. Mead became embroiled in a dispute over the Great Russians and swaddling. She was often misread

during this dispute, but the studies of national character floundered. Still, there was more to this than a lattice of scholars brought together by common interests and the accidents of biography. Perhaps, for a moment, there was the possibility for what can be called, without necessarily outlining all the specifics one might like, a structuralism not beholden to or dependent upon a theory of language, but rather on patterns of growth, reproduction, and decay that examined the juxtaposition of processes and the emergence therein of proportion. If the sort of history of anthropology presented here proves useful, perhaps such a structuralism might yet develop.

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GERMAN ANTHROPOLOGY

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Although the development of anthropology as a philosophical discipline is, at least in Germany, closely connected to the anthropological turn that took place in the 1920s and 1930s, there has been a long tradition of the usage of the word *anthropology* in German thought. The term was first used in the writings of Magnus Hundt in Leipzig in 1501, and later specified by Johann Gottfried von Herder, who prepared the prospect of the human being as a creature deficient by nature. Herder did not consider himself an anthropologist but, rather, a theoretician of human culture. His work has proved to be highly influential, especially for the evolution of philosophical anthropology in the 20th century.

Immanuel Kant

As one of the central disciplines of philosophy, anthropology was—in a strict sense—first established by Immanuel Kant. But Kant's famous reflections on philosophical anthropology are to be found not in his *Anthropology From a Pragmatic Point of View* (1798), but in his *Logik* (1800). For Kant, the field of philosophy, in this cosmopolitan regard, is founded upon the following four questions: (1) What can one know? (2) What shall one do? (3) What may one hope? (4) What is the human being?

The first question is answered in metaphysics, the second question in moral philosophy, the third question in religion, and the fourth question by anthropology. Kant

asserts that all these realms may well be subsumed under the name anthropology, because the first three questions refer to the last question.

In his *Anthropology From a Pragmatic Point of View* (1798), Kant also distinguishes between two kinds of anthropology. For Kant, physiological anthropology deals with the question, "What does nature make of a human being?" At the same time, pragmatic anthropology centers on the human as a freely acting being. It is exactly this distinction that gives rise to a philosophical anthropology attempting to derive a philosophical determination of humans from scientific knowledge. For Kant, this knowledge is primarily psychological. Hence, his *Anthropology From a Pragmatic Point of View* is, according to today's standards, a work on empirical psychology rather than on philosophical anthropology. However, it is beyond doubt that, with this distinction, Kant anticipates the central question of 20th-century philosophical anthropology: How does scientific knowledge of a human as a biological being relate to self-conception as an intellectual being?

This question gained a tremendous new relevance through the evolution of 19th-century life sciences (medicine, physiology, pathology, zoology, morphology, anatomy, embryology, cell theory, etc.). The anthropological question was thus intensified by the rise of the natural sciences in the 19th century. On the other hand, the critique of traditional German philosophy (Kant, Hegel, Fichte, Schelling, etc.) led to questioning the determination of humans as rational animals. The reduction of humankind

to a merely rational subject seemed to be insufficient without a theory of human behavior in the world. Thus, both the rise of the life sciences and the critique of traditional German philosophy led to the question of how, in a philosophical sense, the exceptional position of humankind within the biological world, and based on biological categories, could be justified.

The Anthropological Intermezzo: Philosophy of Life

In the late 19th and early 20th centuries, it was especially the philosophy of life that tried to establish a fact-based, but nonreductive, theory of man and human culture. In an ongoing debate with leading biological theories, philosophers such as Friedrich Nietzsche, Georg Simmel, Wilhelm Dilthey, Henri Bergson, and others have outlined a truly comprehensive theory of human culture under the conditions of a *biological* theory of the human species. It was, above all, the discipline of *Volkskunde* that played a tremendous role in the evolution of both *Lebensphilosophie* (life philosophy) and early philosophical anthropology.

The Foundation for Classical Philosophical Anthropology

The bloom of German anthropology is closely connected with the works of Max Scheler, Helmuth Plessner, and Arnold Gehlen. The main anthropological work of Scheler, *Man's Place in the Universe*, appeared in 1928. Plessner's work, *The Stages of the Organic and Man*, appeared the same year. Scheler, who had outlined his own anthropological concept in a lecture some years before, accused Plessner of plagiarism. While there are indeed numerous analogies in the problems, Scheler's and Plessner's given answers differ greatly.

Max Scheler

Both the philosophy of life (Bergson, 1896/1990, 1907/1983; Eucken, 1918) and Husserl's (1901) phenomenology deeply influence Max Scheler's anthropology. Scheler's work, *Man's Place in the Universe* (1928), can be considered the key text of modern German anthropology. Scheler starts with the essential difference between humans and animals; this is the exceptional position of man that derives from the fact that man, as opposed to animals, is the carrier of a mind. This primarily concerns the question of how humankind positions itself in the natural environment. According to Scheler, man is open to the world, which means that human beings, unlike every other group of animals, are not fitted into a natural environment in a strict sense; they are not determined by the limits of their environmental structure. This structure is, from a biological point of view, determined by a close interconnection between perception and action.

The German term for environment, *Umwelt*, means (in this sense) that every perception of an animal refers to a possibility to fulfill a certain set of actions and every action is determined by the limits of perception. In his work *Environment and Inner World of Animals* (1909), Johann V. Uexküll develops a comprehensive theory in which environment (*Umwelt*) is specific to every animal depending on its individual capability to perceive its world. All animals are equally and perfectly fitted into their environment by their capacity to perceive. This perceptibility is furthermore determined by their sense organs. As Scheler puts it, on the basis of Uexküll: Whatever an animal can perceive and grasp from its environment lies in the safe fences and limits of its environmental structure.

This close interconnection between perception and action, which is (according to Uexküll) characteristic for every animal in a biological sense, can be overcome by the human mind (*Geist*). Mind, in this sense, is a nonbiological determination, and Scheler goes so far as to describe it as contrary to every life—even human life. But the central point of Scheler's determination of human behavior is not only expressed in the human being as a possessor of a mind, but also in behavior toward the world, which is specified by world-openness.

According to Scheler, the close relation between the environment and a living being is, in the case of human beings, abolished and transcended. For Scheler, man is the animal able to react to the world in such a world-open way; this means that man's reactions are not determined by the stimuli of his world. Scheler clarifies this with the linguistic distinction between living in and having a world: An animal lives in an environment; man has a world. To stand in (and live in) an environment means, for Scheler, to be determined by the natural stimuli. That man has a world means, in opposition to that, the ability to distance himself from this stimuli; man is able to free himself from these stimuli. This freedom derives from his mind (*Geist*). Mind is the ability to act in a world-open way. This refers to a double way of openness: First, it means that the pool of possible reactions to a stimulus is not limited by instincts. Second, it means that the world itself is open to humans because it is not limited by individual perceptibility. An animal can react only to stimuli that are perceivable by its sense organs. Humankind, in contrast, has a principally unlimited ability to perceive thanks to their technical equipment.

Hence, the technical culture abets for Scheler one of the main accomplishments of mind: the ability to objectify. Objectivation means, as Scheler puts it, to convert the centers of opposition into centers of objectivation. Thus, objectivation is the main activity of the human mind. According to Scheler, every living creature is an individuality, and therefore represents a self-limiting, ontological center. Accordingly, this self-limitation is nothing specific to humans, but concerns all living creatures. Yet, only humans are able to objectify themselves, thus constituting a person. To be a person means, according to Scheler, to transcend the antagonism of organism and environment.

It is interesting that Scheler locates the difference between man and animal in a different spot than contemporary biologists, as did (at that time prominent) Hans Driesch (1929). For Driesch, the essential difference lies between living creatures and nonliving things. For Scheler, the line of demarcation runs between living creatures (animals) and *persons* (humans) objectifying their environment, thus creating a world: The essence of man and what could be called his “exceptional position” stands highly above what is called intelligence and the ability of choice. Also, it would never be reached even if this intelligence and ability of choice were imagined as enhanced to any given measure, even to the infinite. It is therefore neither intelligence nor freedom of choice that constitutes the exceptional position of humankind, but rather humans’ special way of behaving toward their world. Scheler even goes so far to state that there is only a gradual, not a substantial, difference between a smart chimpanzee and Edison, if the latter is considered solely as a scientist.

This somewhat surprising statement coincides with Scheler’s view on whether or not it is legitimate to attribute some kind of intelligence to some groups of animals. Scheler answers this question in the affirmative, stating that not every accomplishment is to be explained by instincts and associative processes. On the contrary, Scheler attributes some kind of practical intelligence to some groups of animals by defining intelligence in the following way: A creature acts intelligently if it fulfills, without trying, a behavior in a new way, that is, neither a typical nor an individually specific situation independent from further attempts to solve a hormic determined task. In order to corroborate this hypothesis, Scheler affirmatively refers to the contemporary work of the German psychologist Wolfgang Köhler (1917), who illustrated in his highly regarded research that some kind of practical intelligence must be attributed at least to some anthropoids. Scheler agrees with this view, stating that in some cases, some of the animal’s acts are true acts of intelligence.

Nevertheless, in Scheler’s view, this is not an argument for an ethical equalization of man and animal. On the contrary, it shows that this difference is not found in intelligence capacities, but rather in man’s specific behavior, referred to previously, called world-openness. With this central concept of world-openness, Scheler expresses that the distinction between man and animal lies neither in their different capability of understanding, nor in their ability to fabricate tools, nor in man’s technological culture altogether. Rather, it is a different kind of behavior that discerns man from animal. This specific behavior is facilitated by man’s mind (*Geist*). According to Scheler, the principle mind is defined by this ability to dissolve from the organic bond.

Thus, mind, in Scheler’s anthropology, does not only refer to a cognitive capability, but also to humankind’s ability to put themselves outside the natural world. Thus, mind stands for Scheler outside the principle of life. With this statement, Scheler (1928) refers to a long tradition in the philosophy of mind in Germany. Unlike the later philosophy of mind, the former tradition focused on the question of how mind (*Geist*) relates to life. In Hegel’s (1807/1977) early philosophy, mind evolves from life just as it is the case in Schopenhauer’s

(1818/1966) philosophy of the will (to mention only two philosophers). On the other hand, there are philosophers such as Friedrich Nietzsche, Georg Simmel, and Ludwig Klages who claimed that the mind is opposed to life. Thus, when Scheler determines mind as a power standing outside natural life, he refers to this ongoing debate in Germany’s 19th-century philosophy. He rejects both what he calls the classical and the negative theory of mind. According to Scheler, the former theory claims that the cosmos is built in a way that the higher forms—from *materia bruta* up to divinity—are at the same time the more powerful ones. In opposition, the negative theory of mind claims that all the culture-building activities of humans derive from their negation of the natural world. Hence, according to the negative theory of mind, this negation is the real culture-building power.

Scheler rejects both competing theories of mind. According to Scheler, mind as an independent anthropological and metaphysical factor owns no power and activity at all; yet, contrary to this, the mind does own substance and laws but no original, owned power. Thus, the activity of mind consists in the negative act of constraining and at the same time directing the natural drives. To denominate the negative theory of mind, Scheler refers to Buddha, Schopenhauer, Sigmund Freud, and the German anthropologist Paul Alsberg. It is especially Alsberg, who has, in his book *The Mystery of Humankind* (1922), developed a theory of supercompensation in order to explain the specific biological configuration of human beings. Scheler refers to Alsberg’s work in order to affirm his position critically. According to Alsberg, the human mind is nothing but a surrogate for the insufficient adaptation to the natural environment. Humans lack prehensile feet, claws, coat, eyeteeth, and many other features. In order to compensate these naturally given deficiencies, humans switch off, or rather disconnect, their organs from the Darwinian struggle for life by using tools, language, and mental concepts instead. Thus, the so-called mind compensates or, rather, as Scheler puts it with regard to the Austrian psychologist Alfred Adler (1956), overcompensates it. With this affirmative reception to Alsberg’s theory of insufficient organic adaptation of humankind, Scheler puts forward one of the central points of philosophical anthropology: The lack of natural adaptation to the natural environment is compensated or rather overcompensated by some mental power, such as mind (*Geist*).

Scheler’s theory of mind in particular, and his philosophical anthropology in general, can thus be understood as a criticism of Darwinism. Insofar as the mind overcompensates the natural lack of human fitness, the principle of mind overrules and abrogates the Darwinian survival of the fittest. Thus, according to the main representatives of philosophical anthropology such as Scheler, Plessner, and Gehlen, the Darwinian rules are not generally applicable to the human world, and especially, to human culture.

However, this is not the only point in which Scheler criticizes Darwinism and biological anthropology. According to Scheler, mind cannot be objectified with any methods and therefore not with scientific methods. Mind is the only being that is itself unable to be objectified; it is pure actuality, and has its being only in the free execution of its

actions. In the same way, person is defined as a mere center of actions. According to Scheler, a person is nothing that can be objectified or subsumed under the categories of the natural sciences. A person, in Scheler's view, is a constellation of regulations, which means that a person is nothing substantial. A person consists in its actions and is nothing else but its actions. With this definition, Scheler develops a *radical nonsubstantial* view of personality. Personality is nothing else but a way to behave toward the world.

This specific behavior is further characterized as a form of ascetism. Ascetism means that humans are able to negate the real world as perceived by the senses. By virtue of this negation, humans are able to abolish the character of reality from the world; they are the animals that, by virtue of their minds, are able to behave toward their world in an ascetic way. Thus, the term *ascetism*, or ascetic behavior, does not primarily refer to a theological theory (although Scheler himself converted to Catholicism in 1899, and has since then avowed himself to the Catholic doctrine), but to a specific way of human behavior, as a central determination of anthropological theory.

This way of ascetism, as it refers to the specific way of mind-guided human behavior, could best be described as a second-order guidance. According to Scheler, mind relates to the animal drives in a twofold way: It blocks and deblocks them (*nonfiat* and *non nonfiat*). Thus, the regulation of drives brought about by the mind is based not on a suppression of these drives, but on the ability to behave oneself toward them. This is what Scheler means with his central concept of sublimation. Sublimation means, as Scheler explains with reference to Freud, that the hardware of lower energies is put into the service of the software of a more complex but powerless guidance.

According to Scheler, the main task of philosophical anthropology is to show how all activities and works of humankind evolve from this framework. Scheler has himself applied his anthropological theory to the fields of philosophy, sociology, and psychology.

Helmuth Plessner

In the reception of philosophical anthropology, Helmuth Plessner takes a somewhat exceptional position. After having stood in the shadow of Scheler and Gehlen for the longest time, the recent debate on anthropology in Germany is to a better part centered on Plessner's theory of the eccentric position of man. This might be due to the fact that Plessner's work shows, in an impressive way, that the anthropological reception of the concept of life aims toward founding a philosophy of culture on a comprehensive and layered organic model. This model was meant to contain approaches to a systematical unity of natural sciences on the one hand, and the humanities, especially philosophy, on the other.

Plessner studied both philosophy and biology. He attended Hans Driesch's lectures on medical science and zoology in Freiburg, Germany, and later changed to philosophy. Among his philosophy professors were the neo-Kantian Wilhelm Windelband and the phenomenologist Edmund Husserl. After having finished his professorial dissertation in

Cologne, he published works such as *The Unity of Senses* (1923) and *The Limits of Community: A Criticism of Social Radicalism* (1924). His main anthropological work is *The Stages of the Organic and Man: Introduction Into the Philosophical Anthropology* (1928). A political application of this theory appears in *Power and Human Nature: An Approach to the Anthropology of the Historical World-View* (1931). Under the National Socialist regime, Plessner was laid off because of his Jewish ancestry and had to emigrate to Turkey and the Netherlands, where he taught sociology. His highly regarded work, *The Belated Nation: On the Seducibility of the Civic Mind*, appeared in 1959.

Plessner's philosophical and sociological approach commits to biological science, in the sense that the empirical results apply to a theory of positionality, which explains the specific human behavior in culture, politics, and sociology. In the foreword to *The Stages of the Organic and Man* (1928), Plessner agrees to the characterization of Egon Freiherr von Eickstedt, who described Plessner's anthropological approach as biophilosophy centered on the position of man. In order to draw upon his philosophical anthropology, Plessner refers to biologists such as Lodewijk Bolck, Adolf Portmann, Hans Driesch, and Konrad Lorenz, to system theoreticians such as Ludwig von Bertalanffy, Erwin Schrödinger, and Nehemiah Jordan, as well as to neo-Darwinians such as Theodosius Dobzhansky and August Weismann.

Plessner states that the theory of humanities needs a philosophy of nature. But this reference to the philosophy of nature is not to be understood as a speculative reflection on the true character of nature and life in general, as undertaken by the idealistic philosophy of nature (e.g., Schelling and Hegel, but as a reflecting adaptation of the given empirical results of life sciences). At the same time, Plessner strongly rejects his teacher, Hans Driesch. Driesch's neovitalism claimed that life processes are not to be explained by physical or chemical analysis, but only by a factor called *entelechy*, which, according to Driesch, is made inaccessible to verification by the natural sciences. This vitalism ignores, according to Plessner, the interim development of the life sciences.

Plessner's central anthropological concepts, namely the eccentric positionality and the double aspectivity of life, reflect this more affirmative attitude toward the natural sciences. The double aspectivity of life refers to the fact that the principally divergent outside-inside relation characterizes living creatures. Thus, to be alive means to stand in and relate to this perpetual relation between inside and outside.

This double aspectivity shows, first and foremost, in the morphogenesis of creatures: The vital morphogenesis is as an autonomous, automorphic one to be contrasted with the dead one which is heteronymous, heteromorphic. With the term *vital morphogenesis*, Plessner refers to one of the most influential disciplines within early 20th-century psychology attempting to describe perception (in contrast to behaviorism) as a holistic process. Thus, by referring to this discipline, Plessner describes his theory of life as a specific, holistic phenomenon.

The exceptional position of creatures derives from their special behavior to their limits. Creatures are, according to

Plessner, limits actualizing bodies, which primarily means that the limits of the body belong to this very body itself. The body is its own and in this regard it is against the self and the other. From this, to be put against the environment derives the positional character or the positionality of the organic.

The determination of creatures as “limits actualizing” implies, according to Plessner, the ability to put itself at a distance. Every living creature is able to distance itself from itself. This ability is not specific to humans, but to all living creatures. The determination specific to human life lies in the term *eccentricity*. Whereas the life of the animal is centric, the life of the human is, without being able to break through this centering, eccentric. Eccentricity is the form characteristic for humankind’s positioning against the surroundings. Although Plessner does use the term *surrounding* instead of environment, it is quite clear that, even though he avoids using the biological term (environment), this theory has strong biological implications. Whereas every animal stands in and is centered within its environment, humans are able to transcend this centeredness by means of his reflection. This center of positionality is distant from itself: A human, as the living thing that is put in the middle of its existence, knows this middle, experiences it, and is for this reason beyond it. This means that humans do not have a natural environment, but instead they make their own surrounding. Placeless, timeless, put into nothingness, the eccentric life-form creates its own ground. Only insofar as this life-form creates it, it has ground, and is carried by it.

Here we have a conception very similar to existentialist theories of man. If, for example, Martin Heidegger (1927/1962) mentions that man is (in a very contingent way) thrown into the world, then the positions seem to be very similar on a first glimpse. (The same seems to be true for Sartre and Camus’s existentialism.) Yet, these existentialists consider themselves (and, in fact, are) strictly non- or antinaturalist thinkers. Even though they agree to Plessner’s point that there is no such thing as a given human essence, all of the mentioned existentialist thinkers do (despite their other diversities) in fact deny that biological research can add to the true knowledge of man.

Plessner refers in detail to Heidegger’s criticism. According to Plessner, the crucial point lies in Heidegger’s methodical primacy of the existence. This would imply (according to Heidegger) that the philosophical analysis of existence antecedes the biological analysis of nonhuman life-forms. Thus, the analysis of life would only be accessible by analysis of the reflecting entity. But even though humans *are* this very eccentric life-form, they remain animals from a biological point of view. Therefore, Plessner’s inquiry takes the opposite direction, as he explains in his annotations to his aesthesiology of mind: As long as humans are not understood as living forms of existence in their nature-grown way and are not submitted to a pre-empiric (i.e., not scientifically attached inquiry), they cannot hope to be above raised questions, such as which layers of the entity they stand in essential coexistence with and how they, as a life unity, have to experience themselves and the world in order to receive a comprehensive answer.

Plessner’s aesthesiology of mind aims at examining humankind as a personal life unity in all layers of his existence. The analysis of culture follows this examination and results from it. According to Plessner, three anthropological laws characterize culture: (1) the law of natural artificiality, (2) the law of mediated immediacy, and (3) the law of utopian place:

1. *The law of natural artificiality.* Man only lives insofar as he leads a life. This principle means, in Plessner’s interpretation, that man has to produce his own existence by means of culture. Thus, culture is understood as man’s distancing from natural liveliness. Plessner explains this artificiality as follows: As an eccentric creature not being in equilibrium, placeless, timeless standing in nothingness, constitutively homeless, he has to become something and create his equilibrium. This implies furthermore a criticism of the so-called naturalist-vitalist explanation of culture, according to which culture is the outcome of a vital climax as assumed by Friedrich Nietzsche (will to power), Georg Simmel, Alfred Adler, and others, most notably radical political tendencies (e.g., in the late 1920s, and early 1930s, emerging National Socialism). With reference to the latter, Plessner states that although the vital climax seems to celebrate orgies in favor of striving for power, it must not be made the foundation for the origin of culture; instead, it must itself be understood as a symptom of the eccentric positionality. Here, it becomes clear that Plessner tries to invent, with this concept of eccentric positionality, a truly fundamental law of human existence. At the same time, Plessner understands his theory of eccentricity as a criticism of the Darwinian theory of culture. According to Plessner, all of these mentioned theories lack a sufficient explanation of culture. Because this *vis a tergo* explanation has proven to be insufficient, we need, therefore, a *vis a fronte* explanation to explain human culture from his eccentric positionality.

2. *The law of mediated immediacy.* This second law points in a similar direction, but stresses more the aspect of communication, expressivity, and sociability. According to Plessner, every technical invention is an example for expressivity; it is an encounter of man and object. The inventor does not find something new; rather, he *expresses* what is already there. But the expressivity derives from the human necessity of expression and therefore from the eccentric positionality itself. This necessity is not only a personal-subjective need but also derives directly from this very fundamental law of human nature. Insofar as man stands in this twofold way toward his world, he despairs of his situation. This despair leads to the necessity of expression. According to Plessner, man expresses himself not because he is lonely or because he needs his fellow humans in order to survive, but because he despairs of his eccentric situation. Only by means of this expressivity can man become a *zoon politikon*—a social creature.

3. *The law of utopian place.* This law transfers the aforementioned determinations to the question of God and belief. Like Scheler, Plessner argues in favor of a theomorphism according to which man, despite his eccentric positionality or

rather because of it, is reliant on God for arranging himself in the world. His eccentricity puts him into an indissoluble conflict. His place is utopian, but at the same time he craves a *definitivum*. The eccentricity of his life-form, his standing in nowhere, and his utopian position force him to aim his disbelief of divine existence against the unity of the world.

Arnold Gehlen

Arnold Gehlen is commonly considered a very distinguished, yet controversial, anthropologist because of his conservative attitude and his attitude toward National Socialism. Gehlen studied philosophy, history of arts, and philology in Leipzig and Cologne. Influenced mostly by Max Scheler, Nicolai Hartmann, and Hans Driesch, Gehlen received his doctoral degree with Driesch, and in 1930 his habilitation degree with a phenomenological work. He then taught as a private lecturer in Leipzig. In 1933, Gehlen joined the National Socialist party in 1933 and was an active member until 1945. He taught philosophy, psychology, and sociology at the universities in Frankfurt, Leipzig, Königsberg, Vienna, and (after an only 2-year compulsory break) in Speyer and Aachen. Gehlen is not known to have been an anti-Semite but he undoubtedly used his membership in the National Socialist party in order to pursue his career goals.

After World War II, Gehlen was one of the leading figures in both philosophy and sociology. His theory of institutions has been very influential, just as his moral theory (*Moral and Hyper Moral*, 1969) and his philosophy of technology (*The Soul in the Technological Age*, 1957) have been. Gehlen's main anthropological work is *Man: His Nature and His Position in the World* (1940). This anthropological theory is at the same time the key to Gehlen's philosophy of culture, morals, and technology. For Gehlen, culture in general is an anthropo-biological concept.

This refers to Gehlen's central anthropological concept that determines a human as a creature deficient by nature. As mentioned above, this idea (but not the expression itself) can be traced back to Herder, but it is Gehlen who brings this concept together with the question of humankind's exceptional position. Gehlen explains that this exceptional position is closely linked to humans' deficient biological configuration. In opposition to Scheler, Gehlen interprets humankind's world-openness as a biologically determined openness of human actions, which is mainly determined by the fact that both men and women are unspecialized regarding their bodily organization and their instincts. According to Gehlen, humankind's morphological setup is mainly determined in an essentially negative way, namely by shortcomings that are, in an exact biological sense, to be characterized as nonadaptive-ness, and nonspecializedness as primitivisms (i.e., as something undeveloped). According to Gehlen, all of these shortcomings (lack of pelage, of escape and attack organs, but also the instinctive weakness and the long need for protection) are compensated and overcompensated by human culture.

To corroborate his theory, Gehlen refers to the contemporary biologists Driesch, Uexküll, Lorenz, Bolk, and others. Gehlen's concept of an anthropo-biological determination of

man implies that man's deficient bodily configuration needs to be seen together with his very complex and complicated inwardness. According to Gehlen, all former anthropological theories have failed because they ascribed specific human characteristics only to particular properties. In opposition to this, Gehlen tries to think man's deficient bodily configuration together with his determination of culture. Gehlen's central concept is exoneration. According to Gehlen, exoneration is a key concept of anthropology. Culture exonerates man from the biological necessities; it removes his burden. For Gehlen, man is a free being because his actions are free. But this freedom emerges from exoneration, namely the liberation from biological forms of behavior and fitness. In this sense, exoneration means that the concentration in human behavior falls increasingly into the "highest," namely the most effortless, only adumbrative functions—surely the conscious or mental ones.

This activity of condensation accomplished by consciousness takes place in the symbolic fields of viewing, speaking, and imagination that allow for a progressive indirectness of human behavior by reducing the stimulus overabundance to a minimum, but a minimum of highest potential developability. Hence, exoneration distances humans from nature, enabling culture and a cultural community. Consequently, Gehlen's concept of exoneration exhibits a deeply dialectic structure insofar as every exoneration must be seen, at the same time, as an additional burden because it inevitably detaches and thus alienates humans from nature.

One outcome of his theory of exoneration is Gehlen's concept of background satisfaction. It means that in higher evolved cultures, the satisfaction of human wishes and needs becomes durable and stable, and is thus displaced in the background in a twofold way: The satisfaction does not need to be conscious, and it does not need to take place in singular actions. The consciousness that the satisfaction of a need is possible at any time we call background satisfaction, whereupon, in the extreme case, the suppositional need does not transfer into an action-positioning actuality.

Thus, Gehlen's concept of background satisfaction is a central element of his theory of institutions. For Gehlen, the freely acting position of man is the main fact of human existence. But according to Gehlen, institutions mainly facilitate this freedom. On the other hand, the allegation cannot be dismissed that Gehlen's determination of human existence results in an apologetic justification for existing institutions. This conservative and apologetic attitude has brought him many criticisms from other philosophers.

Conclusion

After its foundation through Scheler, Plessner, and Gehlen, philosophical anthropology in Germany has become one of the most regarded disciplines in the academic community. It also plays an important role in contemporary pedagogic theories. In an ongoing, rivaling debate with existentialism, many philosophers and biologists have managed to outline an up-to-date framework for a philosophical theory

of humankind that tries to examine and evaluate its special (deficient) biological configuration, its ability to build a culture, and its exceptional position in the world.

One of the most quoted anthropologists is the Swiss biologist Adolf Portmann. He has coined the phrase “extra-uterine early year.” According to Portmann (1944), a newborn human is unfinished and needs, compared to other animals, to catch up on the individual evolution in his or her first year on earth. Thus, the human being is a “secondary nidicolous bird.” Portmann has, in his books and also in many popular articles, tried to make this theory known not only in the academic field but also among the nonacademics.

Ernst Cassirer conceptualized a theory of man based on his cultural philosophy. According to Cassirer (who also refers to the biological works of Uexküll), the exceptional position of man is characterized by his ability to write forms. With this determination, Cassirer applies his philosophy of symbolic form to an anthropological theory. Only man is able to build and to understand (symbolic) forms. Especially in his work *An Essay on Man* (1944), Cassirer outlines this anthropological theory of symbolic forms. The philosopher Josef König (1937) established a theory of a Hermeneutic logic in which the anthropological aspect (determination of man's position in the world) plays a central role.

The neediness of man is also the central building block of Wilhelm Kamlah's anthropology. Kamlah (1972) understands this neediness not only as a biological determination but also as an ethical one. The insight that one's fellow humans are needy creatures summarizes for Kamlah the practical fundamental norm of his moral philosophy and ethics.

Based on the cultural theory of Georg Simmel, the Jewish philosopher Martin Buber (1923/1958) evolved a dialogical anthropology. The central category of this dialogic is the between that actualizes in the encounter of “I” and “you.” Buber's dialogical philosophy sees the existence of man in two different relationships: I-it and I-you. Whereas the former is the regular, all-day relation to the (natural or cultural) environment, the latter is the central category of encounter in which everybody manifests all of their essence. For Buber, this encounter of I and you is only possible because a dialogue between man and God is possible.

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VALUES AND ANTHROPOLOGY

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What is the significance of the work done in anthropology? What are the unique contributions of anthropology to science and to the humanities? What principles, ideas, and practices guide the practice of anthropology? Why is it important to continue to do research in anthropology?

The answers to those questions frame what is important about anthropological work. They also highlight the contributions of anthropology to humanity and provide good reasons for continuing to do anthropological work. This chapter will summarize some answers to those questions and demonstrate that anthropological inquiry is an important human activity guided by core principles, ideas, and practices, and that has contributed significantly to science and the humanities, and further, that there are good reasons for continuing to do the work that anthropologists do.

Early anthropologists grounded the study of humanity, that is, anthropology, within the developing philosophies and methods of science in the 19th century. So, it will be necessary to briefly survey how the discipline emerged from the scientific thinking of that time. After that, a series of topics related to the philosophies and methods of science will be covered to illustrate the value of those philosophical perspectives and methods. Then, some of the major concepts, ideas, and methods of anthropology will be discussed. Finally, various contributions of the subfields of anthropology will be covered,

followed by a few comments on the future and continuing importance of anthropology.

Early Anthropology

Anthropology in the 19th century developed as an extension of important and successful work then being done in the “natural sciences,” and was given further impetus by the colonialism of various nations, and by the westward expansion of the United States. While it is true that anthropology has sometimes served the political interests of various governments, that aspect of the discipline will not be covered here. Regardless of how anthropology may have been—or is—involved in Western colonialism, there remains a philosophical, scientific, and humanistic dimension to anthropology that—independent from politics—seeks to understand what it means to be human.

Scientific investigations of the 19th century typically involved collecting and categorizing large volumes of information about the world, and, from that information to then construct explanations, that is, theories, for why the world is the way it is. In 1833, Charles Lyell (1797–1875) wrote *The Principles of Geology: Being an Attempt to Explain the Former Changes of the Earth's Surface by Reference to Causes Now in Operation*, the title of which illustrates well the goals of the Victorian scientists who sought to observe the world and then to explain it in terms

of those observations. Lyell's work influenced that of Charles Darwin (1809–1882), whose investigations as a naturalist aboard the HMS *Beagle* from 1831 to 1836 led to the publication of *On the Origin of Species by Means of Natural Selection* in 1859. The observations and botanical and faunal collections that Darwin gathered during his time on the HMS *Beagle* resulted in a proposed explanation for why life varies as it does and how new varieties of life can emerge. Astronomers, in the 18th and 19th centuries, discovered the planet Neptune, and began to systematically catalogue the objects in the heavens. Friedrich Wilhelm Herschel (1738–1822) discovered the planet Uranus and two moons of Saturn, and he contributed significantly to the theoretical understanding of the universe and to cataloging other astronomical phenomena. In chemistry and physics of the 19th century, fundamental discoveries were made about the nature of matter and energy and their interaction. It seems inevitable that any scientific investigation into humans would follow the patterns already established in other academic disciplines, and that is exactly what happened.

Some of the earliest anthropological works that adopted methods similar to other disciplines and that take a scientific approach to the study of humans are *The League of the Ho-de-no-sau-nee or Iroquois* (1851/1922), *The Indian Journals 1859–62* (1959), and *Systems of Consanguinity and Affinity of the Human Family* (1870/1997), all by Lewis Henry Morgan (1818–1881). *The Indian Journals* was first published in 1959 from a collection of Morgan's papers, edited by Leslie A. White. *The League* is a fairly detailed ethnography that surveys politics, religion, dancing, games, kinship, and other aspects of the Iroquois culture; *The Indian Journals* consists of miscellaneous notes that Morgan took during his travels from 1859 to 1862, which record whatever cultural and linguistic information he had access to and that he had time to record; *Systems* is an impressive compilation of kinship-system terminologies sampled from cultures all over the world and an analysis of that data.

The scientific approach of gathering data, looking for patterns, logical analysis, and suggesting explanations are found throughout Morgan's work, but are, perhaps, best exemplified in the three sources just given. Clearly, Morgan is trying to systematize the study of humans in a way similar to the way that other academic disciplines of the time did their work. In fact, this effort to make humanity the focus of scientific study during the 19th century marks the beginning of a significant shift in how humans perceive themselves in the world. Up to that time, at least in the Western world, humans primarily thought of themselves as separate from nature. Anthropological inquiry in the 19th century began to understand humanity as a part of nature, and just as amenable to objective, scientific study as anything else. Anthropology changed the place of humans in the universe.

This scientific approach to the study of humanity pervades the literature of early anthropology in the late 19th to

early 20 centuries. Herbert Spencer (1820–1903), in an 1860 essay titled *The Social Organism*, suggested that human societies can be understood analogically as living organisms (McGee & Warms, 2008, pp. 11–27). This, undoubtedly, was an effort to apply the recent successes of evolutionary theory in biology to anthropology. Even more transparent is Sir Edward Burnett Tylor's (1832–1917) two-volume *Primitive Culture* (1871), the first chapter of which is called "The Science of Culture." It is not necessary to give an exhaustive listing of examples, but a few other early writers and works of note are: Marcel Mauss's (1872–1950) *The Gift* (1925/1967), Émile Durkheim's (1858–1917) *Rules of the Sociological Method* (1895/1982), and Lucien Lévy-Bruhl's (1857–1939) *Primitive Mentality* (1922/1978).

Of course, it must be mentioned that the values and overall approach to anthropology were significantly shaped by the work of Franz Boas (1858–1942). Boas argued for recognizing four different subfields in anthropology: prehistory (archaeology), linguistics, physical (biological) anthropology, and cultural (social) anthropology (McGee & Warms, 2008, p. 118). He also trained other influential anthropologists, such as A. L. Kroeber, Ruth Benedict, Margaret Mead, and Edward Sapir. His influence has been pervasive in anthropology. His scientific approach led him to reject race as a determining factor in cultural development (McGee & Warms, 2008, p. 119). In this, he was ahead of his time.

Early anthropologists sought to establish their discipline within the larger framework of scientific thought and research. The goal was to establish a science of humanity that would generate a particular kind of epistemology, or body of knowledge, that would lead to a better understanding of and appreciation for what it means to be human. Of course, there are other epistemologies—other ways of "knowing" humanity. Art, poetry, narrative literature, music, philosophy, and theology all suggest ways to know various aspects of the human experience. Science, however, offers an approach that transcends and subsumes those other epistemologies and subjects them to analysis within a larger context. The resulting "scientific perspective" has positively contributed to an understanding of and appreciation for humans and human behavior over the last century and a half in anthropology.

Anthropology as Science

Anthropology is sometimes described as a science and sometimes as one of the humanities. In fact, anthropology programs are located in a variety of departments across colleges and universities in the United States, usually depending on the subfield of anthropology that is being emphasized. Anthropology is probably best understood as both a science and as one of the humanities, with the former perspective philosophically subsuming the latter. There are, however, anthropologists who question whether

or not it is possible to apply the scientific method in some aspects of anthropological research.

J. T. O'Meara (1989), in an article titled "Anthropology as Empirical Science," asserted the value of an empirical approach for the study of human behavior. He refutes the claims of those who suggest that because much of human experience is subjective that the scientific method is inapplicable. Concerning the idea that the study of humans can only be done by subjective interpretation instead of by the scientific method, he concludes as follows:

While these arguments contain important observations concerning the difficulty of acquiring knowledge of human affairs, their conclusions are unnecessarily extreme, being largely based on overstatements and misunderstandings by both science advocates and their interpretive critics. (O'Meara, 1989, p. 366)

Pierre Bourdieu also sees the value of maintaining a scientific approach in anthropology. In *Outline of a Theory of Practice* (1977), Bourdieu suggested that "third-order knowledge" can be derived from both the objective (i.e., scientific) and subjective aspects of human phenomena (p. 4). As an example, he describes the differing explanations of gift exchange offered by Marcel Mauss and Claude Lévi-Strauss. Mauss's explanation is described as phenomenological, that is, a subjective explanation; Lévi-Strauss's explanation is that of an objective observer outside, looking in, positing a mental principle that governs the practice. In this example, Bourdieu suggests people who have some freedom to manipulate the system act upon both the objective and subjective aspects of gift exchange (pp. 5–8). It is in the interplay between model (objective), meaning (subjective), and practice (the actions of people) that the explanation of human behavior is found. The scientific, or objective, perspective is an essential component in Bourdieu's theory.

In June 2002, the *American Anthropologist* published a Special Centennial Issue that contains an article by Susan Trencher titled "The American Anthropological Association and the Values of Science, 1935–70." In it, Trencher concludes, "Despite differences in time and circumstance, the position of anthropologists as articulated through the AAA in the 1930s through 1970 . . . was that anthropology is a science" (2002, p. 459). Of course, in the same passage, she is careful to point out that there is a great deal of variation in "research, methods, practice, professional responsibilities, and ultimately ethics" (p. 459). Those observations also seem to apply to anthropology from 1970 to the present.

The origins of anthropology are rooted in science, and anthropology continues to remain a scientifically oriented discipline. The fact that the methods and theories of anthropologists are subjected to constant critique and analyses is, itself, evidence of a scientific approach, which by its very nature, must be introspective and self-evaluatory.

Value of Science

What is meant by a scientific approach? What is gained from a scientific perspective?

A scientific approach uses the scientific method to construct a body of knowledge about things in the world and an understanding of that knowledge. In the case of anthropology, humanity is the object of the study. To do this, the scientific method employs a number of underlying philosophical assumptions that systematize the method and the knowledge it produces. In other words, the body of knowledge generated by the scientific method is framed within a set of assumptions and principles that exclude some ways of knowing, which, again, does not mean that such other "unscientific" ways of knowing are unimportant.

One important philosophical perspective underlying the scientific approach is that the world can be perceived and measured by observations through our senses. This idea is called *empiricism*. Another perspective is the assumption that the observable natural world and natural processes are the only legitimate focus of the scientific method. This idea is called *naturalism*. Empiricism and naturalism limit the accumulation of scientific knowledge to those things in the natural world that are observable and measurable by anyone. Consequently, the validity of scientific knowledge can be established through repeated observations and measurements.

In addition, the scientific method involves the formulation of hypotheses and the testing of the explanatory success of those hypotheses by gathering additional research data. Thus, scientific knowledge is constructed over time through a dynamic process of hypotheses formation and testing, and data collection that eventually results in the acceptance of theories, which are hypotheses that continue to be successful in explaining and incorporating new data.

So, what is gained from a scientific approach?

While it is true that there are ways of understanding the world that are not scientific, such as in religious cosmologies, there are advantages to the scientific approach, which make it more useful, in many ways, than other epistemological approaches.

Scientific knowledge consists of data that can be verified by other researchers. Scientific research is performed under the scrutiny of a scientific community. Also, scientific conclusions and interpretations are subject to revision in the light of new data. These three things—validity through verification, social accountability, and the constant evaluation and revision of theory—generate a body of knowledge about the world that is objective. Such a body of knowledge in anthropology has been useful in applied areas such as forensic anthropology, medical anthropology, and business anthropology. The scientific approach in cultural anthropology has also been successful in describing and explaining a great deal of the behaviors manifest in political organizations, economic systems, religious beliefs and behaviors, and kinship systems.

In anthropological archaeology, the scientific approach has helped to reconstruct the social history of humanity. In linguistic anthropology, we have come to better understand the social complexities of language and the relationship of language to culture. Finally, in biological anthropology, we have achieved a sophisticated understanding of human origins, human diseases, and human genetic structure.

It is doubtful that a nonscientific approach would have achieved any of these significant discoveries and contributions.

Value of Reason and Logic

Reason, which is our capacity for various kinds of analytical thought, and logic, which is a type of analytical thought, guide the construction of scientific knowledge in anthropology. The application of a general ability to reason and the ability to apply a systematic method of logic are two important characteristics that separate science from pseudoscience. For example, there are some popular writers who suggest that the Egyptian pyramids, or other ancient monuments, could only have been built with the help of extraterrestrial beings who visited the earth in the past. On close examination, however, it is easy to see that the actual archaeological and historical evidence cannot support their hypothesis. Their argument rests on faulty assumptions, biased data selection, false logical premises, and false conclusions. They fail to reason appropriately across the data, and then derive premises from their faulty reasoning, which they then insert into the forms of logical argumentation. Of course, such an approach precludes any hope of successfully arguing to any reasonable conclusion.

Archaeological and historical sources reveal that the pyramids in Egypt are associated with a number of ancient rulers. Burial artifacts, associated funerary temples, hieroglyphic texts on the walls of some chambers in some pyramids, and other monuments clearly indicate that the pyramids were tombs intended for ancient Egyptian rulers. In addition, there are some hieroglyphic depictions of exactly how the ancient Egyptians managed to move large blocks of stone, huge stone statues, and obelisks. On the water, they moved these objects with barges. On land, they did it with sleds, rollers, a little lubrication, and a lot of people pulling with ropes. A reasoned assessment of the data must conclude that ancient humans built the pyramids for the purpose of burying their rulers. From this data, we can make many valid, logical inferences about the social structure and economy of ancient Egypt. This kind of reasoned approach, which does not make unwarranted assumptions and that incorporates all the empirical data, is able to successfully employ logical analysis to further our understanding.

On the other hand, the pseudoscientific approach begins by making the unwarranted assumptions that extraterrestrials are real and that they have visited earth. Neither assumption is demonstrable. Before someone can reasonably

claim that a picture on an ancient object represents an extraterrestrial or its spaceship, it must first be demonstrated that such things are real—by discovering an extraterrestrial's body or spaceship. After all, archaeologists have the mummies of pharaohs, so we can reasonably be assured that pharaohs are real, but the same thing cannot be claimed for extraterrestrials. Therefore, the only reasonable and logical conclusion is that pharaohs, not extraterrestrials, built the pyramids.

In anthropology, all the different theoretical approaches recognize the value of reason and logic. Reason and logic give coherence to our scholarly efforts and enable the sharing of knowledge. Reason and logic also provide a basis for the comparison and evaluation of different concepts and theories. Consequently, the ability to think in a reasoned and disciplined way and the ability to logically analyze research data are important skills that must be mastered by the anthropologist.

Value of Concepts, Ideas, and Comprehensiveness

From its very earliest years, anthropology has aspired to be comprehensive in its understanding of humanity. Every aspect of what it means to be human is considered as a possible focus of inquiry. Anthropologists look at the past, the present, and the future of humanity. They explore the biological, psychological, social, and linguistic aspects of humans. Anthropologists have studied art, literature, music, material culture, philosophy, theology, genetics, and a host of other subjects. Neither do anthropologists restrict themselves solely to a Western perspective. The comprehensive nature of anthropology makes it unique among the academic disciplines, which is probably why the general public usually has a difficult time grasping exactly what it is that anthropologists do. In spite of the breadth of the discipline, there are some key concepts and ideas that have emerged in anthropology that structure the discipline as a whole.

Some important concepts and ideas in anthropology have made their way into modern intellectual discourse across a number of academic disciplines. Perhaps the most significant and widespread of those is the concept of *culture*.

While it is true that there are many definitions of culture in anthropology and that no one definition is generally agreed upon, the concept of culture has proven to be extremely useful in framing the discussion of differences between human societies. Culture is a synthetic idea that is derived from the observation of a variety of human beliefs and behaviors. That is, culture is an abstraction that is inductively reasoned from the sum total of beliefs and behaviors that characterize a group. The concept of culture captures that characterizes a group. The concept of culture captures and expresses the complex and integrated nature of human social interaction within a group, and the concept of culture keys into two other important and closely related ideas.

The first of these ideas is the *holistic perspective*, which is the idea that everything in a culture is interconnected and that in order to study or know another culture, one must, as much as possible, look at everything. This idea causes anthropologists to eschew methods with too narrow a focus in the study of humanity, and to advocate methods that embrace all aspects of social life in a group. Essentially, the holistic perspective calls for an integration of knowledge from all four subfields of anthropology. Some anthropologists observe, however, that anthropology has failed to achieve this perspective. Robert Borofsky, in a survey of 3,264 articles published in the *American Anthropologist* from 1899 to 1998, found that “only 9.5 percent of the articles in AA bring the discipline’s subfields together in significant ways” (2002, p. 463). While it is the case that very few of the journal articles published in the *American Anthropologist* demonstrate collaboration across the subfields of the discipline, it would be hard to conceive of archaeological projects that do not draw upon sociocultural anthropology and biological anthropology; or cultural anthropologists that would not find knowledge of sociolinguistics useful. Much of the collaboration across subfields is more implicit than explicit, but there are some shining exceptions. For example, anthropologists from all four subfields produced the American Anthropological Association’s *Statement on “Race”* (1998).

The second of these ideas connected to the concept of culture is *cultural relativism*, which is the idea that one culture’s way of doing things is just as valid as another culture’s way of doing things, and that we must suspend our own culturally based moral judgments in order to effectively study another culture. This perspective helps create a level playing field, morally and ethically, for the objective study of another culture.

Finally, the concepts of *ethnocentrism* and *ethnicity* shape the way in which anthropologists think about cultural bias and identity. Ethnocentrism is the belief held by all human beings that their particular way of doing things, beliefs, and knowledge are the best or most correct. Understanding that everyone is this way is the first step toward overcoming this bias in ourselves and to seeing past it in others. This commitment by individuals to a particular cultural perspective is an important part of how we locate and identify ourselves in the world and in relation to others. Ethnicity is the idea that the identity of a social group within a culture is socially bounded and that these social boundaries and identities persist through time. Ethnic groups are biologically self-perpetuating social groups identified by themselves, and by others, as members of that group, whose community comprises a network of communication that is socially bounded by marriage practices and other social prohibitions and prescriptions, and whose identity and social boundaries persist despite the occasional movement of people across the social boundaries, such as through marriage, leaving the community, adoption, and so on. (For more information on this topic, a key source is

Frederik Barth’s *Ethnic Groups and Boundaries: The Social Organization of Cultural Difference* [1969/1998]).

The concept of culture, the holistic perspective, cultural relativism, ethnocentrism, and ethnicity are important concepts and ideas in anthropology. The principles and perspectives derived from these shape and guide the work that anthropologists do.

Value of an Evolutionary Framework

As discussed at the beginning of this chapter, evolutionary thinking profoundly influenced the work of early anthropologists, such as Louis Henry Morgan, Herbert Spencer, Edward Burnett Tylor, and others. Also, despite the fact that in the 20th century most cultural anthropologists, from Franz Boas on, have strongly rejected the application of the theory of evolution to explanations of culture change, evolutionary thought remains both useful and in some ways necessary to the study of social and cultural change.

It is true that the early unilineal evolutionary models, such as Morgan’s seven stages of cultural evolution presented in his *Ancient Society*—lower, middle, and upper savagery; lower, middle, and upper barbarism; and civilization—are deficient in that they make sweeping generalizations that fail to explain the variation of cultures in similar environments. However, the theory of evolution is still useful for understanding some aspects of social and cultural evolution. For example, looking at the big picture, human biological evolution and cultural evolution are clearly connected. The technological and social characteristics of Lower Paleolithic culture are manifestations of evolutionary processes—natural selection, genetic mutation, gene flow—on genetically diverse early hominids in central East Africa. The ability to manufacture Oldowan and Acheulean stone tools, to cooperate in hunting, and to live together in social groups are all adaptations brought about by the evolutionary pressures exerted on our early ancestors. Likewise, the cultural changes from the Lower Paleolithic to the Middle Paleolithic correspond to selection pressures acting on genetically diverse populations of *Homo erectus*. Middle Paleolithic Neanderthals are not only biologically different from *Homo erectus*, but their toolmaking skills and cultural behaviors differ, as well. And, finally, the cultural changes associated with the transition from Middle Paleolithic to Upper Paleolithic occur alongside the biological changes associated with the transition to anatomically modern humans. Evolution may not be able to provide a theory of culture, but the evolution of humans and the development of cultures are intrinsically connected.

The theory of evolution provides a way of understanding change. Over time, everything changes: biology, society, culture, and language. The theory of evolution not only clearly helps us understand the biological changes from early hominids to modern humans, but also, by metaphorical extension, it can be useful for talking about society,

culture, and language. Concepts like natural selection, adaptation, and gene flow can be used to help organize our thinking on those topics. Phrases like “genetically linked languages” and “cultural adaptations” are examples of this kind of metaphorical extension.

In terms of the holistic perspective, evolution is the large theoretical framework within which the scientific study of humans must articulate.

Value of Comparative Methods

One of the best and earliest examples of the application of the comparative method in anthropology is Lewis Henry Morgan’s *Systems of Consanguinity and Affinity of the Human Family* (1870/1997), which surveys 196 kinship categories in 39 languages in Table I (pp. 79–127) and 268 kinship categories in 80 languages in Table II (pp. 293–382). From this large body of data, Morgan was able to discern that all kinship terminology systems were reducible to just a few types. This book laid the foundation for the study of kinship systems in anthropology.

The idea of studying another culture in order to learn about our own is also an important aspect of the comparative method that shows up regularly in the work of anthropologists. Margaret Mead studied Samoan culture in the 1920s because she was interested in adolescence in her own culture. By looking at the transition from childhood to adulthood in Samoa, she hoped to shed some light on that process in Western culture. In a similar way, Bronislaw Malinowski (1922/1961) tried to make the practices and beliefs of the Trobriand Islanders comprehensible by showing that the way we do things is very similar to theirs. For example, he compares native sentiments toward the objects of the Kula trade as being just like British sentiments toward the crown jewels:

Every really good Kula article has its individual name, round each there is a sort of history and romance in the traditions of the natives. Crown jewels or heirlooms are insignia of rank and symbols of wealth respectively, and in olden days with us, and in New Guinea up till a few years ago, both rank and wealth went together. (Malinowski, 1922/1961, p. 89)

Indeed, plentiful examples of comparisons of our culture to other cultures are to be found throughout the ethnographic literature.

George Peter Murdock (1897–1985) established the Cross-Cultural Survey in 1937, which was a project to collect ethnographic information for the purposes of comparison. In 1949, the project, with funding from the Social Science Research Council, became the Human Relations Area Files (HRAF). Today, there are two databases in the HRAF collection: the *eHRAF Collection of Ethnography* and the *eHRAF Collection of Archaeology*. These databases are maintained at Yale University and can be accessed by members online.

The comparative method is a key element of the ongoing ethnographic and theoretical work in anthropology.

Cross-cultural comparisons give us insight into some common patterns of human behavior, such as kinship-classification systems. They give us insight into the relationships between different classes of patterns, such as correspondences between residence patterns and economic systems. They give us insight into the relationships between behavioral patterns and the environment, such as correlations between certain religious beliefs and the ecology of where people live. The comparative method makes it possible to see through the diversity of humanity to the things that collectively define us as human.

Value of Theoretical Models

Clifford Geertz’s *The Interpretation of Cultures* (1973) seemed, at the time, to herald the end of theory in ethnographic work. Every culture was to be rendered in “thick description” and that is all that could be done. Every culture was viewed as a unique set of integrated symbols and behaviors that could not be compared to those of other cultures. Coming to the end of the 20th century, at least in cultural anthropology, theory seems to have disappeared in ethnography. The functionalism, structure and function, and structuralism that permeated the ethnographic work of early to mid-20th-century cultural anthropologists had been criticized and rejected. In other areas of anthropology, however, the development of theory has persisted. Archaeology and biological anthropology, in particular, have continued to work on theories related to the origin of the state, the origin of food production, social stratification, the evolution and adaptation of human ancestors, and much more.

Cultural anthropology has, however, turned back to theoretical constructs in order to extend its work beyond just description. The work of Bourdieu has been influential in this regard. Bourdieu’s *Outline of a Theory of Practice* (1977), while criticizing traditional theory in anthropology, offers an alternative theoretical approach that links objective structures to the practices of people.

The construction of theoretical models is an important part of the scientific method. Such models reason across the data, linking it together in a logical fashion that results in some degree of explanatory adequacy. Collection of data and exhaustive descriptions of that data can only be a prelude to the proffering of an explanation.

Theoretical models also give us a basis and a framework for asking new questions, which can further extend our knowledge. Theory also gives us a common intellectual space within which to converse with each other. Theory is essential to practicing the science of anthropology.

Value of Relevance and Application

There are some anthropologists who view the work of anthropology as valuable in its own right, and the pursuit

of knowledge for the sake of knowledge. On the other hand, there are some who believe that the work of anthropology should be relevant to human concerns and have an applied component. Anthropologists who lean more toward the first view fear that the knowledge possessed by anthropologists could be used by governments or by others to cause harm to people, while those who lean toward the second view argue that the same knowledge could be applied to benefit people. Most anthropologists probably believe in both views to one degree or another.

It is true that many anthropologists are privy to sensitive information about the people they study and that anthropological knowledge could be used to manipulate people. Even so, it is also clear that similar observations could be made about other academic disciplines as well. Journalism, political science, and biology, to name a few, have the potential for causing human harm as well as providing human benefit.

As a result of the tension caused by these two views in anthropology, applied anthropology has taken a little longer to become prominent than otherwise would have been the case. Today, business anthropology, as well as forensic anthropology and medical anthropology, have achieved some status in the discipline and there are good graduate programs for their study.

The development of applied anthropology is a natural outcome of anthropology done as science, because, in addition to gaining knowledge and understanding the world, science seeks to solve problems through the application of that same knowledge and understanding.

Anthropological knowledge is both relevant and applicable to the world in many ways. Archaeologists, practicing cultural resource management, act as the conservators of our cultural heritage. Cultural anthropologists, who advocate for the human rights of the groups they study, use their knowledge to achieve moral and political goals. Anthropological linguists, who apply their knowledge to the teaching of social aspects of second-language acquisition, make important applications of anthropological knowledge that meet educational needs. Biological anthropologists working in forensics apply anthropological knowledge to serve human needs in law and justice.

Anthropology has a great deal to offer humanity. The formal recognition and practice of applied anthropology has come about only relatively recently in the discipline—in about the last 30 years. Over time, the effect of applied anthropology will undoubtedly increase. This will probably bring about changes within the discipline itself, especially as to how anthropology is taught, and where anthropologists will be employed.

Value of Ongoing Research

What follows is a brief overview of some contributions that have been made in various areas of anthropology:

biological anthropology, archaeology, sociocultural anthropology, linguistic anthropology, and applied anthropology. The list is certainly not exhaustive, but it does highlight some of the ways in which the product of anthropological research and knowledge has social and scientific value.

Biological Anthropology

Forensic anthropology is enjoying a great popularity today as a result of books, movies, and television shows in which the characters rely upon forensic science to resolve their plot conflicts. While most pop-culture examples of forensic science and forensic anthropology are highly exaggerated, there are real forensic anthropologists whose work has made valuable contributions to law enforcement. Clyde Snow is a forensic anthropologist of note who has worked at mass graves in Central and South America and in the former Yugoslavia to identify the remains of war crime victims. William Bass, who founded the Body Farm at the University of Tennessee in Knoxville, is probably one of the most well-known forensic anthropologists. His book *Death's Acre* (2004) tells the story of how the Body Farm—a laboratory for the study of the decomposition of human remains—came into being. The book also relates some of Bass's most notable forensic cases.

One of the most astounding accomplishments in the last century, and, perhaps, one of the greatest scientific accomplishments ever, is the completion of the Human Genome Project, which was completed in April 2003 (National Human Genome Research Institute, 2009). The Human Genome Project produced a complete map of the human genetic sequence. This genetic map has, in turn, stimulated a lot of further research, especially in medicine, that could not otherwise have been done. Many biological anthropologists participated in this effort.

Archaeology

In the United States and around the world, archaeologists continue to be agents of the discovery and preservation of the past. Archaeologists and archaeology organizations are active in lobbying for changes in the law for the purpose of protecting archaeological sites and artifacts, and some archaeologists are even active in law enforcement, as, for example, archaeologists who work for the Parks Service or for the U.S. Forest Service. Professional archaeologists play a key role in protecting our historical heritage and in helping to understand and appreciate it.

Early in the 20th century, when the Tennessee Valley Authority (TVA) began building dams in the southeastern United States, archaeologists undertook the enormous task of surveying and identifying archaeological sites and excavating those that were considered most important. Their efforts recovered enormous amounts of data and material that otherwise would have been lost forever. The same thing happened in other parts of the United States, at about

the same time, as dam building for flood control and power generation spread across the country's major watersheds.

Archaeologists are also involved in museums as curators of important cultural knowledge. In addition, archaeologists teach at a large number of colleges and universities. Being positioned in museums, and in higher education, means that archaeologists have both visibility and influence. The past can help us make decisions for the future and archaeologists play a role in passing on important culture knowledge.

Sociocultural Anthropology

Anthropologists who study contemporary societies and their cultures have developed very sophisticated theories about power and power relations, social stratification, ethnicity, religion, kinship systems, economic systems, and subsistence patterns, among other things. They have generated a huge body of ethnographic material, much of it in databases such as the HRAF. This huge body of literature alone is an incredible accomplishment that has yet to be fully mined for its total value.

One of the greatest accomplishments and contributions of sociocultural anthropology has been the advocacy of anthropologists on behalf of the people they have studied. Perhaps it goes a bit beyond a strictly scientific approach to practice any kind of moral advocacy for another group, but anthropology is also one of the humanities in the sense that anthropologists, as human beings, are aware of a moral responsibility to others. Many ethnographers have gone on to act as political advocates for the people they have studied. Others have even helped with development projects in the communities in which they have worked. A lot has been written about anthropologists and advocacy. A good starting place for examining this literature is an article by Samuel R. Cook (2003) that takes a look at the positive aspects, as well as the challengers, of advocacy by anthropologists working with Virginia Indians.

Linguistic Anthropology

Many contributions by linguistic anthropologists are more abstract than concrete, but no less important. Linguistic anthropologists have looked at important social issues and have examined the linguistic phenomena associated with them. For example, language plays a role in racism, as well as in sexism. They have also contributed a better understanding of language and identity issues, especially in the case of dying languages, and in attempts to restore languages.

In the 1950s and 1960s, Linguist Joseph Greenberg (1915–2001) sorted out the relationships among the languages of Africa, and classified them into four major groups. He also worked on classifying the Pacific and Native American languages. Though his later work was somewhat controversial, his earlier work with African languages has “become the basis for virtually all subsequent

treatments of the continent and its culture (pre)history” (Silverstein, 2002, p. 632).

Applied Anthropology

The category of applied anthropology usually refers to business, forensic, and medical anthropology, but is not limited to these. Each of the subfields discussed in this section has applied areas; some were discussed, such as forensic anthropology in biological anthropology, but there are others, such as contract archaeology and applied linguistics. Business and medical anthropology are types of applied sociocultural anthropology.

Business anthropology and medical anthropology have proven to be productive areas in applied anthropology. The full impact of applied anthropology on business remains to be seen, but there are a fairly large number of anthropologists who work as consultants in this area. There already exists an immense literature in anthropological publications and in business publications about business anthropology.

Medical anthropology has at least two peer-reviewed journals. The first is called the *Medical Anthropology Quarterly*, published by the American Anthropological Association on behalf of the Society for Medical Anthropology. The second is called *Medical Anthropology: Cross-Cultural Studies in Health and Illness*, published by the University of Lethbridge.

Future Directions

As technology allows us to handle more and more information in newer and more creative ways, the holistic perspective of anthropology will, no doubt, develop a clearer view of humanity, and in ways that are not yet possible. In turn, applied anthropologists will find more ways to use anthropology to serve human needs and to solve human problems. Already there are steps in this direction. Just to mention two, the growing eHRAF files, and the relatively new *AnthroSource* database, which has over 100 years of anthropological publications, are changing the way in which anthropologists do anthropology. In the future, anthropologists will be able to handle more information in even shorter amounts of time than is possible now.

Despite the technological innovations that will speed up and expand some aspects of work in anthropology, there will still be a need, maybe even greater than before, to keep the discipline centered on science and its core concepts, ideas, and values, in order to maintain the discipline's relevance and significance beyond its own boundaries.

Conclusion

From its early years, anthropology has worked toward a scientific understanding of and comprehensive appreciation

for humanity. In its pursuit of that goal, it has embraced methods, practices, concepts, ideas, and principles that have allowed it to make significant social and scientific contributions. Anthropology is continuing to develop as a science, as evidenced by an increasing amount of applied work. Anthropologists are also important advocates for the peoples and groups they study.

The future of anthropology looks bright, and technology is poised to open new horizons for the next generation of scholars. Anthropology will continue to significantly contribute to the solution of human problems and add to our deeper comprehension of humanity.

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HUMAN EXCELLENCE

Past and Present

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The word *excellence* is derived from the Latin word *excellentia*, and it means the quality of being extremely good. Human excellences could be defined as those human qualities that make a person outstanding, exceptional, superior, or, in one word, the best of one's kind in any field of human activities. Frequently, it is synonymously used with the word *virtue*, narrowly meaning moral excellence.

Historical and Cross-Cultural Approach

In this chapter, the accounts of human excellence will be elucidated in the history of human thought, from the ancient Greek and Roman time, through the Medieval Age and Early Modern Age, to the Modern Age and contemporary civilization. The historical approach provides a survey of the various views and concepts on human excellence, which were changing in time. By exploring these concepts, one will find out that there are some constant themes in the considerations of human excellence, despite the shifts in the historical contexts and circumstances. A historical approach will be combined with the cross-cultural approach, which implies a comparison of the accounts of human excellence in different cultures. Further, a cross-cultural approach offers a comparison of the accounts of human excellence in the Western tradition to those of China, India, the Islamic world, and Russia.

Archaic Greece

The Greek word for excellence is *arête* (plural *aretai*), which functions as an abstract noun derived from the adjective *good*, and means the quality of being good. Originally it was not only attributed to human beings, but also to inanimate things, human organs, animals, and so forth. A thing has *arête* if it performs its characteristic function efficiently. The *aretai* do not designate any single human feature, but those features making a person excellent. Thus, it was contextualized to mean competence in any field of military, political, athletic, and ordinary life.

Although the word *arête* rarely appears in Homer's epics, he was the first Greek author to depict it. He talks of a variety of *aretai*: *arête* of gods, women, children, even animals and body parts. Nevertheless, the paradigm of excellence is a man, or more specific, a warrior. His qualities are primarily courage, strength, competitiveness, and cunningness. These excellences are manifested in the actions aimed at honors, glory, and social prestige. The moral *aretai*, like nobility, dignity, and being humane, are not attributed to the Greek heroes, but to Priamus and Hector, the king and the prince from the enemy side.

In two of Homer's epics, two different and central *aretai* are crystallized, and these are characteristic for the two periods of Greek history. Whereas courage and audacity are ascribed to Achilles, a hero of the *Iliad*, cleverness and curiosity are attributed to Odysseus, a hero from Homer's

The Odyssey. Therefore, at the same time, Homer describes the key excellence, courage, from the archaic period of Greek history, and indicates a new one, wisdom, which will be dominant in the new classical period.

Unlike Homer, Hesiod (ca. 700 BCE) portrayed *arête* of the ordinary people, both peasants and craftsmen. Their excellence is to work, and to be efficient and successful in performing that work. According to Hesiod, it is difficult to attain *arête*, and such pursuit always implies diligence and great effort. However, if attained after all, *arête* is connected with fortune, richness, and respect.

According to Pindar (ca. 522–443 BCE), excellence manifests itself primarily in athletic competition. It is most significant to have a competitive attitude, and happiness consists of being better than others, while the worst misfortune is to be defeated by someone. To become excellent, innate talents are necessary, but not sufficient. Their own efforts, with the help of the gods, will enable humans to fully realize their natural gifts.

Simonides (ca. 556–468 BCE) was the only Greek author who was skeptical in respect to attaining *arête*. In his view, being a good person is very hard, and being a good person for a long term is almost impossible, or at least beyond one's own influence. If someone is struck by a misfortune, obstructing the individual to do anything efficiently, then this person necessarily becomes a bad one.

The pre-Socratic philosophers, whose main concern was the physical world, did not pay much attention to the question of *arête* in particular, and moral issues in general. It is, consequently, only randomly mentioned in their works. A common characteristic could be noticed in their reflections on *arête*, and that is the priority given to intellectual over physical, athletic, and competitive excellences. The new model of *arête* is no longer a warrior, but a wise man. For example, Xenophanes (ca. 570–480 BCE), who takes political usefulness as a criterion for *arête*, thinks that the wisdom of poets can contribute to the well-being of the polis more than qualities of an athletic champion. Heraclitus (1987) also held that “highest *arête*” is the intellectual excellence: “sound thinking,” which manifests in our saying, “what is true and acting in accordance with [the] real constitution” (pp. 64–65). In Democritus's philosophy, a specific moral use of *arête* emerges, which is dependent on knowledge and understanding. He also emphasizes the interior character of *arête*, apparent in feelings like shame, particularly in one's own eyes.

Classical Greece

In 5th and 4th centuries BCE, the question of *arête* became one of the central topics of Greek philosophy, and culture in general. The civic duties and obligations, especially in the Greek democratically governed city-states, imposed the questions of social and political *aretai*. The Sophists, professional teachers of *arête* to the young people, introduced this reversal of philosophical interests. The

Sophists were not teaching how excellence in some specific fields can be achieved, but how someone can attain the attributes that make one a good and worthy person. The greatest Sophist, Protagoras (ca. 490–420 BCE), understands the *arête* of a man as a political *arête*, since a human being necessarily lives in a political community. Therefore, in Protagoras's view, being a good person means being a good citizen, whose excellence is cleverness, both in private and city affairs. A person who is clever is also moderate and just, since this individual knows that justice and moderation enable citizens to live together in a community. Unlike Protagoras, Callicles defines the *arête* of a man as indulging his own urges and having power to gain the object that can satisfy his appetites. According to Callicles, justice and moderation are unnatural forms of self-restraint, invented by the inferior majority in order to have dominance over those who are superior in intelligence, courage, and manliness. Thrasymachus (ca. 459–400 BCE), a Sophist, also argues in an immoralist manner. According to Thrasymachus, injustice is a positive *arête*, which he describes as a pursuit of purely selfish interests, without paying any attention to the needs and interests of others.

Socrates (ca. 469–399 BCE) was a person who lived life according to his own reflections, ideals, and values. Unlike Callicles and Thrasymachus, Socrates considers excellences such as moderation, courage, piety, justice, and so on, to be fundamental if one wants to live a flourishing life. He equates *arête* with knowledge, which implies that one who really knows what is good and bad cannot act in a morally unjust way. Consequently, all unjust acts are merely due to the agent's ignorance. Being genuinely virtuous is, for Socrates, solely an intellectual matter.

Although Plato's (ca. 427–347 BCE) reflections upon ethical issues were highly influenced by Socrates, and is particularly noticeable in his early dialogues, in the *Republic*, Plato claims that wrong doing is due not only to ignorance, but also to emotional, irrational drives. In this dialogue, Plato articulated the eminent doctrine of four cardinal excellences, both personal and political, based on the analogy between the city and the soul. Plato's good *polis* consists of three classes: the rulers, the guardians, and the producers. Likewise, the human soul has three parts: reason, spirit, and appetites. Wisdom is an excellence ascribed to the rulers in the polis and to the reason in the soul. It consists in “consulting well” about the way the city-state as a whole should be governed the best, both in relation to itself and in relation to other city-states. Similarly, wisdom attributed to reason is knowledge of what is good for the soul as a whole, as well as for each of its “parts.” Courage is an excellence of the guardians and it is defined both as true beliefs about the things to be feared and as the preservation of these beliefs under any circumstances. The spirited part of the soul is courageous, when, as an ally of reason, it protects our soul from the corruptive influences of our appetites. Moderation is the excellence achieved in the soul when the spirited and appetitive parts of the soul are in harmony with

its rational part and, in the polis, when the subjects obey their rulers. A polis, or a person, is considered to be just only when each of its political classes, or the soul's constituent "parts," performs its own work and does not meddle in the work of the others. Political and personal justice should harmonize our psychological and political activities, thus enabling us to lead a good and prosperous life.

The concept of *arête* also plays one of the most prominent roles in Aristotle's (384–322 BCE) ethics. According to Aristotle, the ultimate good for humans is a flourishing life (*eudaimonia*), which is the actualization of the soul in accordance with complete excellence. Aristotle distinguishes two kinds of excellence, which cannot occur apart: one of character and the other of the intellect. The character excellences embrace: courage, moderation, openhandedness, greatness of soul, mildness, wittiness, and justice. Character virtue is defined as a disposition of an agent to choose a mean between extreme alternatives, relative to abilities and stores of the agent and with regard to what is best. The intellectual excellence that guarantees a good choice is practical wisdom, which is concerned with what can be otherwise (i.e., with the variety of human situations). The highest excellence is, however, theoretical wisdom, which deals with the necessary and universal objects, such as the eternal being, the laws of nature, and mathematical numbers. By emphasizing the highest importance of theoretical excellence, Aristotle reaches the "zenith" of the classical Greek ideals, according to which knowledge, understanding, and insight into the objects of divine nature are considered to be something most valuable.

Hellenistic Age

One of the key ethical questions in Hellenistic thought concerns the role of *arête* in a flourishing life. To that question, Epicurus (341–270 BCE) and the Stoics gave entirely different answers. According to the Stoics, *arête* alone constitutes *eudaimonia*, while all other values, including wealth, reputation, and even health, are irrelevant for a truly flourishing life. Following Socrates, the Stoics argued that *arête* is a kind of knowledge through which one avoids outside influences and reaches *eudaimonia*, the total absence of outside influences. On the other hand, Epicurus argues that *aretai* are valued not for their own sake, but only as instrumental means for attaining pleasure, which he equates with *eudaimonia*. For example, a person strives for courage, not for the sake of being courageous, but because bravery is an instrument for defeating fear, which is one of the main causes of an unhappy life.

In Neoplatonist reflection on *arête*, the tendency toward systematization and harmonization between the classical and the Hellenistic positions is to be noticed. Plotinus's views (ca. 205–280 CE) on *aretai* are determined by his general claim that the intellectual life is the true and proper goal for humans. He distinguishes between political excellences, which are Plato's cardinal excellences, purgative excellences, and the paradigms of excellences at the level

of the intellect. These form a hierarchy of excellences. While the lower excellences are always connected with the changeable conditions of earthly life, the higher theoretical excellences are accessible only in the state of complete freedom from everything material and emotional. The function of the purgative excellences is to reach the state like Stoic *apatheia*, in which the soul will be free from affects. Thereby, the soul will be prepared to perform its highest activity—the thinking of the intellect.

Ancient Rome

The Roman views on excellence were highly influenced by the Greek authors, particularly Plato, Aristotle, and the Stoics. It was the part of the Roman education to be acquainted with Plato's four cardinal virtues and with the Stoics's views on that subject matter. Nevertheless, the Roman practical and energetic spirit is always present in the reflections of their authors. They lived a very active life, and most of their efforts were focused on the organization of life. Therefore, one of the Roman excellences is discipline, which is an ability to bring things in order by obeying the rules and methods, and *ordo*, signifying both psychic and social order, based on well-founded laws and a powerful army. Since the Romans were a military nation, the military excellences were significant in their lives, and those were: *fortitudo* (bravery in dangerous situations), *labor* (endurance in accomplishing tasks), *industria* (zeal in efforts), *celeritas* (quickness in actions), and *consilium* (deliberative planning). Closely connected with their military mentality was one of the vital Roman excellences, *clementia*, meaning generosity toward the conquered from the position of superiority attained in the battlefield. For example, Julius Caesar (100–44 BCE) illustrated this virtue when he released his political enemies after he had conquered the city of Corfinium. Caesar was content with his deed, although his enemies, having been released, took up arms against him. In doing this, he confirms who he is (i.e., a noble and generous person). In time, the concept of *clementia* has acquired broader meaning, referring also to mercy and compassion in both public and private affairs.

Although the Stoic doctrine on virtues and vices was closest to his own views, Cicero (106–43 BCE) criticized their thesis that moral virtue is the sole good and, hence, sufficient for a flourishing life. Nevertheless, he considers that the virtues are not sufficient, but necessary for happiness. In his second speech *Against Catilina*, Cicero gave the list of virtues and vices. The typical Roman excellences are particularly represented in this list. The first on the list is *pudor* (i.e., decency and modesty), then *pudicitia*, meaning both chastity and shame in a narrow sense. While the first two excellences from the list refer to the private domain, the third one, *fides*, refers to the functioning of the Roman community. And, it is a significant notion with a variety of deeply connected meanings: loyalty, honesty, confidence, and also mutual trust between friends, the ruler and his subjects, and among different

people in the community of peoples. Along with *fides*, Cicero mentions *pietas*. In Roman life, this plays a vital function, referring not only to piety, but also to the respect toward someone who really deserves to be respected, like gods, rulers, or the head of a family. The next excellence on the list is *constantia*, which connotes steadiness or being firm and faithful to one's own ideals, principles, and purposes. It is presupposed that if a person is to be *honestas*, or to have an honorable attitude, decency, self-confidence, and respectfulness then it leads to general appreciation and public esteem. The *continentia* is a kind of self-control and self-discipline, and it is, to some extent, equivalent to the Greek arête *sophrosyne*. The next four excellences: *aequitas* (equity), *temperamentia* (moderation), *fortitudo* (bravery), *prudentia* (prudence) are of Greek origin. At the end of this list are excellences such as *bona ratio* (good reason), *mens sana* (healthy mind), and *bona spes* (good hope). The first two are intellectual, yet their intellectualism is more of a practical, rather than of a theoretical nature. This is a characteristic feature of the Roman *Weltanschauung*, which manifests itself not as much in the metaphysical treatises, but rather in the issues of organizing the state and codifying the laws upon which the state should be governed. The *bona spes* is a kind of intelligent optimism, which goes well with a healthy and quick mind as a contributor to attaining good goals.

For the Roman Stoic philosopher Seneca (4 BCE–CE 65), the ultimate good consists exclusively in attaining virtues. He talks of the *virtus perfecta*, which through the knowledge of things, human and divine, is a precondition for leading a harmonious life. The plurality of virtues represents the various aspects of one perfect virtue. In addition to the four cardinal excellences, Seneca emphasizes *patientia* (patience), *tolerantia* (tolerance), *simplicitas* (simplicity or candor), *modestia* (modesty), and *humilitas* (humbleness). The prominent place in his work is given to the virtue *humanitas*, which signifies the sense of solidarity with others. With his humanist ideas, Seneca influenced important authors in Western culture for centuries to come.

Eastern Traditions

China

The core of Chinese thinking in regard to the human excellences lies in the teachings of Confucius (551–479 BCE), along with the contributions of Mencius (372–289 BCE), and Xunzi (298–238 BCE). Significant achievements of the Confucian philosophy are to be found later on in the works of Cheng Hao (1032–1085), Cheng Yi (1033–1107), Zhu Xi (1130–1200), and so forth. Although they developed ethical reflections in a conceptual framework different than the one we find in the Western tradition, the Chinese philosophers also view the virtues as excellences that enable a person to lead a flourishing life. Confucian ethics stress the concept of *junzi*, similar to Aristotle's notion of

phronimos (i.e., an ethically superior or paradigmatic individual). Later on, Confucius and Laoze (6th century BCE) were considered to be closest to the ideal of *junzi*.

De and *ren* are two interchangeably used words for virtue in the Chinese language, and both have a double meaning in Confucian usage. *De* represents moral “force” or “potency,” as opposed to physical force, as well as “virtue” pertaining to the excellence of a character. The word *ren* signifies both the particular virtue of benevolence or humaneness and the sum of all virtues.

A large number of virtues have played a significant role in the history of Confucianism: aforementioned *ren*, *li* (often rendered in English as rules, property, rituals, etc.), *yi* (righteousness), *zhi* (wisdom), *zhong* (devotion), *xin* (faithfulness), and *xiao* (filial piety).

Bearing the highest ethical significance, *ren* is a fundamental virtue upon which all other virtues depend. It seems that already the etymology of the word *ren* discloses its meaning. The combination of the radicals *ren* (person, human) and *er* (two) in this character implies that it is one's relation to others, rather than singleness and individuality, that constitutes what a person really is. What makes a person excellent in his pursuit of *ren* is a particular kind of relation one develops toward others, based on love and respect for one's fellows, and attained by overcoming one's egoism and self-interest.

As a virtue, *li* is a formed disposition of regarding and obeying the set of ritual rules, traditional customs, and other practices that are of no significance in Western ethics. Their role is to establish and maintain the harmonious social order in accordance with the prescriptions of reasons and humaneness (*ren*). If these rules become burdensome and unreasonable, then they should be revised, replaced, or even rejected.

Yi is a cultivated disposition to perform the acts that are just, right, and appropriate to the situation at hand. Like Aristotle and the Stoics, the Confucian philosophers also think that what is right depends on the agent's reasoned judgment. An individual must be led not by one's personal gain, but by the welfare of the entire community. In this case, a very important role is played by the virtue *zhong* (devotion), because it is a commitment to the interest of someone else, especially in cases where this conflicts with one's personal interests.

Generally speaking, *zhi* (wisdom) is a disposition to deliberate well about the best means to achieve given ends, and to determine the consequences of various courses of action. It is also an ability to evaluate the characters of others, as well as oneself.

Xin (faithfulness) is primarily fidelity to words. The most apparent aspect is faithfulness in the sense of honesty: doing what one says one will do, and not promising more than one can give. For Confucianism, faithfulness is of vast importance in interpersonal communication and state administration.

Chinese ethics attach wider significance to the excellence *xiao* (filial piety) than the Western tradition did or

does. It is a cultivated affection and respect that one should display to one's parents. The primacy of xiao derives from the natural feeling of love that each offspring has for the parent. It is fundamental for understanding and forming a society, in the way that social relations are to resemble the relation between children and their parents. They have to mirror its hierarchical structure based on natural and strong devotion. In addition, the Confucian thinkers profoundly remarked that the habitation and cultivation of each excellence began in the family, afterwards substantially influencing our conduct and socialization in general. Nevertheless, according to the Confucians, obeying one's parents is not to be applied absolutely and unquestionably in every situation, but only if it is in accord with what reason judges to be just and appropriate.

By stressing the role of reason, which should deliberate well about practical matters, taking into account the special characteristics of each case, Confucian ethics is similar to that of Aristotle, where practical wisdom plays a crucial role. Like the ancient Greek thinkers in general, Chinese moral philosophers, in particular Mencius, consider that overcoming the passions and instincts is the way one acquires virtues and becomes truly human. The uniqueness of the Chinese account of excellences lies in stressing the significance of family and society, our relations to others in cultivating our own nature. In fact, Chinese thinkers attempt to find a kind of social order in which each person is able to realize her full potential as a human being through mutually beneficial relations with others.

India

The human virtues and excellences in general were not prominent topics in the Hindu tradition. In Indian thought as a whole, there is a lack of reflection on the very essence of virtue, since it was understood as supersensible and thus not entirely knowable by unaided reason; one can get a complete account of it only from revelation. However, a step in the direction of knowing virtues is to identify the moral duties that one should perform, as well as the character dispositions guiding these duties.

In the old Indian text *Bramahas*, devoted to interpreting rituals, virtue is envisaged as ritual excellence, performed, for example, in the acts of sacrifices. This ritualistic concept of virtue is significantly modified in the "Treatises on Dharma" (*Dharmasastras*), composed around 600 BCE. The word *dharma* literally means "what holds together." With its connotation as a sum of all moral duties and our disposition to acquire them, the dharma becomes a basis for either social or moral order. Although the proper performance of rituals is still vital, the disposition for performing the highest rite, according to this text, is a disposition for "good conduct." The text describes caste society consisting of the *Brahmans* (priests and teachers), *Kshatriyas* (warriors), *Vaisyas* (tradesmen), and *Sudras* (laborers and servants). Each of the four castes is distinguished by the

characteristic excellences exhibited by its members: the spirituality of the Brahmins manifests itself in their purity, righteousness, and knowledge; the excellence ascribed to the soldier caste is valor, especially in battle, and lower castes are assigned the virtues of industrious labor. However, it is mentioned in the Hindu texts that along with the excellence of a specific caste, there are the virtues common to all orders. These are forgiveness, self-control, nonviolence to all living beings, self-control of the pleasures, compassion and patience, as well as freedom from anger, envy, and avarice. It seems that these excellences are treated as mere instruments to an end, that is, enlightenment or liberation (*moksa, nirvana*) from the cycle of rebirth.

Buddhism as a religious and philosophical tradition was born in India around 600 BCE, and spread over Asian countries such as China, Korea, Japan, and Thailand. The texts of Buddhism criticized some aspects of the ethical system of traditional Hinduism by recommending universal principles over traditional, caste-specific norms and stressing mental attitude over performance. For example, one should not only avoid taking what does not belong to him, but also avoid having greedy thoughts.

The catalog of fundamental virtues in classical Buddhism could be found in the Holy Eightfold Path, and the doctrine of the Four Noble Truths. These truths are that life is suffering; the reason of this suffering is the "birth sin" of desire; suffering ends only upon nirvana, the annihilation of desire; and nirvana may be achieved only by following the Holy Path. The components of the Eightfold Path have been divided into a three-step plan of action consisting of *sila* (virtue), *samadhi* (meditation), and *prajna* (wisdom). The third (right speech), fourth (right action), and fifth steps (right livelihood) involve virtue; six (right effort), seven (right mindfulness), and eight (right concentration) involve meditation; and one (right understanding) and two (right thinking) involve wisdom. A later Buddhist virtue catalog is given by the so-called Five Virtues or Precepts, which consist of abstaining from harming any living thing, stealing, sexual misconduct, lying, and intoxication. Eventually, there are the four universal virtues of Buddhism. These are also mentioned in different canonical texts, concern the practical aspects of Buddhism, and promote the ideals of humanity. They are *maître* (benevolence), *karuna* (compassion), *mudita* (joy), and *upeksa* (equanimity).

Unlike Western thought, the Indian traditional texts do not take into account the political excellences. Moreover, in contrast to Western accounts of excellences, in Indian philosophical and religious tradition, rituals and ceremonies do play a prominent role. Entire Indian thought views human excellences as belonging to the path of achieving liberation from the restraints of everything belonging to humans. By strongly appealing to almost absolute nonviolence, based upon the view of the interconnectedness of all living creatures, the Indian tradition traces presumably the most valuable account of universal mercy and charity.

Muslim Tradition

The core of the Muslim view of human excellences lies in the Koran, the traditions (*hadith*) of Muhammad, Sufi's writings, and in the scripts of Muslim philosophers like Ibn Sina (980–1037), Al-Ghazali (1058–1111), Ibn Rushd (1126–1198), and so forth. The essential Muslim excellences are those attributed to Allah (i.e., God himself). Primarily, Allah is the *ar-Rahman* (beneficent) and the *ar-Rahim* (merciful). Moreover, Allah is the *al-Mohaymin* (protector), the *ar-Razzaq* (provider), and the *al-Ghafur* (all forgiving). Secondly, Allah is also the *al-Adl* (just), representing the *al-Haq* (truth) and the *al-Barr* (source of all goodness). Since Allah deals with the weak and uncertain humans, he is the *as-Sabur* (patient).

As humans in their relations should emulate these divine attributes, they should accordingly be generous, merciful, benevolent, and just, as well as honest to each other. They should also be patient and wise in their life. The prophet Muhammad exemplifies these virtues, since he is the perfect man par excellence, whom the Koran calls an excellent model to follow.

Apart from moral excellences, the Islamic principles encouraging intellectual flexibility and rational choice are based on *ijtihad* (judgment), *shura* (consultation), and *ijma* (consensus). Clearly, rationality and man's own judgment play a significant part in arriving at decisions. In Islamic culture, the importance of *ilm* (knowledge) was highly appreciated. One of the Muslim ideals is to spend life in a pursuit of knowledge. Sufism, the most profound teaching of Islam, describes the path of attaining the illuminating knowledge of God, which presupposes the cultivation of excellences, spiritual excellences in particular. Although the virtues are human attributes, in their deepest sense, they belong only to God, and what belongs to humans is their "nothingness" before him. In this sense, the Islamic view of virtues distinguishes itself from the other traditions, particularly from the Chinese and Western ones, in which the virtues are attainable primarily in the active engagement of humans.

The ancient Greek philosophers also influenced the Islamic account of virtues. Al-Ghazali's view of happiness is a good example of how the Islam tradition could be creatively combined with Western philosophy. According to Al-Ghazali, happiness, as the highest good, admits two subdivisions, the worldly and the otherworldly. Otherworldly happiness, which is our ultimate end, cannot be attained without certain worldly goods. These include Plato's four cardinal virtues; the bodily virtues of health, good fortune, and long life; the external virtues of wealth, social position, and noble birth; and lastly the "divine virtues" of guidance, good counsel, direction, and divine support, all belonging to the Islam tradition.

Russia: Between East and West

There is no other nation that questions its own values and identity so deeply as the Russians had, thereby

showing one of their virtues. This virtue is a profound self-awareness, which implies inquiring its own scope and merits, and longing for one's true self. In its long history, Russia has formed a unique culture based on the Orthodox Christian religion in the productive, although not always harmonic, dialogue with Western culture and its tradition. This dialogue was important in the formation of the greatest geniuses of the Russian culture, particularly such as Pushkin (1799–1837), Dostoyevsky (1821–1881), Tolstoy (1828–1910), and film director Tarkovsky (1932–1986). Inspired by Western ideas, they critically explored, denied, or creatively assimilated them, introducing, at the same time, something new and unique.

The uniqueness of the Russian view on excellences could be seen in the notion of *svecholovek* used by Dostoyevsky in his *Pushkin Speech*. *Svecholovek* is a person whose excellence is not proved by being superior to others, but by embracing and synthesizing the features of others. In one's attempt to know and experience other nations and cultures, *svecholovek* is both unique and universal. According to Dostoyevsky, such a completely universal person was Pushkin, who transformed and unified in his own spirit as "the spirits of foreign nations" (p. 56).

The Russians are very talented for exact mathematical and natural sciences, and they have had excellent results therein, both in the past and present. Nevertheless, the most prominent Russian thinkers and writers (e.g., Dostoyevsky, Tolstoy, Berdyaev) criticized the pretension of excellences in calculation and the rational sciences in general, to give a full and sufficient account of reality. In criticizing abstract, theoretical reasoning, Tolstoy pointed out the significance of a practical ability, similar to Aristotle's *phronesis*, to instantly grasp the unique features of each particular case.

The most appreciated moral excellence for the Russians is *chelovekoljubie*, meaning to have genuine love for each human being. In particular, this relation manifests itself in the empathy with the insulted and humiliated. There is no human, so miserable, handicapped, even wicked, who cannot and should not be loved. The Russian humanists did not pledge for an abstract humanism, but for one that should be proved in everyday life in terms of helping a concrete person.

As strikingly depicted in Dostoyevsky's novels, the Russian understanding of *vera* (faith) is also specific, since it is not to be grounded only in doctrine, but rather in the living experience of a believer, permeating one's entire life. The importance of *nadezhda* (hope) in Russian thought is expressed in its fundamental orientation toward the future, understood either as heavenly kingdom or communism or a better life improved by science. The most prominent political excellence in the Russian culture is an organic togetherness, as opposed, according to the Russian thinkers, to the Western self-centered individualism.

Medieval Ages

The Apostle Paul's faith, hope, and love from the New Testament became the most significant and unique Christian excellences. The church fathers variously discussed the ancient accounts of virtues and vices, often comparing them to new Christian ideals. Among the early Greek Church fathers, the most original and insightful notion of *arête* is to be found in the writings of Gregory of Nyssa (335–394). For him, Socrates is no longer a paradigmatic individual, as he was for the classical Greeks, but Moses, after whom his major work is entitled. Gregory of Nyssa endeavored to account for the place of *arête* in the spiritual and dynamic progress of the soul attempting to overcome the limits of its own nature. He used the word *epektasis* to signify this paradoxical process of how finite humans can exercise their excellence by progressing into unlimited perfection. According to Gregory of Nyssa, to be fully human is to be in an infinite state of *becoming* ever better or *more* perfect, without ever *being* best or perfect. This process of human divination was conceived by Gregory of Nyssa as the cooperation of God combined with the effort of a human himself. By the belief that the human side is very active in acquiring virtues, Gregory of Nyssa was closer to the Greek classical tradition than to Augustine and the later Christian authors, who considered that this process is sorely dependent on God's mercy.

Saint Augustine (354–430) critically discussed and eventually rejected classical Stoic and Platonic accounts of virtue as rational self-mastery, substituting instead an account of virtue as *ordo amoris*, "rightly ordered love." This right ordering of love reflects the divinely ordained hierarchy of nature, with God at the peak. Augustine defined the four classical virtues of courage, moderation, justice, and wisdom as forms of this love of God. By defining *virtus* in terms of correct love, Augustine made it into a divine gift, rather than a human achievement. This implies that there is a categorical difference between genuine virtue, based in God's "pouring" love into human souls, and the cardinal virtues grounded on any other love. Although it is certainly true that Augustine viewed pagan virtues as superior to pagan vices, such virtues remain always imitation compared with the authentic virtue of divine love in our souls.

Among the early Scholastics, two opposite views on human virtue are to be noticed. While for Anselm of Canterbury (1033–1109) the notion of virtue was of no significance, and even justice is not conceived as virtue, Peter Abelard (1079–1142) attempted to connect Aristotelian concept of virtue with the elements of Augustinian ethics, by claiming that the virtues are those qualities that make human life worthwhile. He productively developed Augustine's criticism of the Stoics's thesis that all virtues are equal.

Aristotle and the Neoplatonists, were an inspiration to Bonaventura (1217–1274) in his account of human excellences, as he attempted to reconcile them with Christian doctrine. In his view, human excellences participate in divine exemplars to various degrees. The cardinal virtues

of wisdom, justice, moderation, and courage may be possessed at any of three levels. At the lowest level, they are "political" and belong to us insofar as we are political animals; at the next level, they are "cleansing" and belong to us insofar as we are fit for God; and at the next level, they belong to those already entirely cleansed. At all levels of the hierarchy, human virtues depend on the exemplars for their reality. The cardinal virtues likewise also depend on the theological virtues of faith, hope, and charity to attain their perfection and achieve their ends. According to Bonaventura, the virtues are not only the products of God's grace, but are also rooted in *liberum arbitrium* (free decision). Thus, the cardinal virtues can belong only to the intellect and the will—those powers of the soul that share in free decision.

Saint Thomas Aquinas (1225–1274) was a great Christian synthesizer of the Medieval Ages. He combined the two lists, saying that there are four cardinal virtues and three theological virtues. According to Aquinas, the theological virtues, having God as their object, are prior to all other virtues. Due to the fact that God, as an ultimate end, must be present in the intellect before it is present in the will, and since God is present in the will by the reason of hope and charity, faith is prior to hope and charity. Hope is the theological virtue through which we trust that, with divine assistance, we will attain the ultimate good—the eternal enjoyment of God. In the order of generation, hope is prior to charity, but in the order of perfection, charity is prior to both hope and faith. While neither faith nor hope will remain in those who reach the eternal vision of God in the life to come, charity will endure in blessedness. It is an excellence that is infused into the soul by God and that inclines one to love God for God's own sake. If charity is more excellent than faith and hope, then through charity the acts of all other excellences are ordered to God.

Early Modern Age

The Renaissance

During the Renaissance, the virtues became the theme of poetic imagination, the question for philosophical thinking, and the subject matter frequently represented by the painters. For example, the Italian artist Antonio da Correggio (1489–1534) painted the three ancient moral excellences (justice, courage, and moderation) in his famous work, *Allegory of the Virtues*. Persons of distinguished excellences—both intellectual and artistic—represent the Renaissance, such as Marcilio Ficino (1433–1499), Leonardo da Vinci (1452–1519), and Michelangelo di L. Buonarroti (1475–1564).

The direct approach to the sources of the ancient Greek texts produced a huge diversity in the Renaissance, both in the accounts and evaluations of excellences. While Francesco Petrarca (1304–1374) held that virtue is a cure for vicissitudes of *fortuna*, Leon Battista Alberti (1404–1472), in his

Intercoenales, represented virtues in confrontation with fortuna as helpless and inferior.

The Italian humanist Lorenzo Valla (1407–1457) decisively rejected the Stoic concept of virtue as happiness by reevaluating the Epicurean views of instrumental nature of virtues. In rejecting the Stoic equation of virtue with happiness, Valla pointed out that apparently selfless, virtuous actions are in fact very often performed out of egoistic, self-interest reasons. By refuting the Stoics, Valla was affirming the insufficiency of humans to achieve happiness outside the Christian dispensation. He advocated the Christian pleasure that does not exclude the joys of life, yet its highest peak is heaven's delight. Although Valla's ranking of pleasure as the ultimate end has an Epicurean flavor, his equation of heavenly delights with pleasure is of a Christian nature.

Niccolo Machiavelli (1469–1527) created a novel political theory presenting how politics could be practiced outside the boundaries of morality and virtue, by redefining the very notion of virtue. According to Machiavelli, virtue is an excellence in achieving desirable goals, which are, however, not necessarily morally acceptable. The moral indifference of the ruler can help him in various struggles with the changeable circumstances of fortuna. The requirements for leading a country successfully are not traditional virtues, like piety, humanity, and honesty, but cleverness in making things useful and efficient. In sum, political excellence for Machiavelli presupposes power and intellectual excellences, but it is indifferent to moral ones.

Michel de Montaigne (1533–1592), a French Renaissance thinker, held that each excellence, whether moral or intellectual, entails struggle and difficulty. He explained his assumption by stating that even-minded people with good intentions find it easy to act justly, while virtuous persons are those who are able to actively overcome the difficulties when acting rightly. Thus, he implicitly criticized the Aristotelian thesis that a virtuous person is recognized by the fact that he readily performs his virtuous acts, whereby he could be seen as a precursor of Kant's concept of "moral value" of each act.

Age of Discovery

In the European culture of the 16th and 17th centuries, the human mind's scope and limits were "discovered," and became the focal topics of the age. Rene Descartes (1596–1650), the "father" of modern philosophy, saw virtue as a firm and contestant determination to act in accordance with what reason judges to be the best. It is an unconditioned and supreme good, entirely dependent on our free will. Being a cure for the aberrations of passions, the key moral excellence is generosity described as a kind of appropriate self-esteem and as a the perfection both of the intellect and of the will.

Similar to the Stoics, Baruch de Spinoza (1632–1677) considered that exercising one's excellence is acting according to the laws of one's own nature, guided by

reason. Being in harmony with one's own reason is nothing but knowledge, which is both the major weapon against the misleading passions and the source of the highest happiness, since it is directed to God or the necessary order of nature. Spinoza distinguished between two classes of virtuous actions, both of which are in accord with reason: (1) those due to tenacity, aimed at preserving one's being; and (2) those due to generosity, aimed at helping and cooperating with others. According to Spinoza, a genuinely virtuous person does pursue his or her own interests, but also takes care of the well-being of others, acting always honestly, nobly, and altruistically.

For the English philosopher Thomas Hobbes (1588–1679), virtues are those character dispositions that produce appropriate actions easily, without any resistance by reason. Due to the fact that there were no generally accepted standards in the prepolitical period, each person considered something different to be good and virtuous. Only in the civil society did laws impose standards, and virtue consisted in respecting such laws that ensure the stability of a society. Apart from political excellence, which Hobbes equated with justice, he also considered *caritas*, interpreted as a kind of solidarity among humans, to be a moral excellence.

Age of Enlightenment

In their pursuit of reason and liberation, the thinkers of the Age of Enlightenment very seriously questioned the generally accepted beliefs on values and virtues. In the French Enlightenment, the traditional views on moral excellences were sharply criticized. For example, F. de Rochefoucauld (1613–1680) held that egoism is a driving force of numerous seemingly selfless actions. J. O. de Mettrie (1709–1751) argued that virtue does not have any intrinsic value, since it exists exclusively due to social interests.

Ch. L. Montesquieu (1689–1755) viewed virtue as a political excellence that he understood as "the love of the laws and of our country" (1777, p. 67). It is a moving force in republics, honor in monarchies, and fear for despotic regimes. On the other hand, J. J. Rousseau (1712–1778) described virtue as something internal, as a "sublime knowledge of simple souls" (2002, p. 67). Its laws are inscribed in our hearts, and only if we turn to our true self and conscious, can we learn what it is. Nevertheless, the pure tendency toward exploring one's own conscious is not sufficient for attaining virtue, since it always requires strength and hard labor. While Rousseau thought that virtues could take the place of natural laws, Voltaire (1694–1778) was more skeptical about the status of virtue, by claiming that it is only a socially useful behavior.

Moral and intellectual virtues have a prominent place in David Hume's (1711–1776) philosophy, who is considered to be a representative of the Scottish Enlightenment. Hume's concept of virtue embraces not only moral virtues, but also excellences of all kinds, including intellectual talents and social virtues. He defined it as "quality of the mind agreeable to or approved of by everyone who considers or contemplates it" (1975, p. 261). Hume distinguished

the “natural virtues” (benevolence, charity, prudence, good sense, wit, temperance, courage, etc.) from “artificial” virtues (justice, allegiance, chastity, etc.). The former are rooted in our nature and based on our natural tendency to prefer and to approve, while the latter are dependent upon convention. All the artificial virtues arise from the circumstances and necessities of life, and they take different specific forms in different societies and historical conditions. They consist in conventions, generally accepted to be socially beneficial, like respect for traditional property, and “fidelity to promises.” Contrary to the artificial virtues, the “natural” virtues are invariant across cultures; they always produce good outcomes.

Modern Age

According to Immanuel Kant (1724–1804), the founder of the modern ethics and philosophy in general, *Tugend* (virtue) cannot depend merely on a benevolent tendency, but exclusively on general and strict principles. Kant (1797/1996), therefore, thought that the traditional account of virtue should be redefined. Kant conceived a morally relevant virtue as a kind of strength of will to do what is right, and distinguished the duties of right and duties of virtue. Whereas the former are eternally imposed laws, which requires the coercive order, the latter are self-imposed and aim at self-perfection and the happiness of others. By introducing the duties of virtue, Kant developed the concept of moral excellence, which consists of the enhancement of one’s dispositions of mind and certain moral duties of respect and charity. A rational agent with more or less excellence performs the duties of virtue. However, our duties to perfect ourselves and to realize the happiness of others are imperfect. While perfect duties of right allow no exception for one’s inclination, the imperfect duties of virtue are circumstantial and sometimes dependent on one’s preferences.

In modern utilitarian ethics, virtue is interpreted as an instrument in attaining an external end, such as benefit, power, or happiness. John Stuart Mill (1806–1873) had a more profound view of the role of virtues in one’s life. He distinguished between desiring a thing as a “part” of our happiness and desiring it as a means to our happiness. Virtues are the constituent part of one’s happiness, since they are also desired for the sake of themselves. In contrast to Mill, G. E. Moore (1873–1958) considered that virtues are not good as such; they are rather certain instruments for attaining the good. The evaluation of virtues depends on how efficient they are in accomplishing goals.

In his philosophy, Friedrich Nietzsche (1844–1900) gave priority to the excellences of all kinds over the traditionally conceived virtue, concurrently aiming at demystification and overcoming its double-faced morality. While compassion and charity are the most valuable virtues for Christians, Nietzsche believed them to be nothing but the sign of human weakness. He vividly portrayed an *overman* as a being equipped with everything best, with

all the excellences like courageousness, great creativity, uniqueness, healthy, life affirming, and practicing self-reverence. The overman has to possess his peculiar virtue, belonging only to himself. He looks into the future and not to the past; his main task is to overcome his own self (i.e., to make his own self better, even almost perfect). Nietzsche’s words about the future of morality and virtues were prophetic. He attached to them little power to inspire humans, and since they no longer represented great ideals, which can make people become more than what they are, he thought that in the 20th and the 21st centuries the civilization would be faced with an eruption of barbarism.

The flourishing of all kinds of intellectual excellences and human achievements in science, technology, and the arts distinguishes the 20th century. At the same time, this was the century of the most horrible wars and massive killings, the century in which humanity could have been destroyed. Perhaps that is why virtues were not the dominant theme in the previous century, neither in philosophy nor in culture in general. This, however, does not imply that they were not treated at all. In his material value ethics, M. Scheler (1874–1928) thought that virtue should be rehabilitated. According to Scheler, it is a vivid consciousness of good, the quality of a person as such, who is a bearer of moral values. On the other hand, M. Weber (1864–1920) advocated a utilitarian view of virtue in the manner of “the spirit of capitalism.” On the example of B. Franklins, he showed that moral excellences, such as honesty, diligence, and punctuality are beneficial only because they gain profit.

In the mid-20th century, an almost forgotten virtue was revived in the works of E. Anscombe, A. MacIntyre, P. Foot, and B. Williams. As R. Hursthouse (1999) suggested, the virtue of ethics for these authors was initially endorsed to distinguish a position in normative ethics, which puts the emphasis on a person’s virtues, in contrast to deontology, a theory which stresses duties and rules, as well as utilitarianism, which emphasizes the consequences of actions. The source of inspiration for these authors is ancient Greek ethics, Aristotle in particular. The central issues of their concern, although treated differently, are the following: the nature of virtue, formation of character, practical reason, moral education, and thereto connected feelings such as loyalty, shame, and guilt. The discussion initiated by these philosophers is still going on, showing that our culture, at least in the eyes of some intellectuals, is concerned with the fact that moral virtues are almost nonexistent in our lives.

Future Directions

It seems that our modern age is focused on the body, rather than the mind or the soul. In contrast to the previous centuries, intellectuals, state representatives, or even ideologies do not form our views of what is valuable today. The electronic mass media, though profoundly influenced by the political and economic powers, has the

key role in forming our evaluative beliefs. The excellences promoted by the media are excellences or perfections of the body rather than those of the soul or the mind. One of the ideals followed by many people is a perfectly shaped, young, and fresh body and the face of a model. Also, entertainers and athletes who prove their excellences in competitions are today's heroes, rather than scientists or philosophers. For instance, not many people know the name Z. I. Alferov, a Russian physicist and the Nobel prize winner in physics (2000), and even fewer people know that his invention, the heterotransistor, revolutionized mobile phone and satellite communications—but almost everyone is very well-informed about David Beckham, Brad Pitt, Madonna, and so forth.

Now, we face a kind of paradoxical situation where the excellences essentially enhancing our lives, such as scientific and technical expertise in the first place, do not seem to be the most esteemed in the system of values held by the majority of the population. Moreover, despite the fact that these excellences are not too popular, they truly contribute to the march of human progress. They presuppose the scientific exactness and application of skills connected with the inventiveness of their creators in all fields of human knowledge. What is missing, although not entirely, is a comprehensive, sufficiently systematic, and critical awareness of these fast processes, followed by the question of the meaning and the appropriate ethical evaluation of such development.

One step in that direction is transhumanism, an intellectual and cultural movement aiming at improving human mental and physical capacities, and thus prolonging human life by the use of science and technology. This movement attempts to find out how the emerging biotechnologies could be used in our struggle with human disabilities, diseases, and even death. By improvements of all kinds, including genetic improvement, it is apparent that the qualities of the human mind and character will be enhanced, too. However, we do not know exactly what will be the final result of such biotechnological processes: an improved human being equipped with all excellences, or an entirely new being belonging to another form of evolution yet to be created by ourselves. What remains open, regarding the latter alternative, is whether these excellences are in any way human. If not human excellences, then future science and ethics will have a delicate task to evaluate these excellences properly.

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PART IX

EVOLUTION

FOSSIL PRIMATES

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Primates are mammals included in the order Primates, which was defined by Carolus Linnaeus in 1758 in order to group lemurs, monkeys, apes, and humans. Except for humans, most Primates live in the tropical or subtropical regions of Africa, Asia, and the Americas. The Primates have been traditionally subdivided into two main informal groups: prosimians and simians. Members of the first group have traits most like those of the earliest Primates; they include tarsiers, lemurs, galagos, lorises, and aye-ayes (among others). The second group includes the New World and Old World monkeys in addition to the apes and humans.

Primates have a general morphology but exhibit a wide range of characteristics. Many species are sexually dimorphic, with females and males differing in size, certain physical traits, and coloration. This dimorphism is mainly exhibited in simians and humans. Primates are characterized by their large brains (particularly in anthropoids) and stereoscopic vision, and most have opposable thumbs. Most of them live in trees, possessing adaptations for climbing. They have various locomotion techniques, such as leaping from tree to tree, walking on four or two limbs, knuckle-walking, and brachiation (swinging between branches of trees).

The order Primates is included in the superorder Euarchontoglires, infraclass Eutheria, class Mammalia, phylum Chordata, and kingdom Animalia. In addition to Primates, the superorder Euarchontoglires (also called

Superprimates) includes rodents, rabbits, tree shrews, and colugos. This superorder is divided into two clades: glires and euarchonta, the last of which includes two other sister clades, scadentia (tree shrews or tupaiis) and primatomorpha. This last clade includes three orders, two of them extant: Dermoptera (flying lemurs) and Primates and one fossil, Plesiadapiformes.

Although they do not possess a common diagnostic character, Primates can be grouped together because all of them have a common origin. They show some distinctive progressive evolutionary trends, such as toward the enlargement of the brain, predominance of the visual sense, and improved manipulative capacities. The most primitive Primates may have existed more than 65 million years ago, in the late Cretaceous, and even 85 million years ago according to some DNA molecular-clock studies. The Cretaceous ancestors of Primates were small and generalists in diet and behavior. This allowed them to survive the Cretaceous/Tertiary mass extinction, which ended the dinosaur era. Our ancestors survived by being small, omnivorous, and flexible in their behavior within diversified environments.

The late Paleocene *Plesiadapis* is suggested as the oldest known fossil Primate (55–58 million years ago), although most paleoprimatologists consider it belonging to a different order (order Plesiadapiformes) closely related not only to the Primates but also to the flying lemurs (order Dermoptera) and perhaps to the bats (order Chiroptera).

They are characterized by long tails, agile limbs, rodentlike jaws and teeth, eyes at the side of the head, and no post-orbital bar. The order Plesiadapiformes diverged during the Paleocene into several families such as Plesiadapidae, Carpolestidae, Saxonellidae, Microsyopidae, Paromomyidae, and Picrodontidae. *Purgatorius*, a 65-million-year-old fossil primatomorph, might be the precursor to the Plesiadapiformes and all Primates. They have primatelike characteristics, such as enlarged central incisors and molarlike terminal premolars.

Primates are subdivided into two great suborders: Strepsirrhini and Haplorrhini. Both sister clades, strepsirrhines and haplorrhines, parted ways about 63 million years ago, according to molecular-clock analyses. The first representatives of both groups were prosimians, which have adaptations to preying on small, quick-moving prey in an arboreal setting (visual predation): grasping hands and feet, nails instead of claws, eyes rotated forward (enhancing stereoscopic vision), and the elaboration of visual-sensory pathways. Both strepsirrhines and haplorrhines evolved from the ancestral Primates' lineage (Plesiadapiformes), which included the most primitive strepsirrhines and the extinct Adapiformes as well as the most primitive haplorrhines and the extinct omomyids. These early Primates split off during the Eocene, an epoch characterized by climatic warming. The Primates' rain forest habitat was very widespread during the Primates' acme of the Eocene.

Strepsirrhines

The suborder Strepsirrhini includes the “wet-nosed” Primates (lemurs, lorises, galagos, aye-ayes, indris, etc.), which are considered the most primitive in features and adaptations. Their brain capacity tends to be smaller than that of the haplorrhines, indicating a lower intelligence. Their nose is connected to the upper lip, which is connected to the gum. Their nickname “wet-nosed” comes from the presence of a rhinarium, that is, the wet, naked surface around the nostrils of the nose typical of many mammals. Almost all strepsirrhines have a toothcomb, that is, tightly clustered incisors and canine teeth.

Strepsirrhines are composed of four infraorders: Adapiformes, Chiromyiformes, Lorisiformes, and Lemuriformes. The first group is a fossil taxon typically called adapids; the second includes the enigmatic, extant aye-ayes; the third group is typically called lemurs; and finally, the fourth group includes lorises, indris, and galagos. Strepsirrhines also include some *incertae sedis* fossil taxa, such as *Azibius* (middle Eocene), *Panobius* (middle Eocene), *Lushius* (late Eocene), and *Shizarodon* (early Oligocene).

Adapiformes

Infraorder Adapiformes, also called adapids, primarily radiated during the Eocene between 55 and 34 million years

ago, although an endemic Asian group, the sivaladapids, survived into the Miocene. Adapid fossils are found in all Holarctic continents (Africa, Eurasia, and North America), together with the great fossil group of Eocene Primates, the omomyids. Adapids have small eye orbits and elongate skulls and were adapted to folivorous or frugivorous diets, which is indicated by their cheek teeth.

Adapiformes are subdivided into five families: Caenopithecidae, Nothactidae, Sivaladapidae, Omanodontidae, and Adapidae. They also include a group of *incertae sedis* genera, such as *Simonsia*, *Alsatia*, and *Kohatius* of the late Eocene; *Hallelemur* and *Chasselasia* of the middle Eocene; and *Petrolemur* of the late Paleocene to middle Eocene. The family Caenopithecidae includes four genera: early middle Eocene *Aframoni*, middle Eocene *Caenopithecus*, and late Eocene *Mahgarita* as well as middle Eocene *Adapoides*, whose fossils come from Africa, Eurasia, and North America. They lacked some of the typical specialization of the Adapiformes (in the dentition) but have affinities with the cercamoniine and nothactids.

The family Nothactidae is an extensive group of adapiforms, which is subdivided into three subfamilies, each one with several genera: early Eocene–early Oligocene subfamily Cercamoniinae (including the genera *Anchomomys*, *Buxella*, *Barnesia*, *Donrussellia*, *Europolemur*, *Agerinia*, *Pronycticebus*, *Cercamoni*, *Protoadapis*, *Periconodon*, and *Wadilemur*), early middle Eocene subfamily Nothactinae (including the genera *Cantius*, *Notharctus*, *Pelycodus*, *Copelemur*, *Smilodectes*, and *Hesperolemur*), and middle late Eocene subfamily Pondaunginae (including the genera *Siamopithecus*, *Amphipithecus*, *Bugtipithecus*, and *Pondaungia*). They possessed a generally long muzzle, opposable thumbs, big toes, flexible limbs, a long tail, and a supple back. The most famous nothactid is the middle Eocene *Notharctus*, which had extremely long digits and skeletal proportions that resemble the living lemurs (about 7 kg in weight). Older and smaller (1–3 kg in weight) was the early middle Eocene genus *Cantius*, a diurnal, arboreal, and quadrupedal prosimian. The primitive cercamoniine *Donrussellia* might be close to a common ancestor of the adapids.

The family Adapidae includes species that are characterized by forward-facing eyes, a postorbital bar, a large brain, a reduced snout, and vertical incisors. It has been subdivided into two subfamilies: the early late Eocene subfamily Pronycticebinae (including the genera *Pronycticebus* and *Agerinia*) and the early Eocene–early Oligocene subfamily Adapinae (including the genera *Microadapis*, *Leptadapis*, *Adapis*, *Palaeolemur*, *Cryptadapis*, and *Godinotia*). The most characteristic member was the late Eocene genus *Adapis*, a prosimian that was diurnal, folivorous, and a slow arboreal quadruped similar to the slow lorises. Their dental formula was 2/2 (incisors), 1/1 (canines), 4/4 (premolars), 3/3 (molars) = 40 teeth.

Adapiform evolutionary relationships are controversial, but it is widely accepted (according to the postcranial

skeleton characteristics) that they belong to the strepsirrhines. However, the most primitive adapiforms lacked many of the anatomical specializations of present strepsirrhines (e.g., lack of a toothcomb), suggesting that they are the basal group of strepsirrhines.

During the late Eocene and mainly during the Eocene-Oligocene transition, the climate changed, becoming very cool. It was a large extinction episode in which many large mammals disappeared, including almost all the adapiforms. The mid- to high-latitude vegetation changed dramatically from broadleaf evergreen rain forest to deciduous forest. Remnant Primates were forced to cluster into smaller forest areas near the equator. Among the survivors, there was a reduced group of adapiforms belonging to the families Omanodonidae and Sivaladapidae. The family Omanodonidae includes only one known genus, the early Oligocene *Omanodon*, which was related to primitive anthropoids. The family Sivaladapidae includes late Miocene adapiforms of 2 to 5 kg in weight and adapted to a folivorous diet. It has been subdivided into two subfamilies: the middle late Eocene subfamily Hoanghoniinae (including the genera *Hoanghonius*, *Guangxilemur*, *Rencunius*, and *Wailekia*) and the middle late Miocene subfamily Sivaladapinae (including the genera *Sivaladapis*, *Indraloris*, and *Sinoadapis*).

Lorisiformes

The infraorder Lorisiformes includes African and Asian strepsirrhines typically known as galagos or lorises. They are closely related to both the Chiromyiformes (aye-ayes) and the Lemuriformes (lemurs), but it is currently unknown whether the Chiromyiformes (aye-ayes) represent a form ancestral to both the Lemuriformes and Lorisiformes or are simply related more closely to the Lemuriformes. DNA molecular-clock analyses suggest that chiromyiforms and lemuriforms constitute a clade that diverged from the Lorisiformes about 50 million years ago. The infraorder Lorisiformes included three families, two of them extant: Lorisidae and Galagidae and the fossil family Plesiopithecidae.

The family Plesiopithecidae includes only one known fossil genus: *Plesiopithecus* (late Eocene species *P. teras*). The 36-million-year-old genus *Plesiopithecus* is clearly a strepsirrhine prosimian, although mandibular and molar morphologies resemble those of the archaic members of the anthropoids. Its dental formula was 2/0 (incisors), 1/1 (canines), 4/4 (premolars), 3/3 (molars) = 34 teeth, the canines being very large. It was a frugivorous, lorislike prosimian, probably without close ties to extant strepsirrhines. Molecular-clock analyses suggest that lorises and galagids diverged about 23 million years ago, so the plesiopithecids may be the last common ancestor of both extant families.

The family Lorisidae includes the modern lorises, such as lorises, pottos, and angwantibos, which live in tropical central Africa and south Asia. They are arboreal, diurnal, and predominantly insectivorous, but they can also consume

bird eggs, small vertebrates, fruits, and sap. Their size is short, between 17 and 40 cm in length, and 0.3 to 2 kg in weight. Their face is forward and their eyes are large. Their dental formula is 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 36 teeth. Their thumbs are opposable, but their index fingers are short. They are subdivided into two great subfamilies: Lorisinae, which includes the extant genera *Arctocebus* (angwantibos) and *Loris* (slender loris), and Nycticebinae or Perodicticinae, which includes the extant genera *Perodicticus* (pottos), *Pseudopotto* (false pottos), and *Nycticebus* (slow loris). The first subfamily, Lorisinae, includes besides two other fossil genera, *Mioeutoticus* (early Miocene) and *Karanisia* (late Eocene); the second subfamily includes Nycticebinae and the other fossil genus *Nycticeboides* (late Miocene).

The family Galagidae includes the small, nocturnal lorisiforms known as galagos. They are agile leapers and run swiftly along branches and are omnivorous but mainly insectivorous. They have large eyes, strong hindlimbs, and long tails. Like lorids, their dental formula is 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 36 teeth. Galagids include four extant genera, *Otolemur* (greater galagos), *Euoticus* (needle-clawed bush babies), *Galago*, and *Galagoidea* (lesser galagos), as well as the three fossil genera *Saharagalago* (late Eocene), *Progalago* (early Miocene), and *Komba* (early middle Miocene).

Chiromyiformes

The infraorder Chiromyiformes includes only one extant species (*Daubentonia madagascariensis*), which is included in the family Daubentoniidae. They are the aye-ayes, dwellers of rain forests or deciduous forests. They do not exhibit sexual dimorphism, being of 30 to 40 cm in body length and 45 to 55 cm tail lengths. Their face and teeth are rodentlike and their body squirrel-like. The teeth number of Chiromyiformes is very reduced, their dental formula being 1/1 (incisors), 0/0 (canines), 1/0 (premolars), 3/3 (molars) = 9 teeth. They possess opposable thumbs much like other Primates, although both the hallux and fingers are long and slender.

This is an enigmatic group whose phylogenetic relationships are not clear. No fossils of Chiromyiformes have been found. The only other known species, *Daubentonia robusta* (giant aye-aye), became extinct at the beginning of the 20th century. If they represent a basal group to all the strepsirrhines, then they might have evolved 63 million years ago; but if they are simply a sister clade to Lemuriformes, then they might have evolved 50 million years ago. Molecular-clock analyses suggest that Chiromyiformes and Lemuriformes diverged more than 45 million years ago.

Lemuriformes

The infraorder Lemuriformes includes the typically known lemurs, nicknamed as spirits of the night, or ghosts,

due to their large, reflective eyes that shine at night. The infraorder is subdivided into five families: Cheirogaleidae, Megaladapidae, Lepilemuridae, Lemuridae, and Indridae. The scheme of evolutionary relationships supports the hypothesis that strepsirrhines had an African Arabian origin and that lemuriforms likely colonized Madagascar by crossing the Mozambique Channel. DNA molecular-clock analyses suggest that indrids are the more primitive among the extant lemuriforms; indrids are derived from lemuriids, as were the cheirogaleids 28 million years ago.

The family Cheirogaleidae includes the dwarf and mouse lemurs, small lemuriforms living in Madagascar that are nocturnal, arboreal, and omnivorous. Their size is only 15 to 30 cm, and they weigh no more than 0.5 kg. Their dental formula is 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 36 teeth. They comprise five extant genera, *Cheirogaleus*, *Microcebus*, *Mirza*, *Allocebus*, and *Phaner*, and one known fossil genus, *Bugtilemur* (the late Oligocene species *B. mathesoni*). Although they include the earliest known fossils of lemuriforms, DNA molecular-clock analyses suggest that they are a more derived group.

The family Megaladapidae is extinct and includes only one genus: *Megaladapis* (Pleistocene-Holocene species *M. brachycephalus*, *M. dubius*, *M. edwardsi*, *M. grandidieri*, *M. insignis*, and *M. madagascariensis*). Its species lived in Madagascar and became extinct only 500 years ago. They were large, between 1.3 and 1.5 m in length, and had long arms and fingers (specialized for grasping trees) and legs adapted for vertical climbing. They are closely related to the lepilemurs, which were for a time included with the megaladapids. The family Lepilemuridae includes the sportive lemurs (*Lepilemur*), a medium-sized lemuriform with a 30 to 35 cm length and 0.9 kg weight. They are herbivorous, strictly nocturnal, and predominantly arboreal. No fossil species belonging to this family has been found, and sportive lemurs are known only during the recent Holocene.

The Pliocene-Recent family Lemuridae includes the typical lemurs. They are medium-sized lemuriforms, arboreal, quadrupedal, agile, and herbivorous. They are 30 to 55 cm in length and 0.7 to 5 kg in weight. Their hindlimbs are slightly longer than their forelimbs. Their dental formula is 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 36 teeth. The family includes five extant genera, *Hapalemur* (bamboo lemurs), *Prolemur* (greater bamboo lemurs), *Lemur* (ring-tailed lemurs), *Varecia* (ruffed lemurs), and *Eulemur* (brown lemurs), and one recently extinct genus, *Pachylemur* (Holocene species *P. insignis* and *P. jullyi*), which lived in Madagascar and is closely related to *Varecia*.

The Pleistocene-Recent family Indridae includes large-sized lemuriforms known as indrids. There are three extant indrid genera: *Indri* (indrids or babakotos), *Avahi* (avahis or woolly indrids), and *Propithecus* (sifakas). They are arboreal and herbivorous, and they are large in size but vary in

size considerably from species to species. While the avahis are only 30 to 50 cm in length and 0.6 to 1.2 kg in weight, the sifakas are 45 to 55 cm and 4 to 6 kg and the indrids are 65 to 80 cm and 8 to 13 kg. Their hind legs are longer than their forelegs, with long and thin hands. Their thumbs cannot be opposed to the other fingers correctly. Their dental formula is 2/2 (incisors), 1/1 (canines), 2/2 (premolars), 3/3 (molars) = 32 teeth. There is a fossil genus, with close ties to extant indrids, called *Mesopropithecus* (Pleistocene–middle Holocene species *M. pithecoides*, *M. globiceps*, and *M. dolichobrachion*), a larger and longer-armed indrid, which became extinct only 500 years ago.

The three extant genera mentioned above and *Mesopropithecus* have been grouped in the subfamily Indridinae. In addition, another two extinct indrid subfamilies have been considered: Archaeolemurinae, which includes the fossil genera *Hydropithecus* (Pleistocene-Holocene species *H. stenognathus*) and *Archaeolemur* (Pleistocene-Holocene species *A. majori* and *A. edwardsi*); and Palaeopropithecinae, known as “sloth lemurs,” which includes the fossil genera *Archaeoindris* (early Holocene species *A. fontoynti*), *Babakotia* (Holocene species *B. radofilai*), and *Palaeopropithecus* (Holocene species *P. ingens* and *P. maximus*). All of them document a wide adaptive radiation of lemuriforms in Madagascar from their arrival on the island to little more than 1,000 years ago. *Hydropithecus* was a large lemuriform up to 13 kg in weight, probably terrestrial, that lived until recently (less than 1,000 years ago), becoming extinct probably before the arrival of humans to the island of Madagascar. *Archaeolemur* was semiterrestrial, about 17 kg in weight, and clearly related to the living indrids. Both archaeolemurine genera belonged to the ancestral group of the indrids. *Palaeopropithecus* was a large-sized, climber-hanger lemuriform, with a dental formula of 2/2 (incisors), 1/0 (canines), 2/2 (premolars), 3/3 (molars) = 30 teeth, that is, with a canine lacking on the lower jaw. *Archaeoindris* was the largest of the Primates of Madagascar, which weighed almost 200 kg and measured around 1.5 m in height. Due to its weight, it should be near-exclusively terrestrial or adapted to slow, ponderous climbing, like the sloths. *Babakotia* was a medium-sized (approximately 15 kg in weight) indrid whose inferred positional behaviors were primarily slow climbing and hanging. The indrid genus *Mesopropithecus* was close to these more primitive paleopropithecines.

Haplorrhines

The suborder Haplorrhini includes the “dry-nosed” Primates, that is, prosimian tarsiers and simians, also called anthropoids. Their brain capacity is significantly greater than the strepsirrhines’ brain capacity. Haplorrhines include two great groups or clades sometimes considered as suborders: Tarsiiformes and Anthropoidea. In the latter case,

both haplorrhines and strepsirrhines should rise to an upper category, perhaps as semiorders. DNA molecular-clock analyses indicate that tarsiiiforms and anthropoids parted ways 58 million years ago.

Tarsiiiformes

The Tarsiiiformes include the modern tarsiers (genus *Tarsius*), living on the islands of southeastern Asia. They are the most primitive group of the haplorrhines. They were widespread in the past, their fossils being found in Eurasia and North America and perhaps in Africa. This group is often classified as an infraorder although others consider that this group should be elevated to an upper category (suborder Tarsiiiformes). Tarsiiiformes represent a link between toothcombed strepsirrhines and the anthropoids. They include only one infraorder: Tarsioidea.

The carpolestid is an extinct family traditionally included in Plesiadapiformes, but it has been considered on some occasions as belonging to Tarsiiiformes. Carpolestids are relatively late Paleocene–early Eocene Tarsiiiformes-like Plesiadapiformes of Eurasia and North America. Their size was similar to that of a mouse, approximately 0.02 to 0.15 kg in weight. They were characterized by two large upper-posterior premolars and one large lower-posterior premolar. Carpolestids have been considered the ancestor of both tarsoids and anthropoids and classified as a second infraorder (Carpolestoidea) within the clade tarsiiiforms. Nevertheless, the phylogenetic relationships of these groups are not clear. Among the known genera are the *Carpodaptes* of the early Paleocene to early Eocene (62–50 million years ago), *Elphidotarsius* of the early to the late Paleocene (62–56 million years ago), *Carpolestes* of the middle to late Paleocene (60–56 million years ago), and *Chronolestes* of the early Eocene (55–49 million years ago).

The infraorder Tarsioidea includes the modern tarsiers or prosimian haplorrhines, which are grouped in the family Tarsiidae. It also comprises fossil species of two other extinct families: Omomyidae and Afrotarsiidae. The family Omomyidae is the most primitive and includes the typically known omomyids, all extinct, that radiated during the Eocene between 55 and 34 million years ago. Their fossils have been found in North America, Eurasia, and possibly Africa and are the most remarkable Primates of the Eocene together with the strepsirrhine adapids. Their size was relatively small, with a weight less than 0.5 kg, although some reached more than 1 kg. They had a large brain, large eye orbits, a narrow gap between the eyes, and a short face with dental arcades. Their dental formula was 2/2 (incisors), 1/1 (canines), 2/2 or 3/3 (premolars), 3/3 (molars) = 32 to 34 teeth. They were frugivorous or folivorous and presumably still had a rhinarium, that is, a wet nose, indicating that they were a very primitive haplorrhine. Many paleoprimatologists consider them a basal member of all haplorrhines, that is, the base of both tarsiiiforms and anthropoids. However, others consider them a

basal member of only the tarsiiiforms, whereas still others consider them related to adapids and carpolestids.

Omomyids have been subdivided into three subfamilies, Anaptomorphinae, Microchoerinae, and Omomyinae, and a group of *incertae sedis* genera, probably primitive members of the family Omomyidae. Among these last are included *Altiatlasius* of the late Paleocene (58–56 million years ago) and *Altanius* of the early Eocene (58–56 million years ago). The age of these fossil genera is consistent with the DNA molecular-clock analyses, whether or not they are considered the ancestor of both tarsiiiforms and anthropoids. The subfamily Anaptomorphinae includes an extensive group of primitive omomyids, which include *Troglemur* of the middle and late Eocene (48–40 million years ago), and both *Teilhardina* and *Tetonius* of the early Eocene (58–56 million years ago). *Teilhardina*, an insectivorous tarsier-like omomyid of 0.1 kg in weight, may also be near the base of the radiation that produced all living haplorrhines. Among the genera of the subfamily Microchoerinae are included *Pseudoloris* of the middle Eocene to early Oligocene and *Necrolemur* of the middle to late Eocene. The most extensive group of omomyids is the subfamily Omomyinae, which includes well-known genera such as *Omomys* and *Shoshonius* of the early Eocene, *Utahia* of the early to middle Eocene, *Macrotarsius* of the middle Eocene to early Oligocene, and *Rooneyia* of the late Eocene to early Oligocene. The approximately 50-million-year-old genus *Shoshonius* was a 0.15-kg-in-weight prosimian with a very similar morphology to the modern tarsier. The 50- to 45-million-year-old genus *Omomys* was more similar to galagos than to tarsiers in its morphology, being 0.3 kg in weight.

The family Tarsiidae includes small prosimians with enormous eyes, very long hindlimbs, and extremely elongated feet. Unlike other prosimians, tarsiers have no toothcomb for which they were definitively classified within haplorrhines and not within the strepsirrhines like the rest of the prosimians. Their dental formula is 1/1 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 32 teeth. They are primarily insectivorous, although they also eat small vertebrates. The family Tarsiidae includes eight species, including *Tarsius syrichta* (Philippine tarsier), *Tarsius bancanus* (Horsfield's tarsier), *Tarsius tarsier* (spectral tarsier), and *Tarsius pumilus* (pygmy tarsier). *T. bancanus* is a fossil species from the middle Eocene about 45 million years ago. Other extinct fossil species have been found, such as *Tarsius eocaenus* of the middle Eocene (about 45 million years ago) and *Tarsius thailandica* of the early Miocene (about 20 million years ago). The other extinct family of the infraorder Tarsioidea, the family Afrotarsiidae, is closely related to extant tarsiers. It is a fossil group of particular interest in questions about the origin of tarsier specializations and the early tarsiod radiations during the early and middle Oligocene (33–26 million years ago). Only one genus, *Afrotarsius*, and only one species, *Afrotarsius chatrathi*, of this family are known to date.

Anthropoids

The anthropoids, also called simiiforms, include the simians, that is, the higher Primates, such as the familiarly known monkeys, apes, and humans. Like Tarsiiformes, this group is often classified as an infraorder, the infraorder Anthropoidea, although others consider that it should be elevated to an upper category (suborder Anthropoidea). This taxon is traditionally subdivided into two great infrarorders, Platyrrhini and Catarrhini, but there are some primitive fossil anthropoids whose assignment to one of these two infraorders is debatable.

The most primitive anthropoids belong to the group called informally palaeoanthropoid, which could be considered a new infraorder (“Palaeoanthropoidae”). It includes two families: “Palaeoanthropidae” and Pondaungidae. The first family includes genera such as *Myanmarpithecus* (middle Eocene species *M. yarshensis*) and *Djebelemur* (early Eocene species *D. martinezi*). The second family has been subdivided into two subfamilies: Siamopithicini, which includes the genus *Siamopithecus* (late Eocene species *S. eoacenus*), a primitive, medium-sized (7 kg in weight) palaeoanthropoid; and Pondaungini, which includes the genera *Amphipithecus* (late Eocene species *A. mogaungensis*) and *Pondaungia* (middle late Eocene species *P. cotteri* and *P. savagei*) as well as other palaeoanthropoids of medium size (7 kg in weight) and frugivorous.

Platyrrhines and catarrhines split from the ancestral simian line about 50 million years ago (late Eocene), the first ones occupying the New World and the second ones occupying the Old World. DNA molecular-clock analyses suggest that platyrrhines and catarrhines diverged about 40 to 45 million years ago. Earlier fossil members of anthropoids of both platyrrhines and catarrhines had small brain sizes, but the larger brain sizes seen in both groups today must have arisen independently. This documents that large brains evolved separately several times within the Primates.

Platyrrhines

The infraorder Platyrrhini includes the New World monkeys of Central and South America, such as the titis, tamarins, marmosets, capuchins, and so on. They are small or medium-sized anthropoids, which differ from catarrhines mainly by a flat nose and by having 12 premolars instead of 8. Their dental formula is 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 40 teeth. Almost all platyrrhines are arboreal and show substantial paternal care of the young.

About 50 million years ago, the ancestral anthropoids split into platyrrhines and catarrhines. The first platyrrhines surely migrated across the Atlantic Ocean from Africa to South America, perhaps on a raft of vegetation similar to the vast pieces of floating mangrove forest that storms occasionally break off at present from the tropical African coast. The infraorder Platyrrhini is subdivided into six families:

Branisellidae, Callitrichidae, Atelidae, Pitheciidae, Cebidae, and Aotidae (the first of which is one fossil group of primitive platyrrhines). DNA molecular-clock studies indicate that cebids, aotids, and callitrichids constitute a clade, diverging one from another 20 million years ago; cebids are the most primitive group of this clade and callitrichids the most derived. In addition, atelids and pitheciids form other clades. Both clades diverged 25 million years ago.

The extinct family Branisellidae is composed of a single genus, *Branisella* (late Oligocene species *B. boliviana*). This genus lived 26 million years ago in South America, and it is an interesting fossil because of its dental similarity with the Oligocene *Proteopithecus*, a primitive catarrhine. This has allowed paleoprimatologists to hypothesize that the primitive platyrrhine ancestors came to South America from Africa. The modern platyrrhines, which are most closely related in morphology to *Branisella*, appear to be the callitrichids. Nevertheless, the first platyrrhines should be primitive monkeys close to the branisellids that shared traits common to all the first representatives of each platyrrhine family.

The family Cebidae is an extensive group that includes the capuchin and squirrel monkeys. They are generally arboreal, diurnal, and omnivorous and mainly eat fruits and insects. Their dental formula is 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 or 2/2 (molars) = 40 to 36 teeth. The family has been subdivided into two extant subfamilies (Saimiriinae and Cebinae) and three other fossil subfamilies (Palaeocebinae, Tremacebinae, and Lagonimiconinae). According to molecular-clock analyses, the two extant subfamilies, saimiriines and cebines, diverged about 20 million years ago.

The subfamily Saimiriinae includes the present *Saimiri* (squirrel monkeys), which live in tropical forests of Central and South America. They are small, diurnal, arboreal monkeys of 60 to 75 cm (of which 35–40 cm are the tail) and 0.8 to 1.1 kg in weight. They appeared in the middle Miocene, and an extinct species (*S. fieldsi*) is known. A fossil genus of Saimiriinae is also known, *Laventiana* (middle Miocene species *L. annectens*). *Laventiana* is closely related to *Saimiri* and *Cebus*, and it has been considered an intermediate taxon between squirrel monkeys (*Saimiri*) and callitrichids. The subfamily Cebinae includes the modern *Cebus* (capuchin monkeys or capuchins), which appeared in the Pleistocene, and a fossil genus *Dolichocebus* (late Oligocene species *D. gaimanensis*). Capuchins are small monkeys of about 30 to 45 cm in body length and 4 kg in weight. They are characterized by a prehensile tail and a small brain capacity (about 80 cm³). *Dolichocebus* lived 25 to 24 million years ago, and it is strongly related to the Saimiriinae lineage.

The extinct subfamily Palaeocebinae includes three genera: *Chilecebus* (early Miocene species *C. carrascoensis*), *Patasola* (middle Miocene species *P. magdalanae*), and *Antillothrix* (late Pleistocene–middle Holocene species *A. bernensis*). The 20-million-year-old genus *Chilecebus* was a

small monkey of about 0.6 kg, with a smaller relative brain size than the brain of modern Cebidae. *Patasola* shares dental features with callichitrids and saimirines, suggesting that they are the first descendants of the cebids. *Antillothrix* has close ties to cebid capuchins and is nicknamed the Hispaniola monkey since it was found on the island of Hispaniola.

The extinct subfamily Tremacebinae includes only one genus, *Tremacebus* (late Oligocene–early Miocene species *T. harringtoni*), a Patagonian monkey of about 1 m in length closely related to modern night monkeys (*Aotus*). The extinct subfamily Lagonimiconinae includes a single genus, *Lagonimico* (middle Miocene species *L. conclutatus*), a giant tamarin-like cebid of about 1.2 kg that lived 13.5 million years ago.

The family Aotidae includes the modern *Aotus* (from the middle Miocene). They are the night monkeys, also called owl monkeys or douroucoulis, living in the forests of Central and South America. They are nocturnal, arboreal, quadrupedal, and omnivorous monkeys, including insects and small vertebrates in their diet. They are small to medium-sized monkeys of 50 to 100 cm in length (including a 20–50 cm tail) and 0.5 to 1.3 kg in weight. One fossil species of the middle Miocene is known, the 12-million-year-old *Aotus didensis*. It could be related to primitive atelid *Xenothrix*.

The family Callitrichidae includes some types of marmosets and tamarins, which are the smallest of the anthropoids. All of them are arboreal and mainly insectivorous and frugivorous, although some also eat small vertebrates. The family consists of two subfamilies: Callimiconinae and Callitrichinae, which diverged 13 million years ago according to molecular-clock studies. The first one includes the modern genus *Callimico* (species *C. goeldii* or Goldey's marmoset) and the fossil genus *Mohanamico* (middle Miocene species *M. herskovitzi*). *Callimico* is a small Amazonian marmoset of 50 cm in length (30 cm of which are the tail). The second family includes three extant genera, *Leontopithecus*, *Saguinus*, and *Callithrix*, and one fossil genus, *Micodon* (middle Miocene species *M. kiotensis*). *Callithrix* includes the marmosets and is sometimes divided into four species: *Callithrix* (Atlantic marmosets), *Mico* (Amazonian marmosets), *Callibella* (Roosmalen's dwarf marmosets), and *Cebuella* (pygmy marmosets). They are very small monkeys, most of which are about 15 to 25 cm in body size and about 0.4 kg in weight. *Saguinus* includes the tamarins, small omnivorous monkeys of 50 to 70 cm in length (30–40 cm of which are the tail) and about 0.3 to 0.9 kg in weight. *Leontopithecus* are the lion tamarins, small, diurnal, tree-dweller monkeys of 75 cm in length (45 cm of which are the tail) and about 0.9 kg in weight. No fossil species are known of these genera although the living species have fossils known from the Pleistocene. The middle Miocene genus *Mohanamico* was a small extinct marmoset of about 1 kg in weight that lived in Amazonia.

The family Pitheciidae includes the titis, saki monkeys, and uakaris. They are small or medium-sized monkeys,

diurnal, arboreal, quadrupedal, and predominantly herbivorous (fruits and seeds), although some also eat insects. The family consists of two subfamilies: Pitheciinae and Callicebinae (or Homunculinae). DNA molecular-clock analyses indicate pitheciines and callicebines parted ways 17 million years ago.

The subfamily Pitheciinae consists of three extant genera, *Pithecia*, *Chiropotes*, and *Cacajao*, all of which are known only from the Holocene. *Pithecia* includes the sakis or saki monkeys, which reach 60 to 100 cm in length (of which 30–50 cm are the tail) and about 1.8 to 2.2 kg in weight and are omnivorous (including small rodents and bats in their diet). They have close ties to *Chiropotes*, the bearded sakis, medium-sized monkeys of similar length but more weighty (2–4 kg) than *Pithecia*. *Cacajao* includes the uakaris, which have tails (15–18 cm) of substantially less length than their bodies (40–45 cm). According to the DNA molecular-clock analyses, the *Chiropotes-Cacajao* group diverged from the *Pithecia* group about 10 million years ago. In addition, five extinct genera have been recognized within the pitheciines: *Soriacebus* (early Miocene species *S. ameghinorum* and *S. adriane*), *Proteropithecina* (middle Miocene species *P. neuquenensis*), *Cebupithecia* (middle Miocene species *C. sermientoi*), *Nuciraptor* (middle Miocene species *N. rubricae*), and *Mohanamico* (middle Miocene species *M. herskovitzi*). Some of the dental and mandibular characteristics of *Soriacebus* resemble the callichitrids, while those of *Proteropithecina* suggest a relationship with callicebines. *Mohanamico* is a problematic genus that has been related to the callichitrids but also to *Aotus*.

The subfamily Callicebinae consisted of one modern genus: *Callicebus* (from the Pleistocene), which is sometimes subdivided into two genera (*Callicebus* and *Torquatus*). They are the titis or titi monkeys, small monkeys that have a furry tail (25–55 cm) longer than the body (25–45 cm). The subfamily Callicebinae also includes two extinct genera: *Homunculus* (early middle Miocene species *H. patagonicus*) and *Carlocebus* (early Miocene species *C. carmenensis* and *C. intermedius*). The first genus was a diurnal, omnivorous monkey, which seems to be related to both the cebid *Tremacebus* and the atelid *Brachyletes*. *Carlocebus* was another callicebine, predominantly frugivorous, closely related to the modern *Callicebus*.

The family Atelidae includes the only Primates whose tails are prehensile (in addition to capuchins). They are the howler, spider, and woolly monkeys, which live in the dense rain forests of Central and South America. Atelids are small to medium-sized monkeys, arboreal, diurnal, quadrupedal, and predominantly frugivorous and folivorous, although some species also eat insects. The family Atelidae is subdivided into three subfamilies, one extinct, Xenotrichinae, and two extant, Alouattinae and Atelinae. The subfamily Xenotrichinae recently became extinct, with only one genus and species known: genus *Xenothrix* (Pleistocene-Holocene species *X. mcgregori*). Members of *Xenothrix* are nicknamed

the Jamaican monkeys, which share a close affinity with both pitheciids and aotids. According to DNA molecular-clock analyses, the two extant subfamilies, alouattines and atelines, diverged about 16 million years ago.

The subfamily Alouattinae includes the modern *Alouatta* (from the Pleistocene), familiarly called howler monkeys. They have prehensile tails, move quadrupedally (but do not brachiate), and are only folivorous. Alouattines also include three extinct fossils: *Protopithecus* (late Pleistocene–early Holocene species *P. brasiliensis*), *Paralouatta* (early Miocene–late Holocene species *P. veronai* and *P. marinae*), and *Stirtonia* (middle late Miocene species *S. tatacoensis* and *S. victoriae*). *Protopithecus* was a large monkey (25 kg in weight), with characteristics resembling the two atelid subfamilies. *Paralouatta* seems to be intermediate between the xenotrichines and modern alouattines. *Stirtonia* could be near the ancestry of the atelines.

The subfamily Atelinae includes the modern *Ateles* (spider monkeys) and the group formed by the genera *Brachyteles* (muriquis), *Lagothrix* (woolly monkeys), and *Oreonax* (yellow-tailed woolly monkeys). In addition, one extinct genus is known, *Caipora* (late Pleistocene–early Holocene species *C. bambuitorum*). The living species are diurnal, arboreal, and omnivorous monkeys, characterized by prehensile tails capable of supporting their entire body weight. Spider monkeys (*Ateles*) are known from the Pleistocene and are medium-sized monkeys about 90 cm in length (including a 40-cm tail) and 6.5 kg in weight. Muriquis (*Brachyteles*), also known as woolly spider monkeys, are mainly folivorous monkeys of 40 to 60 cm in length (without their tails) and 4.5 to 9 kg in weight. Woolly monkeys (*Lagothrix*) are also medium-sized monkeys of 100 to 140 cm in length (of which 60–80 cm are their tails) and 4 to 10 kg in weight. The fossil ateline *Caipora* seems to be related to the alouattine *Protopithecus*.

Catarrhines

The infraorder Catarrhini includes the Old World monkeys from Africa and Eurasia (colobus, mandrills, langurs, macaques, baboons, etc.) grouped in the superfamily Cercopithecoidea; the apes (gibbons, orangutans, gorillas, and chimpanzees) and humans are grouped in the superfamily Hominoidea, and other fossil taxa are grouped in several superfamilies: Parapithecoidea, Propiopiithecoidea, Pliopiithecoidea, Dendropithecoidea, and Proconsuloidea. According to DNA molecular-clock analyses, the two living subfamilies, cercopithecoids and hominoids, parted ways about 25 million years ago. According to morpho-cladistic analyses, the parapithecoids are the most primitive, and from them evolved the propiopiithecoids. Both superfamilies have been sometimes grouped as the paracatarrhines, whereas the four other more modern ones represent the eucatarrhines. Among the eucatarrhines, the most primitive are the pliopiithecoids, from which evolved the dendropithecoids. These last ones may be the last common

ancestor of the cercopithecoids and hominoids, proconsulooids being intermediate between the dendropithecoids and the hominoids.

Parapithecoids

Some paleoprimatologists have considered that the parapithecoids are the last common ancestor of both platyrrhines and catarrhines, although they are probably only the basal group of all catarrhines. The superfamily Parapithecoidea consisted of two families, Eosimiidae and Parapithecoidea. The first, Eosimiidae, comprises very small primitive parapithecoids, between 0.03 and 0.3 kg in weight. They were predominantly arboreal and frugivorous. Eosimiids might be close to the ancestors of all catarrhines. Six genera are known: *Bahinia* (middle Eocene *B. pondaungensis*), *Eosimias* (middle Eocene species *E. sinensis* and *E. centenicus*), *Biretia* (late Eocene species *B. piveteaui*, *B. fayumensis*, and *B. megalopsis*), *Phenacopithecus* (middle late Eocene species *P. krishtalkai* and *P. xueshii*), *Anthrasimias* (early Eocene species *A. gujaratensis*), and *Phileosimias* (early Oligocene species *B. kalami* and *B. brahuiorum*). The 55- to 54-million-year-old genus *Anthrasimias* is probably the earliest eosimiid and has strong ties to the omomyids, such as *Altiatlasius*. The 40-million-year-old genus *Phenacopithecus* also resembles the omomyids and tarsiers, at least in its jaws, but unlike those had relatively small eyes. The 48-million-year-old genus *Eosimias* was a small primitive prosimian, 0.07 to 0.16 kg in weight, with catarrhine-like dental and mandibular characters. The 42-million-year-old genus *Bahinia* also possessed small eyes, suggesting both genera were diurnal. On the contrary, the 37-million-year-old *Biretia* apparently had orbits nearly as large as those of the tarsiers, evidencing nocturnality. Other traits suggest that *Biretia* is phylogenetically more advanced in the direction of the parapithecoids. The 30-million-year-old *Phileosimias* is a clear eosimiid, being the latest one, but some dental characteristics still resemble the earlier omomyids and adapiforms.

The family Parapithecoidea comprises small, early catarrhines that still retained three premolars. Their dental formula was 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 36 teeth. They are therefore primitive catarrhines that retained ancestral features like the eosimiids. The family Parapithecoidea has five genera known to date: *Qatrania* (late Eocene–middle Oligocene species *Q. wingi* and *Q. fleaglei*), *Parapithecus* (early middle Oligocene species *P. fraasi* and *P. grangeri*), *Arsinoea* (late Eocene–middle Oligocene species *A. kallimos*), *Serapia* (late Eocene–middle Oligocene species *S. eocaena*), and *Apidium* (early middle Oligocene species *A. phiomense*, *A. moustafai*, and *A. bowni*). The most well-known genera are *Parapithecus* and *Apidium*, the first probably near the base of the parapithecoid radiation. The 36- to 32-million-year-old genus *Apidium* was the smallest known of the catarrhines, approximately 30 to 40 cm in body length and 0.7 to 1.5 kg

in weight. It has a short snout, small eyes, and canine sexual dimorphism. Its individuals were diurnal, quadrupedal, and frugivorous. It seems to have certain affinities to the more modern propiipithecoid *Aegyptopithecus*. Certain dental characteristics of *Apidium* also resemble the oreopithecoids and cercopithecoids but may well have evolved in parallel or convergently in these groups. The 36- to 32-million-year-old genera *Qatrania* and *Arsinoea* were also frugivorous but resemble *Parapithecus*. The 36- to 30-million-year-old genus *Parapithecus* was a small prosimian (1.5–3 kg in weight) and surely folivorous or a seed eater. The 36- to 32-million-year-old genus *Serapia* has been considered allied to the propiipithecoids, mainly to *Proteopithecus*, but its dental traits have allowed it to be grouped with the other parapithecoids.

Propiipithecoids

The family Propiipithecoidea may be close to the common ancestry of the later catarrhines (eucatarrhines). They were primitive arboreal catarrhines the size of small cats, with apelike teeth, a small brain, and limbs similar to those of the acrobatic platyrrhine atelines. Their dental formula was already the catarrhine type: 2/2 (incisors), 1/1 (canines), 2/2 (premolars), 3/3 (molars) = 32 teeth. Propiipithecoids consisted of two important families, Oligopithecidae and Propiipithecidae.

The family Oligopithecidae is an extinct propiipithecoid family that includes late Eocene–middle Oligocene species. Its members were mainly insectivorous, according to its dental morphology. They split off the lineage of Old World monkeys and apes sometime after the New World monkeys split off. The family has three genera known to date: *Proteopithecus* (late Eocene–middle Oligocene species *P. sylviae*), *Catopithecus* (late Eocene–middle Oligocene species *C. browni*), and *Oligopithecus* (late Eocene–early Oligocene species *O. savagei* and *O. rogeri*). The 36- to 32-million-year-old genus *Oligopithecus* is the best known oligopithecoid. They were small monkeys, being 1 to 2 kg in weight, that lived in Africa. Their canines resemble those of the platyrrhine and callitrichines more than those of the catarrhines, their teeth being primitive compared with other haplorrhines. As propiipithecoids, they are older than Old World monkeys and apes but are already nearer the common ancestor of the extant catarrhines and cercopithecoids and hominoids. The 37- to 32-million-year-old genus *Catopithecus* was a 1-kg-weight arboreal, diurnal, quadrupedal oligopithecoid. There is an apparently evolutionary transition from primitive *Catopithecus* to relatively apelike *Aegyptopithecus*. Similar in morphology and age to *Catopithecus* is *Proteopithecus*. Both genera have been sometimes grouped in a new family called Proteopithecidae and considered an intermediate group between propiipithecoids and oligopithecoids. The evolutionary transition between primitive oligopithecoids and derived propiipithecoids requires little more than increased body size and the concomitant shift to greater frugivory.

The family Propiipithecidae includes arboreal, quadrupedal, frugivorous catarrhines with characteristics typical of the entire superfamily Propiipithecoidea. It consists of four genera known to date: *Algeripithecus* (middle Eocene species *A. minutus*), *Moeripithecus* (Oligocene species *M. markgrafi*), *Aegyptopithecus* (late Eocene–early Oligocene species *A. zeuxis*), and *Propiipithecus* (late Eocene–middle Oligocene species *P. haeckeli*, *P. chirobates*, and *P. ankei*). The most famous propiipithecoid genera are these two last ones. *Aegyptopithecus*, nicknamed dawn ape and with a single known species (*A. zeuxis*), is a propiipithecoid that lived 35 to 31 million years ago, predating the divergence between cercopithecoids and hominoids. It is a crucial link between both Eocene cercopithecoids and Miocene hominoids. Its body was small, being around 6 to 8 kg in weight, but with a long tail. Its cranium had a sagittal crest, and its brain capacity was very small (30 cm³ on average), although the brain contained advanced traits when compared with the strepsirrhines. Its canines showed sexual dimorphism. Its individuals were frugivorous (also folivorous), diurnal, arboreal, and quadrupedal, and they practiced suspensory behavior. *Propiipithecus* was a typical propiipithecoid, resembling the present gibbons. They were 40 cm in length, 4 to 6 kg in weight, and diurnal, frugivorous, arboreal, and quadrupedal, with hind-climbing suspensory behavior. *Algeripithecus* is a single taxon because it is probably the earliest known anthropoid, living 45 million years ago. *Moeripithecus* is close to *Propiipithecus*, and some have suggested that it is a juvenile specimen of the genus.

Pliipithecoids

The superfamily Pliipithecoidea is closer to the modern catarrhines or eucatarrhines (cercopithecoids and hominoids) than to the earliest catarrhines or paracatarrhines (parapithecoids and propiipithecoids). Some pliiipithecoids had shorter faces and larger brains than propiipithecoids, their brain capacity being larger (around 100 cm³). They participated in the anthropoid Primates radiation that occurred just after the middle Oligocene extinction that was caused by increased glaciation, worldwide cooling, and floral turnovers. The pliiipithecoids' and later anthropoids' body size, like their brain capacity, was larger than that of earlier anthropoids. They became primarily frugivorous, and their sexual dimorphism suggests that the anthropoids began to live in large, complex, polygamous groups. Learning and social complexity may have served to buffer them from the extremes of the increasing variability of the Oligocene climate.

The superfamily Pliipithecoidea consisted of three families: Palaeopliipithecidae, Pliipithecidae, and Crouzeliidae. The palaeopliipithecoid group includes several *incertae saedis* genera, such as *Paidopithecus* (late Miocene species *P. rhenatus*), *Kalepithecus* (early middle Miocene species

K. songhorensis), *Limnopithecus* (early middle Miocene *L. legetet* and *L. evansi*), and *Kamoyapithecus* (late Oligocene *K. hamiltoni*). The genus *Kamoyapithecus* is the oldest pliopithecoid, living 28 to 24 million years ago. It was a large-sized catarrhine, being 30 to 40 kg in weight. The 22- to 17-million-year-old genus *Limnopithecus* has some morphological similarities to *Dendropithecus*, suggesting phyletic relationships. It was a small African catarrhine of 4 to 5 kg in weight, arboreal, quadrupedal, and frugivorous. *Kalepithicus* was another small frugivorous palaeopliopithecoid, being approximately 5 kg in weight and probably related to the dendropithecoids. The 10- to 9-million-year-old genus *Paidopithecus* shared some traits with both pliopithecids and crouzeliids, but its phyletic relationships are not clear.

The family Pliopithecidae is composed of the earliest apes that combined primitive features (small brain, long snout, and a tail in some species) with more advanced features (stereoscopic vision, apelike teeth, and jaws). Their dental formula generally was 2/2 (incisors), 1/1 (canines), 2/2 (premolars), 3/3 (molars) = 32 teeth. Pliopithecids are subdivided into two subfamilies, early middle Miocene Dionysopithecinae and early late Miocene Pliopithecinae. The first one has two known genera: *Platodontopithecus* (early middle Miocene species *P. jianghuaiensis*) and *Dionysopithecus* (early middle Miocene species *D. shuangouensis* and *D. orientalis*). The 18- to 17-million-year-old genus *Dionysopithecus* was a small pliopithecoid closely related to the dendropithecoid *Micropithecus* (both genera have been proposed as possible gibbon ancestors).

Another pliopithecoid with similar characteristics and age was *Platodontopithecus*. Three genera are known of the subfamily Pliopithecinae: *Egarapithecus* (late Miocene species *E. narcisoi*), *Epipliopithecus* (early middle Miocene species *E. vindobonensis*), and *Pliopithecus* (middle late Miocene species *P. antiquus*, *P. platyodon*, *P. zhanxiangi*, and *P. piveteaui*). The most well-known pliopithecoid genus is *Pliopithecus*, which lived in Eurasia 17 to 15 million years ago. Its specimens are characterized by long arms that are well adapted to climbing trees. They seem to have links to the crouzeliid *Anapithecus*. The 16- to 15-million-year-old genus *Epipliopithecus* had long hands and feet and long, curved fingers compared with *Pliopithecus* and some postcranial characteristics resembling the hominoids. These individuals were very likely agile climbers. The 9-million-year-old genus *Egarapithecus* had many similarities with the crouzeliids, and some paleoprimateologists include it within this family.

The family Crouzeliidae differs from its ancestors the pliopithecids mainly in dental traits. It has three known genera: *Anapithecus* (late Miocene species *A. hernyaki*), *Laccopithecus* (late Miocene *L. robustus*), *Plesiopliopithecus* (middle-late Miocene species *P. lockeri* and *P. priensis*), and *Crouzelia* (middle-late Miocene species *C. auscitanensis* and *C. rhodanica*). The 16- to 14-million-year-old genera *Plesiopliopithecus* and *Crouzelia* are today

considered congeneric. They were small pliopithecoids with smaller teeth than *Pliopithecus* but with a similar dental formula. The 9- to 8-million-year-old genus *Anapithecus* was a medium-sized anthropoid, larger than all other pliopithecoids. Finally, the 8-million-year-old genus *Laccopithecus* was another similar crouzeliid, with canine sexual dimorphism similar to nearly all the other anthropoids. The characteristics of crouzeliids such as *Anapithecus* are consistent with the general conclusion that the pliopithecoids contain the last common ancestor of the cercopithecoid lineage and the dendropithecoid-proconsuloid-hominoid lineage.

Cercopithecoids

The superfamily Cercopithecoidea comprises the familiarly known Old World monkeys, such as baboons, mandrills, and macaques, which appeared between 25 and 22 million years ago. They are today native to Africa and Asia, inhabiting tropical rain forests, savannas, scrublands, and mountainous terrains. Nevertheless, they are also known in the European fossil record. Cercopithecoids are Primates of medium to large size, being the smallest of the talapoin (*Miopithecus*) at 35 to 40 cm in length and 0.7 to 1.3 kg in weight, and the largest of the mandrills (*Mandrillus*), whose males are 90 to 100 cm in length and 30 to 40 kg in weight. Unlike apes, they have a tail, for which they are also nicknamed tailed apes. Their dental formula is 2/2 (incisors), 1/1 (canines), 2/2 (premolars), 3/3 (molars) = 32 teeth, which differentiates them from apes. Most cercopithecoids are at least partially omnivorous, but they prefer a vegetarian diet. The superfamily Cercopithecoidea is composed of three families, one fossil, Victoriapithecidae, and two extant, Colobinidae and Cercopithecidae. Molecular-clock analyses suggest that the two extant families, colobinids and cercopithecids, diverged around 14 million years ago.

The family Victoriapithecidae has three known genera: *Victoriapithecus* (early middle Miocene species *V. macinnesi*), *Prohylobates* (early middle Miocene species *P. tandyi* and *P. simonsi*), and *Adelopithecus* (late Miocene species *A. hypsilophus*). *Victoriapithecus* is a single fossil, and it is the oldest cercopithecoid known to date, living 22 million years ago. It already has the typical cercopithecoid dental formula. It showed sexual dimorphism in its canines, its body mass was around 7 kg, and its mandibles were relatively deep compared with other cercopithecoids. Most famous is *Prohylobates*, a small to medium-sized monkey (4–25 kg) of frugivorous and folivorous diet. The victoriapithecids are the oldest cercopithecoids, all of them coming from Africa. They lived between 22 and 15 million years ago, predating the divergence of the modern families Colobinidae and Cercopithecidae. *Prohylobates* has been considered a possible ancestor of the colobinids, whereas *Victoriapithecus* could be a possible ancestor of the cercopithecids.

Unlike the cercopithecids, the colobinids are more restricted in morphology, range, and behavior pattern, and

all are leaf eaters with a complicated digestive tract to facilitate the low-nutrition diet. The family Colobinidae is subdivided into three subfamilies: Palaeocolobinae, Colobinae, and Presbytinae, the two last of which have extant species. DNA molecular-clock analyses suggest that colobines and presbytines diverged 10 million years ago.

The subfamily Palaeocolobinae has two extinct genera: *Dolichopithecus* (late Miocene–late Pliocene species *D. gallicus* and *D. rusciniensis*) and *Mesopithecus* (late Miocene–late Pliocene species *M. pentelicus*, *M. delsoni*, and *M. monspessulanus*). This last genus, *Mesopithecus*, is a primitive colobinid that lived 11 to 5 million years ago, surely one of the first cercopithecoids entering Eurasia from Africa. It looks similar to the macaque, with a 40-cm length. Their individuals were semiterrestrial and adapted to both walking and climbing. They were probably ancestors of the current gray langurs (*Semnopithecus*). Another possible descendant is *Dolichopithecus*, which lived in Eurasia from about 4.5 to 2.5 million years ago. It was terrestrially adapted, even more so than any living colobine.

The subfamily Colobinae includes Old World monkeys, such as the colobines and the langurs. They are medium-sized colobinids with long tails. Most species are arboreal, but some live a more terrestrial life. They are exclusively herbivores (leaves, flowers, fruits), although they occasionally eat insects and other small animals. Colobinids are composed of three extant genera: *Colobus* (late Miocene–Recent), *Ptilocolobus* (Recent), and *Procolobus* (Recent). *Colobus* are the black-and-white colobus and guerezas, which are closely related to the two other genera: *Ptilocolobus*, the red colobus, and *Procolobus*, the olive colobus. They are medium- and large-sized cercopithecoids, about 125 to 150 cm in length (including a 70–80 cm tail), and between 9 and 20 kg in weight. Five extinct colobin genera are known to date: *Microcolobus* (late Miocene species *M. tugenensis*), *Cercopithecoides* (late Pliocene–middle Pleistocene species *C. williamsi* and *C. kimeui*), *Libypithecus* (late Miocene–early Pliocene species *L. markgrafi*), *Rhinocolobus* (middle late Pliocene species *R. turkanensis*), and *Paracolobus* (early Pliocene–early Pleistocene species *P. chemeroni* and *P. mutiwa*). In addition, one fossil species of *Colobus* has been found, *C. flandrini*.

The subfamily Presbytinae includes seven extant genera: *Presbytis* (late Miocene–Recent), or gray langurs; *Semnopithecus* (Pliocene–Recent), or surilis; *Trachypithecus* (late Pliocene–Recent), or lutungs; *Pygathrix* (early Pleistocene–Recent), or doucs; *Rhinopithecus* (early Pleistocene–Recent), or snub-nosed monkeys; *Simias* (Recent), or pig-tailed langurs; and *Nasalis* (Recent), or proboscis monkeys, also known as long-nosed monkeys. They are medium- to large-sized, diurnal, arboreal, herbivorous or frugivorous monkeys of 90 to 180 cm in length (including a 50–100 cm tail) and between 5 and 25 kg in weight. Like the colobines, they show sexual dimorphism in size. Presbytines also include one extinct genus, *Parapresbytis* (late Pliocene species *P. eohanuman*), which seems to be phylogenetically close to

the palaeocolobin *Dolichopithecus*. Several fossil species of *Presbytis* (*P. sivalensis*), *Trachypithecus* (*T. robustus* and *T. sangiranensis*), and *Rhinopithecus* (*R. lantianensis*) have been also been identified.

The family Cercopithecidae includes a wide variety of forms, all of which share cheek pouches for temporary food storage and usually large incisors reflecting a frugivorous diet. It is subdivided into four subfamilies: Macacinae, Papioninae, Theropithecinae, and Cercopithecinae. Cercopithecids are represented first by the fossil papionine *Parapapio*, which was a semiterrestrial monkey probably close to the common ancestor of later forms, and then by several species of the highly terrestrial living *Theropithecus*. DNA molecular-clock analyses indicate that macacines, papionins, and theropithecines constitute a clade that diverged from cercopithecines 10 million years ago. These studies also suggest that macacines, papionins, and theropithecines parted different ways around 7 million years ago.

The subfamily Macacinae is probably the most conservative of the cercopithecids, most species retaining ancestral traits in teeth, skull, and other structures. They are closely related to *Parapapio*. The subfamily has one extant genus, *Macaca* (late Miocene–Recent), the macaques, and two fossil genera, *Paradolichopithecus* (late Pliocene–Pleistocene species *P. arvernensis*) and *Procynocephalus* (late Pliocene–early Pleistocene species *P. wimani* and *P. subhimalayensis*). In addition, seven fossil species of *Macaca* have been found: *M. florentina*, *M. prisca*, *M. majori*, *M. libyca*, *M. anderssoni*, *M. jiangchuanensis*, and *M. palaeindica*. The macaques are diurnal, arboreal, rain forest dwellers, omnivorous, medium-sized monkeys of 50 to 130 cm in length (including a 2–70 cm tail) and between 3 and 10 kg in weight, with sexual dimorphism in size and tail size varying considerably from species to species. They are the most widespread of the Primates, aside from humans. The fossil record of the modern *Macaca* indicates that they were once even more widespread than today, living in Europe in addition to North Africa and eastern Asia. A large and semiterrestrial relative, *Paradolichopithecus*, inhabited Europe, central Asia, and perhaps eastern Asia 4 to 1.5 million years ago. *Procynocephalus* was a terrestrial, large-sized macacine savanna dweller and a root, fruit, and grass eater.

The subfamily Papioninae includes species that are omnivorous, diurnal, and mostly terrestrial or semiterrestrial, although most mangabeys are arboreal and frugivorous. It has five extant genera: *Papio* (early Pliocene–Recent), or baboons; *Mandrillus* (Recent), or mandrills and drills; *Lophocebus* (Recent), or crested mangabeys; *Rungwecebus* (Recent), or kipunjis; and *Cercocebus* (late Pliocene–Recent), or white-eyed mangabeys. They are medium- to large-sized monkeys of 90 to 180 cm in length (including a 50–100 cm tail) and between 8 and 60 kg in weight. They have a pronounced sexual dimorphism. No fossil species of *Mandrillus*, *Lophocebus*, *Rungwecebus*, or *Cercocebus* have been found. However, two fossil species of *Papio* are known, *P. izodi* and *P. robinsoni*. The subfamily Papioninae

comprises, besides three extinct known genera, *Parapapio* (late Miocene–lower Pleistocene species *P. broomi*, *P. joseni*, *P. whitei*, *P. antiquus*, and *P. ado*), *Dinopithecus* (late Pliocene–lower Pleistocene species *D. ingens*), and *Gorgopithecus* (late Pliocene–lower Pleistocene species *G. major*). *Parapapio* was a medium- to large-sized, semiterrestrial cercopithecoid, and appears to be near the common ancestor of all papionines. *Dinopithecus* is one of the largest cercopithecoids known, except for modern *Theropithecus*, is also semiterrestrial, and has a robust skull including a sagittal crest and strong nuchal crest. *Gorgopithecus*, nicknamed the giant baboon, was a large papionine, probably semiterrestrial, and inhabited an open environment.

The subfamily Theropithecinae is probably a recent descendant of the papionines. They are very close to *Papio* as suggested by molecular studies; both theropithecines and papionines diverged 4 million years ago. Theropithecinae has one extant genus: *Theropithecus* (early Pliocene–Recent), known as geladas, and two fossil genera, *Simopithecus* (Pliocene species *S. darti*, *S. oswaldi*, *S. leakeyi*, and *S. delsoni*) and *Omopithecus* (Pliocene–early Pleistocene species *O. brumpti*, *O. baringensis*, and *O. quadrirostris*). No fossil species of *Theropithecus* has been found, but the genus is known from 4 million years ago. Geladas are herbivorous, largely terrestrial, large-sized monkeys of 65 to 75 cm in body length, 45 to 50 cm in tail length, and between 12 and 20 kg in weight, with sexual dimorphism in size. They have the most opposable thumbs of any of the catarrhines, except for humans. The 4- to 2-million-year-old genus *Simopithecus* is closely related to *Theropithecus*, with identical terrestrial locomotor strategies, although *Simopithecus* possibly used arboreal substrates. The 3.5- to 1.5-million-year-old genus *Omopithecus* has close ties to *Papio*, showing the close phylogenetic relationship between papionines and theropithecines.

The subfamily Cercopithecinae is the least represented in the fossil record, except for some fossils of *Cercopithecus*. It is composed of four living genera: *Allenopithecus* (Recent), or Allen's swamp monkeys; *Cercopithecus* (late Pliocene–Recent), or guenons and Mona monkeys; *Chlorocebus* (Recent), or vervet monkeys; *Erythrocebus* (Recent), or patas monkeys; and *Miopithecus* (Recent), or telapins. Most are omnivorous and arboreal although *Erythrocebus* is among the most terrestrial of all cercopithecoids, and some *Cercopithecus* are partially folivorous. Except for the telapins, they are medium-sized monkeys of 90 to 140 cm in length (including a 50–75 cm tail), and between 4 and 8 kg in weight, with great sexual dimorphism. Telapins (*Miopithecus*) are the smallest Old World monkeys, with typically 30 to 45 cm in body length and between 0.8 and 1.3 kg in weight.

Dendropithecoids

The extinct superfamily Dendropithecoidea is composed of one family, Dendropithecidae, with three genera:

Dendropithecus (late Oligocene–middle Miocene species *D. macinnesi*), *Micropithecus* (middle Miocene species *M. clarki* and *M. leakeyorum*), and *Simiolus* (early middle Miocene species *S. enjiessi*). They possessed significant sexual dimorphism in size, and their dental formula was 2/2 (incisors), 1/1 (canines), 3/3 (premolars), 3/3 (molars) = 34 teeth. Their canines were strongly bilaterally compressed, their limb bones were slender, and the humerus had a relatively straight shaft.

The African genus *Dendropithecus*, the most typical dendropithecoid, lived 25 to 17 million years ago. It was a small to medium-sized anthropoid, approximating to macaques and gibbons in size (5–9 kg in weight). Its individuals were active, arboreal, quadrupedal Primates, capable of powerful climbing activities and with at least some degree of forelimb suspension. Many traits resemble *Proconsul*, with which they seem to be closely related. The 20- to 19-million-year-old genus *Micropithecus* was a small dendropithecoid 3 to 4 kg in weight and more adapted to a folivorous diet. Finally, *Simiolus* was the other small African dendropithecoid (4–7 kg in weight) that lived 18 to 16.5 million years ago. It had a face shorter than that of other dendropithecoids, and like them, its individuals were arboreal and quadrupedal. It is closely related to *Dendropithecus* but also probably to the proconsulid *Rangwapithecus*.

Many of the dendropithecoid characteristics can be interpreted as being primitive traits of the catarrhines. The primitive pliopithecoid *Kamoyapithecus* seems to be related to the dendropithecoids. Therefore, they are surely an intermediate group between primitive propiopithecoid-pliopithecoids and more modern proconsuloids.

Proconsuloids

Proconsuloids have been considered for a long time to be the earliest probable members of the family Hominoidea. Nevertheless, many paleoprimateologists and paleoanthropologists prefer to consider them, at the moment, within a separate family, the family Proconsuloidea. It comprises taxa that range in size from small chimpanzees to small gorillas. They were members of a major radiation of catarrhines that occurred during the early Miocene, which resemble modern species. The Miocene climate became warmer and drier than the previous cool Oligocene, and the African collision with Europe allowed faunal dispersion from Africa to Eurasia. New, more modern anthropoids, such as the proconsuloids, appeared. Proconsuloids have postcranial skeleton traits more derived than those of their probable ancestors, the dendropithecoids, mainly in the forelimbs. Their dental formula was 2/2 (incisors), 1/1 (canines), 2/2 (premolars), 3/3 (molars) = 32 teeth, that is, with a reduced premolar compared with the dendropithecoids.

The superfamily Proconsuloidea includes African Arabian taxa and is composed of two families: Proconsulidae and Griphopithecidae. They are often placed in the superfamily

Hominoidea because they share derived dental features with the modern great apes. Nevertheless, many paleoprimateologists have questions considering whether they are hominoids because they lack apelike features in the postcranial skeleton, such as the elbow, shoulder, hip, and knee joints.

The family Proconsulidae is subdivided into three subfamilies: Proconsulinae, Afropithecinae, and Nyanzapithecinae. It is accepted that the proconsulines are the most primitive and evolved from afropithecines to nyanzapithecines. The first subfamily has two known genera: *Morotopithecus* (early Miocene species *M. bishopi*) and *Proconsul* (early Miocene species *P. africanus*, *P. nyanzae*, *P. major*, and *P. heseloni*). The 21- to 15-million-year-old genus *Morotopithecus* was a large-sized catarrhine (35–55 kg in weight) and comparable to *Proconsul major* in dental size but possibly smaller in body size. The femoral and phalangeal bones are similar to *Proconsul*, suggesting an arboreal habit. *Morotopithecus* has been considered as a possible ancestor of the hominoids based on the presence of shared, derived characteristics of the postcranial skeleton, particularly the lumbar vertebra, linking it with extant apes. The genus *Proconsul* is the best known proconsulid, and its species lived in the rain forests of Africa between 20 and 17 million years ago. They were medium-sized anthropoids with a range in weight from 10 to 40 kg and up to 60 kg in weight in *Proconsul major*. They have thin tooth enamel, a light build with narrow chest, short forelimbs, and sexual dimorphism in their teeth (mainly in canines). Their brain was slightly larger than the brains of other catarrhines, except for the hominoids. For example, the brain capacity of *P. africanus* was approximately 170 cm³. They were arboreal, quadrupedal, and frugivorous. Unlike other *Proconsul* species, *P. nyanzae* might have lived in a dry, open woodland environment. *P. major* is considered to be the probable ancestor of *Afropithecus*.

The subfamily Afropithecinae has five genera known to date: *Heliopithecus* (early middle Miocene species *H. leakeyi*), *Nacholapithecus* (middle Miocene species *N. kerioi*), *Equatorius* (middle Miocene species *E. africanus*), *Afropithecus* (early middle Miocene species *A. turkanensis*), and *Otaviopithecus* (middle Miocene *O. namibiensis*). The most representative member of the subfamily is *Afropithecus*, an African Arabian proconsulid that lived 18 to 16 million years ago. Except for *P. major*, it was generally larger than *Proconsul* (about 20–50 kg in weight) and possessed a long, narrow snout and small eye orbits. Based on its teeth, it is known that its diet consisted of nuts, as well as frugivorous and herbivorous foodstuffs. Its individuals were arboreal and quadrupedal. They had affinities with *Heliopithecus*, and their distinctive teeth morphology aligns them toward the kenyapithecid-hominoid lineage. The 17- to 16-million-year-old genus *Heliopithecus* was smaller than *Afropithecus*, with premolars relatively large compared with *Afropithecus* and *Proconsul*. It seems to be related to the proconsulid *Morotopithecus*, which differs in

its dental morphology. *Heliopithecus* is surely the most primitive afropithecine. The 15- to 14-million-year-old genus *Nacholapithecus* was a medium-sized afropithecine about 11 to 22 kg in weight. It had proportionally large forelimbs and long pedal digits, suggesting it was a good climber adapted to an arboreal life. The 15.5- to 14-million-year-old genus *Equatorius*, approximately 25 to 30 kg in weight, is also related to *Kenyapithecus*. It was more terrestrial than *Afropithecus*. The 13- to 12-million-year-old genus *Otaviopithecus* was another large-sized (14–20 kg in weight) arboreal, quadrupedal primitive proconsuloid. It has certain mandibular similarities with the griphopithecid *Kenyapithecus* and even the hominoid *Sivapithecus*, although it seems to be an afropithecid.

The subfamily Nyanzapithecinae differs from other proconsulids mainly by the dental morphology (molars and premolars). It has four known genera: *Nyanzapithecus* (early middle Miocene species *N. vancouveringorum*, *N. pickfordi*, and *N. harrisoni*), *Mabokopithecus* (middle Miocene *M. clarki*), *Rangwapithecus* (Miocene species *R. gordonii*), and *Turkanapithecus* (early Miocene species *T. kalakolensis*). The 18.5- to 13-million-year-old genus *Nyanzapithecus* was a small to medium-sized proconsulid, being 6 to 11 kg in weight. The three species of *Nyanzapithecus* seem to represent a phyletic series of increasing specialization from early Miocene *N. vancouveringorum* through *N. pickfordi* to *N. harrisoni* in the middle Miocene. Another proconsulid, the 16- to 15-million-year-old *Mabokopithecus*, was smaller than *Nyanzapithecus*; both genera are closely related. The 18- to 16.5-million-year-old genus *Turkanapithecus* had a body size comparable to the modern colobus, being approximately 10 kg in weight, with a face relatively shorter than the other proconsulids. Its individuals were typically arboreal, quadrupedal proconsulids but possibly with enhanced climbing capabilities. The oldest proconsulid was the 20- to 19-million-year-old *Rangwapithecus*, which had a similar morphology to *Proconsul* and like it was also arboreal. It was a rain-forest-dweller proconsulid of medium size, being about 15 kg in weight, whose dental morphology suggests a folivorous diet.

The family Griphopithecidae, also called Kenyapithecidae, has been often included within the superfamily Hominoidea since it is the proconsuloid group with more ties to the apes. Whether the representatives of proconsulids or afropithecids can be considered the earliest hominoids still remains problematic, but the griphopithecids, or kenyapithecids, seem to be the basal group from which the earliest hominoids originated. The family Griphopithecidae comprises two African genera, *Kenyapithecus* (middle Miocene species *K. wickeri*) and *Griphopithecus* (middle Miocene species *G. darwini*, *G. alpani*, and *G. africanus*), and perhaps also includes a third genera, *Samburupithecus* (late Miocene species *S. kiptalami*). *Kenyapithecus* is a significant griphopithecid that lived 14 million years ago. Its dental morphology is similar to that of the modern Old World monkeys. It has macaque-like

limbs adapted for a knuckle-walking mode of semiterrestrial locomotion. These individuals probably inhabited drier, more open woodland environments. *Kenyapithecus* had thicker molar enamel, a more robust mandible, and large upper premolars compared with those of the early Miocene proconsulids. Some paleoprimatologists suggest that this taxon is the common ancestor of all the great apes (hominoids), but others consider that it is more primitive and only slightly more modern than *Proconsul*. The 17- to 16-million-year-old genus *Griphopithecus* is poorly known, but it was a large European proconsuloid closely linked to the African *Kenyapithecus*, although probably more primitive. The 11- to 10-million-year-old genus *Samburupithecus* resembles modern African apes, and some paleoprimatologists have suggested that it is also close in morphology to the possible ancestor of hominoids.

Hominoids

The superfamily Hominoidea comprises the small and great apes, which are agile climbers of trees except for gorillas and humans. They are omnivorous, with a diet mainly consisting of fruits, seeds, and leaves, although in most cases some quantities of meat and invertebrates are included. Except for humans, which have spread to all parts of the world, the hominoids are native to Africa and Asia. Most species have a tropical rain forest habitat.

All members of this superfamily have a large braincase. Except for humans, most have a prominent face and prognathous jaw, that is, their mandible protrudes farther out than the maxilla, and their nostrils are close together and face forward and downward. The dental formula is the same for all hominoids: 2/2 (incisors), 1/1 (canines), 2/2 (premolars), 3/3 (molars) = 32 teeth. Generally, their incisors are broad, and their canines are never developed into tusks. Nevertheless, their size varies greatly among species, being especially large in gorillas and markedly small in humans. The small size of human teeth and jaws could be adaptations due to eating cooked food, which may have begun as far back as millions of years ago. Unlike the hylobates, the pongids and hominids are larger Primates with great sexual dimorphism, the males being on average larger and stronger than the females. Nevertheless, the degree of sexual dimorphism varies greatly from species to species.

Although the evolutionary history of the hominoids is poorly known, it is accepted that the earliest fossil apes can be linked to the modern hylobates. In contrast to the paucity of available fossils of hominoids over the past 5 million years, there is much evidence from the Miocene (23–5 million years ago). This fossil record shows that hominoids were much more common and diverse than they are today. The superfamily Hominoidea includes five families, three of them extant, Hylobatidae (gibbons), Pongidae (orangutans), and Hominidae (humans, chimpanzees, and gorillas), and two extinct, Oreopithecidae and Dryopithecidae. Other

classifications also include orangutans in the hominids, using the names Ponginae and Homininae to subdivide Hominidae into two subfamilies. Molecular-clock analyses suggest that the hylobates and the pongid-hominid clade diverged about 18 million years ago, and pongids and hominids diverged from each other about 14 million years ago. These molecular data would be consistent whether or not the 17- to 14-million-year-old proconsuloid family Griphopithecidae, or Kenyapithecidae, is included within the superfamily Hominoidea as its basal group. Probably the entire superfamily Proconsuloidea should be included within the hominoids, which has been often proposed, since the 21- to 15-million-year-old *Morotopithecus* seems to be very near to the probable ancestor of the hylobates, whereas the kenyapithecids could be ancestors of the rest of the hominoid families.

Hylobatids

The hylobates are the small or lesser apes of the family Hylobatidae, extensively known as gibbons and siamangs. They are smaller than the great apes, and their anatomical characteristics are superficially closer to the monkeys than they are to the great apes. They have long hands and feet, and their fur is usually black, gray, or brownish, often with white markings on the hands, feet, and face. Hylobate skulls resemble those of the rest of the hominoids (short rostra, enlarged braincase, and large orbits that face forward). Generally, they do not exhibit sexual dimorphism, with males and females being very similar in size and shape. Nevertheless, some gibbon species have sexual dichromatic differentiation in the male and female fur. They are social animals and strongly territorial, defending their boundaries with vigorous visual and vocal displays. They are habile in their primary mode of locomotion, that is, brachiation, swinging from branch to branch for distances of up to 15 m. They are the fastest and most agile of all tree-dwelling, nonflying mammals. Their diet consists mainly of fruits but also includes insects and leaves.

The hylobates appeared in the middle Miocene and include four extant genera, *Hylobates*, *Nomascus*, *Symphalangus*, and *Hoolock*, although some taxonomists consider that these are merely four species of only one genus, *Hylobates*. The genus *Hylobates* includes several species of Southeast Asia gibbons (*H. lar*, *H. moloch*, *H. pileatus*, *H. agilis*, *H. muelleri*, and *H. klossii*), which often have a ring of white fur around their face, and a size range of 40 to 70 cm in height and 5 to 8 kg in weight. The genus *Nomascus* includes six species of southeastern Asia gibbons (*N. concolor*, *N. leucogenis*, *N. siki*, *N. nasutus*, *N. hainani*, and *N. gabriellae*), some black with a distinct black tuft of crown fur (black crested gibbons) and some with distinct light-colored cheek patches (white-cheeked and yellow-cheeked gibbons). The genus *Symphalangus* includes the siamangs (*S. syndactylus*) of Thailand, Malaysia, and Sumatra; they are larger (twice the size of

other gibbons, reaching 1 m in height and 23 kg in weight), with two fingers fused together on each hand, and they have large gular sacs (which can be inflated to the size of their heads to make loud resonating calls or songs). The genus *Hoolock* includes the hoolocks or hoolock gibbons (*H. hoolock* and *H. leuconedys*) of northeast India, Bangladesh, southwest China, and Myanmar; they reach a size of 60 to 90 cm in height and 6 to 9 kg in weight, and they are the only gibbons that have sexual dimorphism (males are black colored with considerably white brows, and females have a grey-brown fur, which is darker at the chest and neck). There is another gibbon genus called *Bunopithecus*, which includes the extinct species *B. sericus*, discovered in China but found all over southern Eurasia. The two hoolock species were once included in this genus, but they have recently been removed from *Bunopithecus* to be grouped in the genus *Hoolock*.

Dryopithecids

The family Dryopithecidae comprises the best-known European fossil hominoids, but they also lived in eastern Africa and Asia. Their dental morphology is roughly intermediate between the early Miocene proconsulids (e.g., *Proconsul*) from Africa and the later pongids (e.g., *Sivapithecus*) from Asia. They had thin rather than thick enamel in their cheek teeth, gracile canines, narrow incisors, relatively short premaxilla, and a relatively gracile mandible. Their dental formula was 2/2 (incisors), 1/1 (canines), 2/2 (premolars), 3/3 (molars) = 32 teeth. They resemble the hominoids in many cranial features, including the development of a supraorbital ridge. Their postcranial skeleton is similar to the pongids (e.g., modern orangutans), indicating that they were suspensory. They may include the ancestor of all hominoids, which include the lesser apes (gibbons and siamangs), the great apes or pongids (orangutans, gorillas, chimpanzees, and bonobos), and humans. Many paleoanthropologists consider that the dryopithecids are, in fact, in the evolutionary direction toward hominids.

Dryopithecids include two known genera, *Pierolapithecus* (middle Miocene species *P. catalaunicus*) and *Dryopithecus* (early late Miocene species *D. wuduensis*, *D. fontani*, *D. brancoi*, *D. laietanus*, and *D. crusafonti*), and perhaps also include *Udabnopithecus* (late Miocene species *U. garedziensis*). *Dryopithecus*, the most well-known dryopithecid, lived 13 to 7 million years ago in Europe and Asia; these individuals were about 70 to 120 cm in length and 35 kg in weight. They had a 150-cm³ brain capacity, large eye orbits, and a light supraorbital ridge. The face exhibited certain klinorhynch, that is, the face tilted downward in profile. They were brachiators, like modern orangutans and gibbons, but were never knuckle-walkers like chimpanzees and gorillas. They were tree-dwelling apes that ate berries and fruits. *Dryopithecus laietanus*, also called *Hispanopithecus laietanus*, seem to be more like

orangutans than the other apes, with very long forelimbs and relatively short femora. The 13-million-year-old genus *Pierolapithecus* is closely related to the common ancestor of pongids and hominids. They were 30 to 35 kg in weight and 120 cm in length and had a wide, flat rib cage, a stiff lower spine, flexible wrists, and shoulder blades that lay along the back. These are special adaptations for tree climbing, just like those found in the great apes of today. The 8.8-million-year-old genus *Udabnopithecus* is an interesting fossil since it could be a link between the dryopithecids and pongids in Eurasia. Its individuals inhabited a semiarid environment.

Oreopithecids

The family Oreopithecidae includes a single known fossil genus, *Oreopithecus*, which is represented by only one known species, *O. bambolii*. *Oreopithecus* evolved in isolation, over at least 2 million years, on an island in the Mediterranean where Tuscany (Italy) is found today. It lived between 10 and 8 million years ago (late Miocene) in a swampy habitat and adapted to both suspensory arborism and bipedalism. *Oreopithecus* was 30 to 35 kg in weight and 1.10 to 1.20 m in height. Its skull possessed a small and globular neurocranium, with a cranial capacity between 275 and 530 cm³. Moreover, it had a relatively short snout, elevated nasal bones, vertical orbital plane, gracile facial bones, a large attachment surface for the masseter muscle, and a sagittal crest, indicating a heavy masticatory apparatus. Its canines had a size comparable to the rest of its dentition. Its postcranial anatomy was characterized by a broad thorax, a short trunk, and long fingers. It had a lumbar curve, suggesting that it adapted to upright walking. Because of these characteristics, this species is a considerable anomaly since it represents an independent development of bipedality, and its taxonomic placement is unsettled. Most paleoanthropologists consider it an extinct great ape without descendants, perhaps derived from *Dryopithecus* just before the split from the orangutans. Some paleoanthropologists include the oreopithecids within the family Dryopithecidae as a very derived group.

Pongids

The family Pongidae contains several genera, and all but one are now extinct. The extant genus is *Pongo* (orangutans) with two known species: *P. pymaeus* and *P. abelii*. They are native to Indonesia and Malaysia, being *Pongo pymaeus* from the island of Borneo and *Pongo abelii* from the island of Sumatra.

Orangutan skulls have a prominent sagittal crest, which is a ridge of bone running lengthwise along the midline of the top of the skull at the sagittal suture, whose presence indicates that there are exceptionally strong jaw muscles (mainly temporal muscles, which are one of the main

chewing muscles). Orangutan brain capacity is 275 to 500 cm³. Orangutans are large apes and exhibit considerable sexual dimorphism in size, with the *P. abelii* adult males 1.65 to 1.75 m in height and 90 to 120 kg in weight and the adult females 1.25 to 1.35 m in height and 40 to 50 kg in weight. *P. pymaeus* individuals are smaller, with adult males 1.30 to 1.40 m in height and 50 to 100 kg in weight and adult females 1.10 to 1.20 m in height and 35 to 45 kg in weight. Their arms, which can grow up to 2 m in length, are twice as long as their legs. Their feet are designed like hands, and both their hands and feet are long, narrow, and strong, being used in a hooklike fashion when grasping branches. Their thumbs are fully opposable. Orangutans are quadrupedal when on the ground, but unlike chimpanzees and gorillas, they are not true knuckle-walkers; they walk on the ground by shuffling on their palms with their fingers curved inward. Males have secondary sexual characteristics, such as long fur, cheek pads, and a throat pouch.

Orangutans are arboreal dwellers, spending nearly all of their time in the trees, living typically in tropical-subtropical moist broadleaf forests. They are mainly frugivorous. Sumatran orangutans (*P. abelii*) are more frugivorous and especially more insectivorous than the Bornean orangutans (*P. pymaeus*). The Borneo orangutans have a more varied diet, which includes leaves, shoots, seeds, birds' eggs, insects, and bark. Their gestation period is 8.5 months, and their life span is between 35 and 40 years. The individuals are sexually mature at the age of 6 to 7 years. They are infants from 0 to 4 years, juveniles from 4 to 7 years, adolescent males from 7 to 10 years, and adolescent females from 7 to 12 years. Several genetic differences separate the two species of orangutan (*P. abelii* and *P. pymaeus*). The species parted from one another 2.3 million years ago. The DNA sequences of humans and orangutans differ in only 3.6% of their genomes, that is, in their complete DNA sequences, suggesting that pongids and hominids (the orangutan-gorilla-chimpanzee-bonobo and human group) diverged about 10 to 11 million years ago. Like the other great apes, orangutans are very intelligent, being capable of using feeding tools. Some psychology specialists consider that the orangutan is the most intelligent extant animal in the world other than the human being; therefore, the orangutan is more intelligent than the chimpanzee, bonobo, or gorilla. They have developed a great symbolic capability and even a complex culture in which adult orangutans teach younger ones how to make tools and find food.

The family Pongidae comprises two subfamilies, Palaeoponginae and Ponginae, which include preponderantly fossil species. The subfamily Palaeoponginae includes four known genera: *Rudapithecus* (late Miocene species *R. hungaricus*), *Bovdapithecus* (late Miocene species *B. altipalatus*), *Graecopithecus* (late Miocene species *G. freybergi*), and *Ouranopithecus* (late Miocene species *O. macedoniensis*). The 11- to 10-million-year-old genera *Rudapithecus* and *Bovdapithecus* were palaeopongines of 45 to 60 kg in weight and have been considered closely related to

the dryopithecids. The 10- to 8-million-year-old genus *Graecopithecus* shows the downwardly bent face (klinorhynchy) typical of African apes and also very thick molar enamel, as expected in an early hominid. The 10- to 8-million-year-old genus *Ouranopithecus* was a larger-sized pongid, with males probably between 80 and 100 kg in weight. It also has intermediate traits between the dryopithecids and the pongids. It has a large, broad face with a prominent supraorbital ridge and square-shaped eye orbits and exhibits clear sexual dimorphism. Some paleoanthropologists have considered that it also has a relationship with hominids, particularly with gorillas. *Graecopithecus* and especially *Ouranopithecus* may lie near the split between the Pongidae and the Hominidae or already be in the hominid lineage.

The subfamily Pongidae includes three Asian groups, two extinct (Lufengpithecini and Sivapithecini) and one extant (Pongini). The group Lufengpithecini is apparently the most primitive. It includes two genera: *Lufengpithecus* (late Miocene species *L. lufengensis*, *L. keiyuanensis*, and *L. hudienensis*) and *Ankarapithecus* (late Miocene species *A. meteai*). The 8- to 7-million-year-old genus *Lufengpithecus* was a large pongid about 50 kg in weight, with slightly greater sexual dimorphism than in living apes. Its cranial characteristics show greater similarities to *Dryopithecus*, such as a broad interorbital region, vertical frontal, and the lack of a broad interorbital torus. The 10-million-year-old genus *Ankarapithecus* appears to be intermediate between the dryopithecids-paleopongines and the sivapithecins. Lufengpithecini are considered a primitive sister group to the clade formed by the sivapithecini and pongini, with *Ankarapithecus* more closely related to this clade.

The group sivapithecini includes two genera: *Sivapithecus* (middle late Miocene species *S. brevirostris*, *S. punjabicus*, *S. indicus*, *S. sivalensis*, and *S. parvada*) and *Gigantopithecus* (late Miocene–middle Pleistocene species *G. blacki*, *G. giganteus*, and *G. bilaspurensis*). The genus *Sivapithecus* was an arboreal pongid that lived between 13 and 8.5 million years ago. It was the size of a chimpanzee (50–90 kg in weight), but with the facial morphology of an orangutan. It shows facial, palatal, and dental architectures clearly specialized in the orangutan direction. However, unlike the great apes, *Sivapithecus* lacks the complex arm-bone features related to suspensory behavior and forelimb flexibility, suggesting the pongid was more adapted to quadrupedalism. The genus *Gigantopithecus* was a huge, herbivorous ape that lived between 1 and 0.3 million years ago in southeastern Asia. Its specimens represent the largest apes that ever lived, reaching 1.8 to 3 m in height and about 250 to 550 kg in weight, the largest being three times heavier than a modern gorilla. They coexisted with *Homo erectus* in Asia, and some cryptozoologists have related them to legendary Primates like Yeti and Bigfoot.

The group Pongini includes two genera: the fossil *Khoratpithecus* (late Miocene species *K. chiangmuanensis*

and *K. piriyai*) and the above-mentioned extant *Pongo* (from middle Pleistocene to Recent). The 9- to 7-million-year-old genus *Khoratpithecus* shares unique derived characteristics with orangutans, supporting the close relationships of both taxa. It was a large ape of approximately 0.9 to 1.2 m in height and 40 to 80 kg in weight. Its traits suggest that it is an intermediate between *Lufengpithecus* and modern *Pongo*. The genus *Pongo* originated during the Pleistocene 2 million years ago. Although modern *Pongo* are currently found only on Borneo and Sumatra, the *Pongo* fossil record indicates that orangutans once had a wider distribution, also having been found in Java, Vietnam, and China. A 1-million-year-old fossil species, *Pongo hooijeri*, is known from Vietnam, and several Pleistocene fossils of extant species have been described from southeastern Asia.

Hominids

The earliest evolution of the hominids is not well-known, with the notable exception of humans, which have a relatively complete fossil record extending back more than 4 million years. The evolutionary history of the pongids is, by comparison, much better documented. Most hominid species are omnivorous, but their feeding base is vegetarian (mainly fruits). The smallest living species of hominids is the bonobos (*Pan paniscus*), also known as pygmy chimpanzees, weighing 30 to 40 kg. The largest ones are the gorillas, with males weighing 140 to 180 kg.

The family Hominidae is subdivided into two subfamilies: Gorillinae and Homininae. The first one includes the genus *Gorilla* and a recently discovered fossil genus, *Chororapithecus* (late Miocene species *C. abyssinicus*). The genus *Gorilla* includes two extant species: *G. gorilla* and *G. beringei*. The first are known as the western gorillas (living in the Republic of Congo, Gabon, Equatorial Guinea, and Cameroon), the most populous species of gorillas, while the second ones are the eastern gorillas (living in the eastern Congo, Kinshasha, Uganda, and Rwanda).

Gorillas are the largest of the living Primates with great sexual dimorphism in size, the adult males 1.65 to 1.80 m in height and 140 to 210 kg in weight and the adult females 1.35 to 1.45 m in height and 90 to 120 kg in weight. The cranial capacity of gorillas is 340 to 750 cm³. The eastern gorilla (*Gorilla beringei*) is more darkly colored than the western gorilla (*Gorilla gorilla*). Gorilla skulls have a prominent mandibular prognathism and a great supraorbital ridge and a prominent sagittal crest. The gestation period of the gorillas is 8.5 months. Infants stay with their mothers for 3 to 4 years, and the females mature sexually at 10 to 12 years and males at 11 to 13 years. Their life span is between 30 and 50 years. Gorillas, like chimpanzees, move around quadrupedally by knuckle-walking. They are fundamentally herbivores, eating leaves (foliovores) but also fruits and shoots. Their large sagittal crest and long canines allow them to crush hard plants. Nevertheless,

some gorillas may ingest small insects. Gorillas are considered highly intelligent, with some individuals in captivity being capable of using a subset of sign language.

The DNA sequences of humans and gorillas differ in about 1.6% of their genes, but in only 2.3% of their genomes, that is, in their complete DNA sequences, thus being the next closest living relative to humans after the chimpanzees. This suggests that the human-chimpanzee clade and the gorilla shared a common ancestor about 8 million years ago. However, a significant fossil species of about 11 to 10 million years ago has been recently discovered: *Chororapithecus abyssinicus*. Its dental traits strongly indicate that it is the earliest species of the subfamily Gorillinae, suggesting that the last common ancestor between hominines (chimpanzees and humans) and gorillines may have lived more than 10 million years ago, that is, 2 million years earlier than the previously believed date of divergence based on DNA molecular-clock calibrations.

The subfamily Homininae is subdivided into two groups: Panini and Hominini. The group Panini consists of the genus *Pan*, which includes two extant species commonly named chimpanzees: *P. troglodytes* and *P. paniscus*. The first one is the common chimpanzee, which lives in the forests of central and West Africa. The second one is the bonobo, or pygmy, chimpanzee, which lives in the Congo. *Pan troglodytes*, or the common chimpanzee, is found not only in the tropical forests but also on the savannas of central and West Africa, although its habitat has been dramatically reduced in recent decades. Adults can measure up to 1.60 m in height in males and 1.30 m in females and weigh 40 to 70 kg in males, and 25 to 50 kg in females. The cranial capacity of chimpanzees is 275 to 500 cm³. Except for the face and palms of the hands and soles of the feet, the common chimpanzee body is covered by coarse, dark brown hair. They are omnivorous, eating small prey and insects, but their diet is mainly vegetarian (fruits, seeds, leaves, etc.). Common chimpanzees are both arboreal and terrestrial, their habitual gait quadrupedal although they can walk upright for short distances. They live in communities that range from 20 to more than 150 members in fission-fusion societies (the social groups sleep in one locality together but forage in small groups, going off in different directions during the day). Their gestation period is 8 months and their life span is 40 to 45 years. They are infants from 0 to 4 years, juveniles from 4 to 7 years, adolescent males from 7 to 15 years, and adolescent females from 7 to 13 years in age. The individuals (females and males) mature sexually at 9 to 10 years. It has been long known that the chimpanzees use tools, including modified branches to capture squirrels; recent studies suggest that the chimpanzees made stone tools at least 4 million years ago. It has been shown that they have an incipient consciousness, being manipulative and capable of deception as well as being capable of using symbols and understanding aspects of human language.

Bonobos (*Pan paniscus*) are smaller and more gracile than common chimpanzees, 75 to 85 cm in height and 35 to 45 kg in weight in adult males, and 70 to 75 cm in height and 25 to 35 kg in weight in adult females. They have brow ridges above the eyes less prominent than those of the common chimpanzees and black faces with pink lips, small ears, wide nostrils, and long hair on their heads. They walk upright about 25% of the time during ground locomotion. Their physical characteristics (slim upper body, narrow shoulders, thin neck, and long legs when compared with the common chimpanzees) and posture give the bonobos an appearance more closely resembling humans. Bonobos are mainly frugivorous, but they supplement their diet with leaves, meat of small vertebrates, and invertebrates.

The DNA sequences of the human and the common chimpanzee are very similar, differing about 2.7% in their genes and only 1% in their genomes. This suggests that humans and chimpanzees are more closely related than humans are with the gorillas, and they shared a common ancestor about 5 to 6 million years ago. Moreover, DNA molecular-clock evidence also suggests that *Pan troglodytes* and the other chimpanzee species *Pan paniscus* (bonobos) separated from each other less than 1 million years ago. It's possible that the formation of the Congo River 1.5 to 2 million years ago led to the speciation of *P. paniscus*. Until recently, no fossils of chimpanzees had been found. However, middle late Pleistocene fossils found in Uganda and Kenya may become the first fossils of the genus *Pan*.

Finally, the group Hominini includes seven known genera: *Sahelanthropus*, *Orrorin*, *Ardipithecus*, *Australopithecus*, *Paranthropus*, *Kenyanthropus*, and *Homo*, of which only the last one has extant species, our own (*Homo sapiens*). It is notable that the 7.4- to 6-million-year-old genus *Sahelanthropus* has been considered the last common ancestor of *Pan* and *Homo*. The hominin lineage has a trend toward a larger and more developed brain, shorter legs and arms, and ever more complex social behavior, intelligence, and technology. The description, fossil record, and evolutionary history of this hominid group are analyzed in the chapter "Hominid Description."

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HUMAN EVOLUTION

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It might seem unnecessary to begin by stating that our species, *Homo sapiens*, is the sole surviving species of a once diverse group of now extinct relatives. For after all, the media is not shy about promoting the assertions of human paleontologists (paleoanthropologists) who claim to have finally discovered the long sought ancestor of our group or a missing link in the chain of human evolutionary succession. Even the repudiations of evolution by the scientific creationists and intelligent designists cannot derail the paleoanthropologists' pursuit of human fossils or submerge the widespread public interest in our evolutionary heritage. Yet for all the publicity that follows the discovery of and supposedly scientifically well-founded pronouncements about previously unknown potential human relatives, many of the assumptions on which paleoanthropology is grounded differ significantly from those that inform the rest of paleontology. And these differences have had profound intellectual consequences for the discipline of anthropology at large.

Before Human Evolution

Among the earliest preserved writings from the Western world that relate to considerations of human history are those from the Greeks (for example, Hippocrates and Herodotus) and Romans (for example, Lucretius) that discuss differences between known groups of humans in both

physical and psychological attributes. Common to all was a theme we might identify as adaptation. That is, people as well as other animals look and behave as they do because of the effects of their specific local circumstances. Consequently, for example, Herodotus believed that Egyptian soldiers had thick cranial bones because men typically shaved their heads, which were fully exposed to the beating rays of a strong sun. Scythian soldiers, however, had softer skulls because they wore hats and lived in less sunny climes.

Perceptions of the place of humans in nature were also based on attempts to understand something of the biology of our own and other species. As such, the Greek philosopher Aristotle, for instance, sought to organize animal life in anatomically meaningful ways, with the result that he defined a group we would call tetrapods on the basis of its members articulating with the world around them via four "points." For unambiguously quadrupedal animals, such as dogs or deer, all four limbs communicate with the ground via feet. But Aristotle's perspective also allowed him to include in this group birds because although not "footlike," their wings connect them with their surroundings as well as hands connect humans with their surroundings. Aristotle was not, however, immune to error. Thus, for example, he believed that the bipedal or two-legged stance of a bird differed from a human's because of differences in their knee joints. Not knowing the actual anatomy of the hindlimb, Aristotle thought that the "knee" of a bird, as

well as the knee of other quadrupeds, such as a dog or deer, bent backward, whereas a human's knee bent forward. This confusion was not corrected until the late 15th century when Leonardo da Vinci pointed out that the "knee" of a bird or any other nonhuman animal was actually its ankle; the true knee joint, which was situated higher up along the limb, bent in the same direction as the human knee joint. But the spirit of discovery that guided the Greek and early Roman method of scientific inquiry, particularly with regard to humans and their place in nature, was unfortunately squelched from the 2nd to 3rd CE centuries with the institution of Christianity, which demanded that "science" could be pursued only through acts of revelation and that its "discoveries" were in keeping with scripture.

One consequence of this credo was the concept of a sequence of creation or Great Chain of Being first proposed by Aristotle. Beginning in force in the 15th century, taxonomists sought to demonstrate this sequence of creation through a hierarchical arrangement of creatures from the perceived lowest to the highest—the lowest often being tied to the inorganic and the highest being the white male Western European who was generating his own particular and idiosyncratic classification of life. Although seafarers exploring far-off lands with the intention of establishing outposts and trade routes continually brought back to their countries examples of previously unknown plants and animals (including humans) that taxonomists eagerly inserted into the gaps in their classifications, there remained many missing links in the Great Chain of Being.

Fortunately, in 1669, Danish geologist and anatomist Nicolaus Steno published a treatise in which he demonstrated that not all rock-hard objects that came from the earth were indeed rocks and minerals. Rather, rock-hard objects with the shapes of bones, teeth, and shells characteristic of living vertebrates and invertebrates were actually the fossilized ("petrified") remains of once-living organisms. Suddenly, there was a new and vast source of missing links that taxonomists could include in their classifications as they strove to flesh out the picture of creation. As practitioners of the nascent discipline of paleontology quickly realized, the picture of past life mirrored that of the present: Not only is there now a diversity of plant and animal species; such taxic diversity had always existed.

But this treasure trove of extinct life went only so far. It did not include humans because according to the book of Genesis, they had been created last, and therefore, their history did not extend into antiquity. For all intents and purposes, Adam and Eve and their immediate descendants barely preceded the Great Flood of the Old Testament, and thus, no specimen of a human could be appreciably antediluvian. Consequently, while the evolutionarily uninformed 18th and early 19th centuries witnessed the development of nonhuman paleontology as a scholarly endeavor that sought to refine its understanding of the diversity of life in the past, even if actual

human fossils had been discovered, they would not have been identified as such.

The Feldhofer Grotto Neanderthal: The Test Case of Human Antiquity

In 1857, two years prior to the publication of the first edition of Charles Darwin's *On the Origin of Species*, miners quarrying limestone at the Feldhofer Grotto in the Neander Valley (*Thal* in German) near Düsseldorf, Germany, uncovered a skullcap and various parts of a skeleton of a human-like individual. They gave the remains to Carl Fuhlrott, a local schoolteacher, who in turn presented them to his country's most eminent human anatomist, Professor Hermann Schaaffhausen at the University of Bonn. Because of the state of "petrification" of this specimen and its obvious morphological differences from humans, Fuhlrott concluded that the Feldhofer Grotto Neanderthal represented an extinct race of a human relative. Schaaffhausen, however, brought all his resources and clout to argue that this was not a specimen of any antiquity; rather, it merely represented a member of a recent savage and barbaric race, not unlike the living Australian Aborigines.

It would not be until 1886, when Julien Fraipont and Max Lohest published incontrovertible evidence from the Belgian site Spy of the contemporaneity of Neanderthal remains with the bones of acknowledged extinct mammals, that it became difficult for dissenters to sustain the notion that humans could not be antediluvian. Nevertheless, before then, a few scholars did accept the antiquity of the Feldhofer Neanderthal. One of them was Thomas Henry Huxley, who maintained this position in "On Some Fossil Remains of Man," one of three essays published collectively in 1863 in the volume *Man's Place in Nature*.

Thomas Henry Huxley and the Stultification of Paleoanthropology

It is an odd twist of fate that while Huxley (1863) unabashedly accepted the Feldhofer Grotto Neanderthal skullcap and postcranial bones as representing the fossilized remains of a being of some antiquity at a time when few scholars did—one of the few, the geologist Charles Lyell, had visited Feldhofer Grotto and concluded that the bones were ancient—Huxley's interpretation of them could not have been predicted. As a salvationist who believed that novel features and thus species emerge abruptly as a result of a prenatal reorganization of developmental pathways, a comparative anatomist who reached national prominence while still in his twenties, and a systematist who undertook a reclassification of all vertebrates, one could reasonably characterize Huxley as having a critical eye when it came to interpreting morphological differences between organisms. Yet when Huxley turned to the clearly

distinctive features of the Feldhofer remains, he abandoned his approach to nonhuman organisms and discussed the Neanderthal from an entirely unexpected perspective.

Similar to Fuhlrott and Schaaffhausen, Huxley (1863) was clearly impressed by the features of the Feldhofer skullcap. It was long, elliptical in outline, flattened both in lateral profile and when viewed from the rear, and of unusually large size. The brow ridges met in the midline of the skullcap, and their extraordinary prominence was accentuated by a depression on the frontal bone behind and another depression below at the root of the nasal bones. In seeking a suitable modern human skull for comparison, Huxley focused on perceived similarities between the Neanderthal and an Australian Aborigine, which he took as the most primitive living human. But prior to embarking on this comparison, he discussed and then dismissed the ways in which other scholars had tried to equate human variation with racial distinctiveness. To the contrary, Huxley argued, upon comparing the “lowest” through the “highest” forms of the human skull, one was confronted with a continuum, not unlike that which he had constructed between the “lower animals” and “man.” And it was on to this continuum that Huxley appended the Feldhofer Neanderthal, stating with assuredness that all it would take to convert the most primitive living human—which Huxley took to be the Australian Aborigine—into the aberrant fossil would be some flattening and lengthening of the skull with an increase in brow ridge size. In turn, Huxley could proclaim that even though the Neanderthal skullcap was the most “pithecoïd,” or apelike, of known human skulls, which might at first glance lead one to classify it in its own species and thus apart from living humans, this specimen was actually one end of a series that led gradually from it to the most modern-looking human cranium.

The effect this perspective had on the study of human evolution was, unfortunately, long lasting. For even though he briefly considered that possibility that the Feldhofer Neanderthal represented an “intermediate” between “man” and “apes,” by diminishing the unique and distinctive features of the fossil to the status of racial difference, Huxley conflated *within* species differences due to individual variation (i.e., differences in the degree of expression of a particular feature—as in robustly versus weakly developed brows) with *between* species differences that reflect taxic diversity (i.e., differences of kind or configuration of a feature—as in partitioned versus continuous brow). The year after Huxley’s publication, professor of geology William King at Queen’s College, Galway, Ireland, would criticize Huxley’s oversimplification of the differences between the Feldhofer Neanderthal and any *Homo sapiens*, Australian Aborigines included. King proposed a separate species, *H. neanderthalensis*, to receive the extinct human. However, Huxley’s perspective has persisted in light of the analysis of more evidence. A version of the racial bias that Huxley had inserted into the interpretation of human evolution would reemerge less than a century later, largely through the efforts

of two of the “fathers” of the so-called modern evolutionary synthesis, Theodosius Dobzhansky and Ernst Mayr.

Human Evolution After Huxley and Before the Synthesis

In 1871, Darwin published his thoughts on human origins in the first part of *The Descent of Man*. But contrary to received wisdom, this was not a treatise on human evolution as much as it was a discourse on the development of “civilized” from “primitive” humans. True, Darwin did suggest that the African apes (chimpanzees and gorillas) were the closest living relatives of “man,” but the basis for this claim was anything but morphological. Guided by his belief that one should find the fossilized remains of the common ancestor of living forms in the same geographical region as its descendants, as well as Huxley’s 1863 essay “On the Relation of Man to the Lower Animals” detailing similarities between humans and the large-bodied apes, Darwin faced a dilemma. While humans were distributed widely across the globe, orangutans were restricted to Southeast Asia and African apes to sub-Saharan Africa. Darwin chose to resolve this problem by arguing that humans could not have evolved in Southeast Asia because its lush tropical environment would not have afforded the kinds of dangers and thus selection pressures (for example, from predators) that abound in southern Africa. Although African apes are primarily distributed throughout the tropical evergreen forests of central Africa and not in the open savannas of South Africa, this inconsistency did not prevent Darwin from arguing that since Africa was also home to the “most primitive” humans, humans and African apes had shared a common African ancestor. It is perhaps also worth mentioning the obvious: Darwin’s primitive humans and African apes are “black,” whereas the orangutan has reddish hair.

While paleoanthropologists of the 20th century increasingly cited Darwin’s genius in suggesting that human evolution began in Africa, historical accuracy demands recognizing that until the beginning of the concretization of the modern synthesis around Darwinism in 1941, with the publication of the second edition of Dobzhansky’s *Genetics and the Origin of Species*, most evolutionists—the German anatomist, embryologist, and paleontologist Ernst Haeckel (1876) being the leading exception—were not Darwinians. Consequently, it is not surprising that efforts to discover fossils that might represent links between humans and Neanderthals on the one hand and the apes on the other were concentrated not in Africa but in Asia, which had long been believed to be the seat of human antiquity.

Thus, the Dutch polymath Eugène Dubois, with the sole purpose of finding ancient human relatives, traveled to Southeast Asia where at the site of Trinil on the island of Java, he discovered two isolated teeth, a skullcap, and a number of variously preserved femora. He believed both

that these fossils represented a single entity and that it was the missing link between Neanderthals and apes: In cranial shape and size it seemed rather pithecoïd, but the human-like femur suggested that its bearer had walked upright and bipedally. In 1892, Dubois allocated these specimens to a new species, *erectus*, of the genus *Anthropopithecus*, which was often used to subsume the chimpanzee. Two years later, Dubois referred his species *erectus* to a genus Haeckel (1876) had invented in anticipation of the discovery of a then unknown human ancestor: *Pithecanthropus* (“ape-man”). Thus, *Pithecanthropus erectus*, or “Java Man,” was born, and the picture of human evolutionary history was changed forever.

By the 1930s, paleontological excavations had resulted not only in the discovery of additional Neanderthal specimens in western and eastern Europe but also in the discovery of specimens of human relatives of different and diverse morphologies from far-flung Old World sites: from Western Europe, the Mauer, or Heidelberg, mandible (the holotype of *Homo heidelbergensis*); from what is now Zambia, a skull that was given the species name *Homo rhodesiensis*; from northern China, an isolated molar that served as the basis of the genus and species *Sinanthropus pekinensis*, to which a number of partial craniums were subsequently added; and from various sites in South Africa (first, Taung, followed closely by Kromdraai, Sterkfontein, and Swartkrans), cranial and mandibular specimens that became the holotypes of various species distributed among three different genera (*Australopithecus*, *Plesianthropus*, and *Paranthropus*). During the 1940s, the discovery of new and often unexpectedly different-looking specimens fueled the practice of erecting new species or even new genus and species names, often for each specimen (e.g., a somewhat crushed mandible with some teeth from the South African site of Swartkrans was named *Telanthropus capensis* because it was smaller and less robust than specimens from the same site allocated to *Paranthropus crassidens*). When in 1950 Ernst Mayr, the systematist of the synthesis, turned his sights on the field of paleoanthropology, he was appalled at what he characterized as a “bewildering diversity of names.” Following a path already taken by the geneticist of the synthesis, Theodosius Dobzhansky, Mayr waded into an area about which he knew absolutely nothing: human evolution.

Ernst Mayr and Theodosius Dobzhansky: Where Angels Fear to Tread

In 1944, the year the vertebrate paleontologist George Gaylord Simpson published *Tempo and Mode in Evolution*, which was the last of the three volumes that became the foundation of the synthesis, Theodosius Dobzhansky began to speculate about the course of human evolution. As a fully converted selectionist by the time he published the second edition of *Genetics and the Origin of Species* in 1941,

Dobzhansky proposed that culture-bearing humans, with their cognitive and musculoskeletal abilities to create and manipulate their own environmental circumstances, were exempt from the Darwinian process of change that resulted from adaptation by means of natural selection. Moreover, any human relative with these neurological and anatomical proclivities was also protected and exempted from the whims of selection. Consequently, since living humans are such a geographically varied but single species, it is likely that this was always the case with hominids.

In 1950, Mayr added his reasons for thinking that human evolution was merely a single, nondiversifying continuum of change. First, Mayr claimed, a “real” systematist would see that regardless of differences, all hominids shared the same adaptation: bipedal locomotion. Consequently, since a real systematist knows that a genus is best defined by its ecological specialization—which bipedalism would constitute—all known hominids should be subsumed in the same genus, in this case, *Homo*. Second, humans today are an amazingly varied and geographically widespread species, occupying all available ecomiches. By extension, hominids of the past must have been at least as varied (Mayr even went so far as to proclaim without justification that earlier humans were even more variable than living humans) and thus must also have occupied all ecomiches available to them. Since, as Mayr had argued in his 1942 opus, *Systematics and the Origin of Species*, in order for speciation via diversification (rather than via unilinear transformation) to occur, a subspecies had to be able to invade a vacant ecomiche so that it could fall victim to new selection pressures and subsequent adaptations, it was clear that hominids had never speciated and never would. Consequently, there was always only one hominid species at any point in time, and the entire picture of human evolution could be thought of as a highly variable continuum of transformation through time. The upshot of Mayr’s speculation was translated taxonomically into three time-successive species: *Homo transvaalensis* (to receive the earliest hominids, which at the time were known from sites in South Africa), *Homo erectus* (which subsumed all specimens from Asia as well as the Mauer jaw from Germany), and *Homo sapiens* (which was the wastebasket for everything younger than *H. erectus*, including Neanderthals).

As if this series of untested (and untestable) assumptions weren’t sufficient to convince paleoanthropologists of the errors of their ways, Mayr (1942, 1950) added another element to his case for a unilinear picture of human evolution, namely, the ugly face of “race” and “racism.” For, he claimed, even though we know that “Congo pygmies” and Watusi are members of the same species, *Homo sapiens*, it is likely that without this knowledge a systematist confronted with their skeletal remains might allocate them to different species. More subtly, though, the implication of Mayr’s folding morphologically disparate living humans and Neanderthals into the same species or the diverse array

of earlier hominids into *H. transvaalensis* was the following: If very morphologically distinctive hominids are members of the same species, then it is ludicrous to pretend that any perceived differences between groups of living humans are biologically and thus evolutionarily significant. Although in hindsight, one can interpret Mayr's taxonomic action as a reaction to the racism and ethnic cleansing that fueled the Nazism of the recently ended Second World War, it nonetheless had a long-lasting and intellectually stultifying effect on the field of paleoanthropology.

Ernst Mayr Meets Louis Leakey

For more than a decade thereafter, most paleoanthropologists followed Mayr's taxonomic revision of hominids. The notable exception was Louis Leakey, who, together with his wife, the prehistoric archaeologist Mary Leakey, had returned from England to the East African country of Tanzania (formerly Tanganyika) to excavate a portion of the Great Rift Valley system known as Olduvai Gorge. Beginning in the late 1950s and continuing into the early 1960s, Louis and Mary discovered specimens of fossil hominids at various sites distributed throughout the uppermost portion of the lowest and thus earliest of the four deposits, or beds, that make up Olduvai. Although the specimens would change the picture of human evolution, the date obtained from the lava flow that capped this stratum, which was identified as Bed I, shocked the world by providing the first evidence of deep antiquity for human relatives. Upper Bed I dated to approximately 1.75 million years ago (mya)—more than three times the length of time previously allotted to human evolution.

At one Upper Bed I locality, which became known as the "Zinj" site, Mary Leakey found a virtually complete cranium, replete with teeth. The incomplete eruption of the last or third molar and the patent sutures of this specimen indicated that the individual had not been fully adult at death. The cheek teeth (premolars and molars) were huge while the anterior teeth (incisors and canines) were so small that all six of them fit easily in the front of the upper jaw. The face was massive, somewhat so across the rather flat midface but especially in the distance from the brows (supraorbital margins) to the teeth; the rounded supraorbital margins themselves, while not anteriorly protrusive, were quite tall, and where they met in the midline above the nasal region, the bone swelled out. The top of the skull bore a midline (sagittal) crest, to which huge masticatory muscles (the temporal muscles) had attached, and markedly expanded mastoid regions, which lie posterior to the ear region and to which the thick bandlike muscles on either side of the neck attach. Louis Leakey coined the genus and species names *Zinjanthropus boisei* to receive this specimen, which was catalogued as Olduvai Hominid (OH) 5. Being the only skull of its kind then known from East Africa, he had to turn to the South African hominids for comparison.

Although Mayr (1942, 1950) had placed all early hominids from South Africa in the same species—*Homo transvaalensis*—the obvious morphological differences between groups of hominids were considerable. One type, represented by the first skull discovered at the site of Sterkfontein, had a small and modestly domed cranial vault, thin supraorbital margins that swelled where they became confluent above the nasal region, and slightly expanded mastoid regions. Although the midface of this specimen was relatively flat across, the lower face curved outward somewhat so that the dental margin extended in front of the nasal opening (aperture). In the Zinj cranium, the lower face region was about as flat and vertical as the midface.

When he was first presented with this Sterkfontein specimen, which was catalogued as Sts 5, physician cum paleontologist Robert Broom (1951) thought it might be a species of the hominid genus his younger colleague, the neuroanatomist Raymond Dart, had created 11 years earlier—in 1925 to be exact—for a partial child's skull that had come from the lime works at the site of Taung, farther to the south and west of the Sterkfontein site. Dart had been impressed by this small specimen's human rather than apelike features, such as smooth supraorbital margins that flowed into a domed frontal region, a very mildly protrusive lower face, small canines (especially uppers), and judging from a mold of the inside of the right side of the braincase that formed as once-dissolved limestone hardened, a very large brain with what seemed to be an apparently greatly expanded cerebral cortex (the "thinking" part of the brain). As such, and because he believed the Taung child was more ancient than Dubois's *Pithecanthropus erectus*, Dart declared his South African specimen to be the missing link between apes and humans and the true ancestor of modern humans for which he created the genus and species *Australopithecus africanus* ("southern ape" from "Africa"), which he placed in a new family, Homosimiadae. Although Broom (1951) provided only conjecture that his Sterkfontein specimen was a species of *Australopithecus*, he nonetheless allocated it to a new species, *A. transvaalensis* (the species in which Mayr would subsume all South African hominids). In 1946, with coauthor G. W. H. Schepers, and again without justification, Broom declared that Sts 5 actually represented a distinct genus. Thus, *Plesianthropus transvaalensis* was born. Taxonomy aside, the Leakeys' Zinj specimen was not even a close match for the Sterkfontein specimen. But it did seem to be relatable to the other type of hominid represented in South African deposits.

Not too far from Sterkfontein in the Transvaal lies the site Kromdraai, which beginning in 1938 had attracted Broom's attention and at which a partial facial skeleton and palate, some isolated upper teeth, and a partial lower jaw had been discovered by a schoolboy. Although it was obvious that the isolated upper teeth had been purposefully removed from the former specimen, it was a mere assumption that the lower jaw also went with it. Nevertheless, in

their 1946 publication, Broom and Schepers referred both the partial face and the mandible to the new genus and species *Paranthropus robustus*, so-named because while larger and seemingly more robust in its features (and presumed tooth size) than Sts 5, its inferred smaller upper canine was taken as indicating its greater centrality to human evolution.

More specimens attributed to *Paranthropus*—but to the species *P. crassidens*—were soon discovered at Swartkrans, which is within view of Sterkfontein and which Broom excavated from 1948 through 1949. Of the various cranial specimens, one (SK 48) was particularly well preserved. It had thin supraorbital margins that swelled out where they merged over the nasal region, a low braincase that bore a midline sagittal crest, a very broad face that was relatively flat and vertical across its midregion and down to the margin of the upper jaw, and an inflated mastoid region. Of the preserved teeth, the upper canine was tiny and the premolars and especially molars relatively much larger. Vacant root sockets (alveoli) demonstrated that all four incisors and the pair of canines had sat along the front margin of the upper jaw. The only mandible with all teeth preserved had similar anterior versus posterior tooth proportions.

In spite of Mayr's (1942, 1950) collapsing this diverse lot of specimens into a single species, those who actually studied them—which Mayr had not—could not avoid recognizing at least some of their differences. And thus it was that Louis Leakey and subsequently other paleoanthropologists found a better comparison between the Zinj specimen and the Swartkrans kind of skull than between Zinj and the Sterkfontein type. Shortly thereafter, paleoanthropologists began to refer to the Sts 5 type as “gracile australopithecine,” the SK 48 type as “robust australopithecine,” and the Zinj type as “hyperrobust australopithecine.”

But Zinj was not the only discovery at Olduvai that revised the picture of human evolution. A few years later, Louis Leakey found at various locales throughout Upper Bed I a partial mandible, fragments of cranial bone, foot and ankle bones, and crudely manufactured stone tools that he, together with anatomists Phillip Tobias and John Napier, published as representing a new and different hominid—one that had a larger brain than any australopithecine, had been a more proficient biped than any australopithecine, and had the capacity to manufacture rather than merely use objects as tools. Following Dart's suggestion, Leakey, Tobias, and Napier gave their constructed hominid the species name *habilis* (“handy man”). Since they had succumbed to the general belief that only one humanlike hominid could exist at any point in time—and Zinj with its chunky cranial features and large cheek teeth did not look the part—Leakey et al. felt justified in placing *habilis* in the genus *Homo*. Since, however, the definition of *Homo* had come to include not only toolmaking but also a brain size (cranial capacity) of at least 800 cc (which accounted for the smallest specimen of *Homo erectus* as well as the large-brained Neanderthals), Leakey et al.

lowered this “cerebral Rubicon” to 600 cc, which was Tobias's estimate for *habilis* based on reconstructing the cranial fragments into pieces of what he thought were paired right and left parietals (the largest cranial bones, which meet along the sagittal suture). A variety of specimens from the lower portion of Bed II were also placed in *H. habilis*, not because they were similar to the original specimens or even similar to one another but because they were not Zinj-like.

Faced with these Olduvai finds and Louis Leakey's interpretation of them, Mayr (1942, 1950) recanted a bit. He allowed that at least early in human evolution there could have been some diversity in perhaps two or three species of *Australopithecus* (*A. africanus*, *A. robustus*, and *A. boisei*). However, Mayr remained firm in his belief that there was always only one species of genus *Homo* extant at any point in time. Thus, *H. habilis* had evolved into *H. erectus*, which evolved into *H. sapiens*.

Paleoanthropology After Mayr

Although discoveries of fossil hominids continued apace—especially of early hominids by Camille Arambourg, Yves Coppens, and F. Clark Howell in southern Ethiopia at Omo and Richard Leakey, Alan Walker, and later also Meave Leakey in northern Kenya at sites on the east and west shores of Lake Turkana into which the Omo River flows—there was no permanent deviation from Mayr's second assault on paleoanthropology until 1974. In November of that year, Donald C. Johanson (Johanson & Edgar, 2006) discovered the partial skeleton nicknamed “Lucy” at Hadar, eastern Ethiopia, for which with Coppens and his colleague at the time, Tim White, he created the species *Australopithecus afarensis*. Although Johanson had initially thought that more than one early hominid was represented in the Hadar sample, he ended up following White in allocating all somewhat contemporaneous Hadar hominids to this single species. The matter of one or more species of Hadar hominid aside, the naming of a new hominid species could be accepted because Lucy et al. were older than any other hominid fossils (dating close to 3 mya) and this taxonomic deed did not affect the genus *Homo*.

Coppens and Howell had coined the genus and species *Paraustralopithecus aethiopicus* for their Omo specimens, but these fragmentary mandibles were quickly subsumed in *A. boisei*, and Richard Leakey avoided the issue of classification for years by referring to his hominid fossils either by their catalog numbers or in vague reference to the species in Mayr's scenario. A proposal in 1975 by Colin Groves and Vratilov Mazák that one of the mandibular specimens from the site of Koobi Fora (east Turkana)—KNM-ER 992—represented not *H. erectus* but a new species, *H. ergaster*, lay dormant until the 1990s when Bernard Wood applied this species name to two cranial specimens from Koobi Fora (KNM-ER 3883 and 3733)

as well as to a fairly complete skeleton from west Turkana (KNM-WT 15000) that Leakey and Walker were content to place in *H. erectus*. But a partial skull—KNM-WT 17000—that Leakey and Walker discovered in the 1980s at a locality in west Turkana and initially referred to as *Australopithecus boisei* would lead to further reconsideration of early hominid systematics.

WT 17000 differed from both Zinj and also specimens from Koobi Fora allocated to *Australopithecus boisei* in having a smaller braincase that bore a very tall sagittal crest. Further, at least as Walker had reconstructed the pieces, while the midface was very broad and flat, the lower face and massive palate projected far forward. Since at 2.5 mya, WT 17000 predated Zinj and many of the presumed hyperrobust specimens from Koobi Fora by about 0.75 million years, and the South African robust hominids by about 1 million years, a number of paleoanthropologists accepted WT 17000 as the ancestor of both *A. boisei* and *A. robustus*. Other paleoanthropologists, however, thought that WT 17000 had given rise to *A. boisei*, which had been ancestral to *A. robustus*. In either scenario, WT 17000 was seen as the morphologically most primitive of the lot and thus deserving of its own species. Since the Omo mandible that was the type specimen of *Paraustralopithecus aethiopicus* was essentially contemporaneous with WT 17000, most paleoanthropologists were comfortable with using that species name for the Turkana specimen in the binomen *Australopithecus aethiopicus*. This act led to a discussion of the existence of a robust-type australopith clade (evolutionary group) that was very different from the gracile-type australopith, which in turn led to the resuscitation of the genus *Paranthropus* to accommodate the species *robustus*, *boisei*, and *aethiopicus*; only *africanus* and *afarensis* remained in *Australopithecus*. By this time, the late 1980s, paleoanthropologists were generally amenable to a broad picture of early hominid evolution in which *A. afarensis* (at approximately 3 mya) could have given rise to *A. africanus* (possibly as old as 2 mya) and perhaps also *Paranthropus*, with *A. africanus* giving rise to *Homo*.

It seems that once the fear of identifying taxic diversity was overcome, recognition of new species if not new genera (pl. genus) and species became acceptable. There were even tentative forays into the genus *Homo*, with Wood's 1991 allocation of various Turkana specimens from *H. erectus* to *H. ergaster* and yet others to a species that V. P. Alexeev had created for the KNM-ER 1470 cranium, *H. rudolfensis*. Two years later, Friedeman Schrenk allocated a specimen from Malawi to the latter species. In 1994, from 4.4 to 4.5 mya deposits in the Ethiopian Middle Awash, Tim White, Gen Suwa, and Berhane Asfaw published work on various isolated teeth and cranial fragments that together they thought represented a new species of *Australopithecus*—*A. ramidus*—that had been ancestral to *A. afarensis*. The following year, White et al. transferred *ramidus* to a new genus, *Ardipithecus*. Although stating that *A. ramidus* was still a hominid on the basis of presumed

nonapelike features of the canine first-premolar complex and an inferred anterior position of the foramen magnum (through which the spinal cord exits the skull into the vertebral column—its anterior position in humans is associated with bipedalism), the absence of thick enamel on the molar teeth represents a major stumbling block for attributing hominid status to it.

Also in 1995, Meave Leakey, Alan Walker, and colleagues announced the discovery of various jaws, isolated teeth, and a few bones from two sites in west Turkana, Kanapoi and Allia Bay. The approximately 4 mya age of these specimens—which put them chronologically in between *Ardipithecus* and *Australopithecus afarensis*—led Meave Leakey et al. to argue that they had discovered a species—*A. anamensis*—that was more primitive in jaw and tooth than *A. afarensis* and thus ancestral to it. A potential problem here was that, judging from the lower part of a humerus that had previously been discovered at Kanapoi and a newly discovered upper part of a tibia, the specimens were humanlike, not australopith-like.

In 1999, Asfaw et al. proclaimed that a 2.5 mya upper jaw with teeth from the Ethiopian Middle Awash represented a new species, *Australopithecus garhi*. Two years later, Johannes Haile-Selassie announced a new 5.8 to 5.2 mya subspecies of *Ardipithecus*, *A. ramidus kadabba*, based on a mandible and worn teeth. But two other events in 2001 also affected paleoanthropology. Brigitte Senut and Martin Pickford pushed further the time depth of human evolution with various jaw, tooth, and postcranial specimens they found near Lake Baringo, Kenya, that dated to just under 6 mya and that formed the basis of their new taxon, *Orrorin tugenensis*. They argued that a reasonably well-preserved upper femur had hominid-like attributes, and unlike *Ardipithecus*, the molars bore thick enamel. Also in Kenya, Meave Leakey and colleagues made public a 3.5 to 3.2 mya skull from a site in west Turkana that, although severely cracked, was sufficiently preserved to show that the face was quite flat and the ovoid orbits devoid of supraorbital development. They assigned this specimen and two mandibles to a new taxon, *Kenyanthropus platyops*, to which they also referred the KNM-ER 1470 cranium, which had already gone through the taxonomic ringer, having been interpreted first as *Homo habilis*, then *Pithecanthropus rudolfensis*, and then *H. rudolfensis*.

At this writing, only one other putative hominid remains to be discussed: a rather crushed skull and presumably associated specimens from Chad, probably closer to 6 mya than its claimed 7 mya age, to which the name *Sahelanthropus tchadensis* was given. Prior to this discovery, which Michel Brunet and collaborators announced in 2002, Brunet had found only one very fragmentary specimen—the front of a lower jaw missing most teeth—which he made the type specimen of a new species, *Australopithecus bahralghazali*. Brunet's interpretation of *Sahelanthropus* as a hominid and ancestral to

all other hominids rested on the antiquity of the specimens as well as canine shape and tip wear, molar enamel being intermediate in thickness between chimpanzees and undisputed hominids (and thicker than that of *Ardipithecus*), and an inferred anterior position of the foramen magnum. If a hominid, then the skull bears the thickest and most prominent brow ridges of any (even more so than gorillas), which would make it the most derived of its putative clade and thus unlikely to have been ancestral to any known hominid.

As this overview demonstrates, in contrast to the 20 years that preceded them, the last 20 have witnessed a flood of newly named hominid taxa. This may give the impression that paleoanthropologists eventually shed the shackles of taxonomic truncation that Mayr (1942, 1950) had imposed, but it should be noted that the recognition of hominid diversity has largely been confined to the older fossils. All things considered, the situation with regard to later hominids is not that different from Mayr's formulation. Wood's revival of *Homo rudolfensis* fell on deaf ears, and even though his effort to recognize *H. ergaster* as an African counterpart to Asian *H. erectus* has been embraced by some paleoanthropologists, a survey of the most popular human evolution textbooks reveals that the *H. habilis*-evolving-into-*H. erectus* scenario is still going strong. So too with regard to *H. sapiens*, which by subsuming such morphologically disparate specimens as Cro-Magnon 1, the Feldhofer Grotto Neanderthal, the Kabwe skull, and the Javanese Ngandong skulls, to name but a few, sports a range of variation otherwise unknown in the animal kingdom.

Granted, some paleoanthropologists have tried to deal with our own unwieldy species. For example, over the past two decades, there has been a growing appreciation of just how different Neanderthals and we are, not just in features of the skull, jaws, and teeth but also in most of the bones of the postcranial skeleton. Consequently, while a handful of stalwart multiregionalists hold steadfastly on to the notion that there was always only one middle Pleistocene hominid—*H. erectus*—that evolved en masse, albeit in regionally different stages, into *H. sapiens*, William King's *Homo neanderthalensis* has enjoyed increasing recognition among paleoanthropologists.

In addition, the name *Homo heidelbergensis*, which Otto Schoetensack created in 1908 for a 0.5 mya mandible excavated near Heidelberg, Germany, has in recent years been applied to various 600 to 300 kya (thousand year old) skulls, most notably those from Kabwe (Zambia), Petralona (Greece), Arago (France), and Bodo (Ethiopia). Yet although superficially similar in having robust faces and tall brows, these skulls do not present a relatively uniform picture when details, especially of sinuses and the inside of the cranial vault, are considered. In addition, and more important, with the exception of specimens from Arago, which include mandibles, none of the other craniums can be compared with the type specimen of *H. heidelbergensis*—which

makes allocating them to this species impossible. Nevertheless, it is probably better to have some recognition of the potential diversity that exists among the specimens attributed to *Homo* than not.

But the recognition of new species of *Homo* has languished. Indeed, although from the 1980s on, Juan-Luis Arsuaga and colleagues (Arsuaga & Martínéz, 2005) have amassed a large collection of specimens of the same hominid dating to about 350 to 320 kya from the site of Sima de los Huesos, which is in the Sierra de Atapuerca in northern Spain, they have inclined toward regarding it as *H. heidelbergensis* or vaguely as something Neanderthal-like. However, in 1997, José María Bermúdez de Castro and collaborators did claim that they found the remains of the common ancestor of *H. neanderthalensis* and *H. sapiens* at the minimally 780 kya site of Gran Dolina in the Sierra de Atapuerca; they called it *H. antecessor*. Since then, in 2002, only one other species of *Homo* has been proposed: *H. georgicus*, based on a large mandible with massive but very heavily worn teeth from the 1.8 mya Georgian site, Dmanisi. The morphologically very diverse craniums from this site have all been referred to *H. erectus*. More than 50 years after Mayr (1942, 1950) imposed the picture of unilinearity on the human fossil record, his influence is still keenly felt in the taxonomic realm of genus *Homo*.

Future Directions

The reader has no doubt noticed that most of this review is the iteration of taxonomic names. That this form of presentation is particularly characteristic of human paleontology, in contrast to the broader domain of nonhuman paleontology, is reflective of the odd history of the former discipline—in which taxonomic minimalism and the perception of unbounded interindividual variation within any taxon has dominated. Consequently, the focus when studying hominid or potential hominid fossils has been less on morphological detail and a concern with systematic theory and practice than on constructing scenarios of how, why, when, where, and from whom a sequence of modern human ancestors evolved. Were this not the case, we would not find that so many type specimens—which are the name bearers of their species or genus and species—are either so fragmentary or devoid of preserved anatomical detail that comparison with other specimens, which would seem a necessary requisite to assigning them to a given taxon, is often impossible. Were this not the case, we would not see the oft-repeated practice of lumping specimens from the same site or the same time period into the same taxon, which gives the locale of discovery or the ages of specimens priority over morphology—which is the only meaningful reflection of evolutionary history. Were this not the case, we would not see the widespread resistance to restudying and reinterpreting the fossils that were discovered

during the 1800s and much of the 1900s. If virtually every newly discovered fossil can be regarded as representing a new taxon, especially if it is well over 1 mya, then why should not the already known human fossil record provide a wealth of information that was overlooked in the past? The problem with paleoanthropology in general has been that most practitioners have left observation behind, and instead, they have focused on evolutionary explanation. This problem is, however, easy to remedy. One need only begin by using one's eyes rather than being influenced by either the past or the perceived weight of received wisdom.

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CULTURE CHANGE

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What is culture change? In a way, the phrase itself is problematic; after all, culture was formulated as a scientific concept partly for the very reason that customs seemed *resistant* to change—at least compared with the confusing blur of particular people and events traditionally studied by historians (Tylor, 1871/1924, p. 5). Indeed, some anthropologists have tried to analyze cultures as if they did not change at all; such approaches, however, seem ever less relevant in the rapidly globalizing world of the 20th century.

In the phrase “culture change,” *change* has its usual meaning; *culture*, however, is being used in a sense technical enough to need a bit more discussion here at the outset. Culture, as classically defined by Edward B. Tylor in 1871, refers to “that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society” (1871/1924, p. 1). Once we realize that by the word “art” Tylor meant all the artifacts customarily made and used by a society, we see that this is a broad definition indeed: It includes the customary things with which people surround themselves, the customary ways they interact with one another behaviorally, and the ideas that are more or less shared among them.

There are anthropologists, it should be said, who consider culture to be things that only an *individual* can acquire by virtue of being a member of society. One problem with this is that it excludes features that inherently

characterize groups rather than individuals—some of which certainly would seem to be fundamental features of a society’s way of life, such as economic inequality, an elaborate division of labor, or (group) religious ritual.

Some anthropologists think of culture not only as an acquisition of individuals but also as a particular kind of individual acquisition, namely, mental. Culture, for them, is strictly in our heads. From their standpoint, neither the automobile nor the computer, say, would be part of American culture in the early 21st century; rather, only the underlying *ideas* of which the things themselves (they maintain) are realizations deserve to be considered culture. This, however, makes culture difficult to study empirically by making it outwardly unobservable.

Defining culture as strictly mental also encourages an oversimplified and misleading conception of culture change. Anthropologists who think of culture as essentially mental tend to think of culture change as essentially due to new ideas. This focus distracts our attention from, if it does not quite deny, three key points about culture change. First, what ideas are “thinkable” depends partly on existing cultural arrangements. Ideas do not really come “out of the blue”; there is cultural wisdom, then, in the scriptural claim that there is “nothing new under the Sun”—nothing totally new at least. Second, new ideas are by no means sufficient in themselves to bring about culture change. The greatest idea in the world must somehow be *acted* on before it has any chance to change culture. Ideas that remain trapped in

their thinkers' heads, issuing in neither new behaviors nor new artifacts, are of no cultural consequence whatever. Third, behavioral or artifactual consequences are also insufficient for culture change. These consequences must be greeted by significant social acceptance; and this, like the occurrence of the new ideas in the first place, depends to some degree on existing cultural arrangements.

In any case, when the subject is *culture change*, it seems that anthropologists (and journalists) today usually use—whether they admit it or not—a more general definition along Tylor's lines; and this appears to have been true in the past as well. For present purposes, then, the *constituents* of culture are not only ideas about things but also about the things themselves—objectively observable artifacts and behaviors. By *artifactual* is meant the world around us insofar as it is built or manufactured by humans: T-shirts and tuxedos, furniture and appliances and buildings, cornfields and computers, automobiles and highways, pencils and power plants, cell phones, baseball bats, factories, and baptismal fonts. By *behavioral* is meant the observable motion of our bodies through space, usually oriented to the artifactual world and/or literally manipulating artifacts. By *ideational* is meant everything that goes on in our heads: thoughts about artifacts and behaviors (of one another and ourselves), about thoughts (again, of one another and ourselves) and even thought itself, and about the rest of the universe. (Feelings, which also may be said to go on in our heads, are important in social interaction and are influenced *by* culture; they are not, however, properly considered as themselves constituents *of* culture.) Because this trichotomy is essential in understanding a current approach to culture change, we shall return to it after examining past approaches.

Past Approaches to Culture Changes

Although its roots naturally lie deeper in the past, anthropology took shape as a scholarly discipline in the 19th century. From the late 15th century on, exploration and colonization—led by Spain, Portugal, the Netherlands, France, and Great Britain—had produced a large and growing body of information about how different were the customs in the various parts of the world. Much of this consisted of reports by explorers and missionaries; systematic anthropological fieldwork was an achievement largely of the 20th century. Not entirely wide of the mark, then, is the image of the so-called 19th-century evolutionists as scholars in their studies poring over fanciful accounts of exotic peoples in faraway places. It sounds a rather far cry from scientists in their laboratories conducting meticulous experiments; indeed, critics later would charge that it in fact had been nothing more than “armchair speculation.” Yet real progress was made. Judicious handling of the material, after all, could go some way in separating truth from falsehood. Tylor pointed out that when

two or more visitors independently of each other had reported the same custom in the same place, it was unlikely to be a fabrication—especially if the custom seemed odd.

In terms of theory, Tylor and others found themselves facing *degenerationism*. Inspired by the biblical book of Genesis, the idea was that all humans had practiced agriculture and achieved a modest level of civilization not too long after creation itself. Then, with the dispersion of people throughout the world, some of them degenerated to lower levels (some forgetting even how to grow food), while others rose to higher levels. Degenerationism, one might say, was the first grand theory of culture change. Foremost among scholars putting it to rest was Edward B. Tylor. Using his extensive knowledge of the anthropological evidence that already had accumulated by around 1865, Tylor showed that “high” cultures quite certainly had originated in a state resembling that of the “low” cultures still observable in some parts of the world and that there was no evidence that any of the latter had come into being by degeneration from a higher condition of culture (Tylor 1865/1964).

The 19th Century: Beyond Degeneration's Defeat

Strictly speaking, the defeat of degenerationism was perhaps more a step in separating science from religion than a step in science itself. Quite different in this respect were the debate over the relative importance of diffusion and independent invention and attempts to characterize the cultural past as a series of stages.

Independent Invention and Diffusion

Tylor and other leading 19th-century evolutionists were united against degenerationism but divided on this question. The issue arose when among the glaring differences between human cultures, striking similarities also appeared. Boomerangs, for example, were reported not only for Australia but also for regions of India and Egypt. How was this distribution to be explained? Had this weapon been invented only once, then spread to the other two regions, or had it been invented independently three times? Those inclined to stress the importance of diffusion would prefer the former explanation, claiming that it is much easier for humans to copy something than to invent it. Those favoring independent invention would prefer the latter explanation, claiming that the human mind is sufficiently alike everywhere (“psychic unity”) that it will tend, when faced with similar problems under similar conditions, to produce similar solutions.

Toward the extremes were two German scholars: Adolf Bastian argued that independent invention should be presumed unless strong evidence for diffusion could be produced, while Henry Balfour argued that diffusion should

be presumed until overwhelming evidence for independent invention was put forth (Lowie, 1937). Most of the 19th-century evolutionists were less extreme. In the case of the boomerang, for instance, they would by no means rule out the possibility that it had originated independently in two of the regions and diffused from one of these to the third region.

Stages

Associated rather closely with a stress on independent development was the idea that human culture everywhere tended to advance through broadly similar *stages*. The most famous formulation was Lewis Henry Morgan's (1877/1985) sequence, savagery, barbarism, civilization. (Morgan subdivided the first two of these stages into lower, middle, and upper for a total of seven stages.) While debates over independent invention versus diffusion often centered on particular cultural features (as in the boomerang example), the concept of a stage involved a vast pattern of cultural features—that is, an entire kind of cultural system. Still, the *defining* of such stages did require reference to at least some particular features; and Morgan chose, for this purpose, mainly items of material technology. The transition from lower savagery to middle savagery, for example, was marked in part by the use of fire and from upper savagery to lower barbarism by the invention of pottery. Civilization was reached, in Morgan's view, not with a technological achievement but rather with the development of a phonetic alphabet. His reliance on primarily technological markers helped make the stages more objectively identifiable and was quite convenient for archaeologists, who after all can recover neither behavioral nor ideational evidence but material evidence alone. Though the terms *savage* and *barbarian* sound ethnocentric today, anthropology still recognizes general stages through which culture change has tended to pass; and they are not entirely different from Morgan's. Pottery, for example, being heavy and fragile, is not highly functional for the mobile way of life characteristic of foragers; Morgan's use of pottery to mark the end of savagery therefore makes this stage broadly comparable to the long period (evidently around 99.8% of our evolutionary past) before settling into villages and growing food—what is today termed the hunting-gathering era, or Paleolithic (Old Stone Age) (Harris, 1968, pp. 185–186).

Some 19th-century evolutionists proposed stage sequences of other kinds. Herbert Spencer (1897) proposed that human political culture had advanced through four progressive stages: simple, compound, doubly compound, and trebly compound. These stages resemble more recent sequences such as band, tribe, chiefdom, and state (Service, 1962) and village, chiefdom, state, and empire (Carneiro, 2003). More important than the specific stages delineated, however, are these two facts stressed by Spencer: First, political evolution does not occur by the simple increase in population of a small society (a band or

village) until it has become a large one (a state or empire); rather, it occurs by the combining of smaller societies. Second, this combining is stepwise, with little room for skipping steps. That is, we know of no cases in which bands or villages have combined directly into states or empires; rather, they combine into chiefdoms, which then may (or may not) combine into states. Similarly, chiefdoms do not combine directly into empires but into states, which then may (or may not) combine into empires. Political evolution thus has a unilinear quality: Any society reaching a later stage will have done so by having passed thorough earlier stages. This assuredly does not mean that all societies at an earlier stage will advance to a later stage! In the human past, there must have been, after all, vastly more bands and villages that never helped compose chiefdoms than those that did, far more chiefdoms that never helped compose states than those that did, and many more states that never helped compose empires than those that did. The unilinearity of political evolution, with respect to a given society, we might well say, is not predictive but retrodictive: Though we cannot be sure a given small society will ever become part of a larger one, we can be sure a large society originally became large by the compounding of smaller ones. Spencer's picture of political evolution as having progressed by the stepwise unification of units (mainly through military conquest) remains influential today (Carneiro, 2003).

Other stage sequences have not held up so well; their main role proved to be stimulating research that led to their own rejection. The greatest is J. J. Bachoffen's (Partenheimer, 1861/2007) set of stages based on gender relations. He argued that humans originally lived in a state of unregulated sexual promiscuity. Females, finding themselves too much at the mercy of the physically stronger males, managed somehow to gain control and institute religion and marriage; but the "male principle" ultimately proved even higher and purer, and the stage of matriarchal culture gave way to patriarchal culture. By around 1900, this theory of culture change as an epic three-stage battle between the sexes had proven untenable: It had been based on conflating matrilineality (tracing family lines through females) and matriarchy (sociopolitical rule by females) and on Bachoffen's having relied heavily on Greco-Roman myths to reconstruct the past. Still, the idea that humans had passed through a matriarchal stage had been embraced by the leading cultural evolutionists of the late 19th century: Edward B. Tylor, Herbert Spencer, and Lewis Henry Morgan.

Errors such as this rather glaring one, a growing suspicion that delineating evolutionary stages was inherently ethnocentric anyway, the misconception that the evolutionists had argued for a kind of rigid unilinearity in all aspects of culture change, and probably increasing contact between societies thanks to dramatically improved means of transportation and communication were among the forces that moved 20th-century anthropology to approach culture change in new ways.

The Early 20th Century

Dissatisfaction with the 19th-century orientation to culture change appeared earlier in the United States than in Europe. Sometimes, it presented itself as choosing a new battle instead of taking sides in the old one. In a highly influential paper of 1920, Franz Boas wrote as follows:

American scholars are primarily interested in the dynamic phenomena of cultural change, and try to elucidate cultural history by the application of the results of their studies. . . . They relegate the solution of the ultimate question of the relative importance of parallelism of cultural development in distant areas, as against worldwide diffusion . . . to a future time when the actual conditions of cultural change are better known. (p. 314)

This sounds evenhanded enough; but in fact, the concept of independent invention (or as Boas here calls it, parallel development) was intimately bound up with that of cultural evolutionism. Part and parcel of discrediting the latter, then, was a growing stress on contact between societies as key to understanding culture change. Boas (1920) went on in the very same paper to admit this stress; but he carefully ascribed it to methodological considerations rather than to any animosity toward cultural evolutionism: “It is much easier to prove dissemination than to follow up developments due to inner forces, and the data for such a study are obtained with much greater difficulty” (p. 315). Boas seems here to have been thinking of the contrast between directly observing how cultures vary over space and using archaeological evidence—laborious to obtain and relatively fragmentary at best—to try to piece together how a culture has changed over time.

By 1924, Boas seems to have decided that more than methodological considerations were involved. A paper titled “Evolution or Diffusion?” argued in effect that when societies appear to be culturally mixed, intermediate, or transitional, this nearly always should be taken as evidence of diffusion of traits from less culturally mixed societies, not as evidence of evolution from an earlier to a later condition of culture; to exemplify the danger of the evolutionary assumption, he discussed the old—and evidently misguided—interpretation of matrilineal customs as indicating transitionality between supposed matriarchal and patriarchal stages.

The Diversity of Diffusion

As part of the general reaction of the anthropological world against cultural evolutionism, then, culture change came to be thought of by anthropologists as primarily a matter of diffusion. In one of the more famous passages ever penned by an anthropologist, Ralph Linton (1936) wrote of how a typical adult male in the United States (of the 1930s) started his day. The flavor—if not the full

effect—of this virtuoso performance can be appreciated from the final paragraph:

When our friend has finished eating he settles back to smoke, an American Indian habit, consuming a plant domesticated in Brazil in either a pipe, derived from the Indians of Virginia, or a cigarette, derived from Mexico. If he is hardy enough he may even attempt a cigar, transmitted to us from the Antilles by way of Spain. While smoking he reads the news of the day, imprinted in characters invented by the ancient Semites upon a material invented in China by a process invented in Germany. As he absorbs the accounts of foreign troubles he will, if he is a good conservative citizen, thank a Hebrew deity in an Indo-European language that he is 100 percent American. (p. 327)

It is one thing to think of a culture as a product of diffusion; it is another to think about the process of diffusion itself. One can usefully distinguish four forms: direct contact, immigrant diffusion, intermediate contact, and stimulus diffusion.

Direct contact describes the case in which a cultural feature spreads from one society to adjacent societies and from those to other more distant ones. The basic type of medieval castle (“motte-and-bailey,” in which the structure stands atop a mound [the motte] surrounded by a ditch, surrounded in turn by a palisaded courtyard [the bailey]), for example, originated in northern France in the 10th century and gradually spread through most of western Europe. On a larger geographical scale, paper, having originated centuries before in China, underwent diffusion from the 8th century through the 15th to the Arab world and then to Europe. Three recurrent steps (in this as in other cases where the feature is a commodity) were (1) importation of small amounts as a luxury item, (2) importation of larger amounts as the item became widely used, followed eventually by (3) internal manufacture supplementing or replacing importation.

A particularly important way that diffusion occurs, often overlooked, is along with the expansion or migration of populations. One example of this *immigration diffusion* is the availability in American cities of “ethnic” options when people are choosing a restaurant. Very often this availability reflects the immigration of people who have opened restaurants serving the cuisine of the nations from which they have come. Another example of immigrant diffusion would be the enormous number of English cultural features—implements, customs, and beliefs (and the language)—that came to North America as a matter of course along with the colonists themselves. Immigrant migration is easily overlooked perhaps because the word “diffusion” conjures up an image of a cultural feature spreading mainly *between* people rather than mainly *with* them. In fact, without historical records it is often difficult to tell whether a cultural feature long ago moved across a resident population or simply along with an expanding one; the spread of motte-and-bailey castles, for example, seems to have been more or less

closely associated with the geographic expansion of the ethnic group known as the Normans.

Ethnic foods nicely exemplify another important point. Though some food critics may complain about, say, the amount of beef in our “Mexican” food, the sugary sauces in many “Chinese” dishes, or the quantities of sour cream in our “Japanese” sushi, such changes seem to appeal to the American palate (so to speak). And for cultural features to undergo such modification as they become accepted in a new social environment is more the rule than the exception when it comes to diffusion. Of course, this often involves cultural features more important than details of cuisine; a good example here would be the changes undergone by capitalism as it was culturally incorporated by Japan after the Second World War (Okumura, 2000).

Intermediate contact refers to the spread of cultural features by such agents as explorers, sailors, traders, or missionaries. This kind of diffusion reflects the fact that by the time societies have grown large enough to have an elaborate division of labor, some occupational specialties routinely position individuals to serve as diffusers of cultural elements. In the 1500s, for example, sailors, having gotten tobacco (and the practice of smoking it) in the New World, introduced it into the great port cities of Europe. Meanwhile, many European things were being introduced into the New World—notably, horses by Spanish explorers and Christianity by the missionaries. (The first Catholic missionaries arrived within a few years of Columbus’s initial voyage.) Another famous example, very important in the evolution of science and technology, was the diffusion of India’s decimal system (along with “Arabic numerals”) into Europe by way of a small number of books imported from the Middle East. Though written before CE 1000, these books’ influence was not widely felt in Europe—where Roman numerals remained customary—until the advent of the printing press centuries later.

Stimulus diffusion refers to situations in which an idea from outside triggers a society to develop and incorporate something new into its culture. A classic case is the development of writing among the Cherokee stimulated by a man named Sequoya from his observations of Europeans. Though the system used some symbols from the English alphabet, they represented not individual sounds but entire syllables; the writing system, that is, was syllabic rather than alphabetic. A “mere” idea from outside had sufficed to inspire a novel cultural development. But some degree of modification in a new environment is, as we have seen, a common aspect of diffusion; therefore, stimulus diffusion can be understood essentially as taking this aspect to an extreme.

Competition among peoples has given rise to important examples of stimulus diffusion. The ancient Hittites, first to develop iron chariots for war, tried to keep iron smelting a military secret and of course were not about to export iron chariots to surrounding societies; but eventually, the other societies developed (or otherwise acquired) them on

their own. Fear of being conquered is a powerful stimulus! Some 4,000 years later, biological weapons, space programs, and nuclear power often have been developed more by stimulus diffusion than by direct diffusion though it seems likely that indirect contact by way of espionage has played no small role as well.

Intrasocietal Diffusion

In anthropology, diffusion traditionally has been thought of as between social groups, especially between entire societies—typically nations. This form of diffusion may be termed *intersocietal*; as such, it contrasts with *intrasocietal* diffusion. Intrasocietal diffusion refers to the spread of an innovation within one group rather than from one group to another. Disciplines such as economics and sociology have given more attention to intrasocietal diffusion than have anthropologists. One of the most interesting things to emerge is a characteristic *S-shaped curve* describing the extent of an innovation’s adoption with respect to time. Some authorities consider this curve to result from innovativeness being a normally distributed trait (that is, a trait fitting the “bell curve”) within human populations. An innovation diffuses slowly at first because early-adopter types are fairly rare, gains “speed” as less atypical people adopt it, and levels off as the later-adopting, relatively rare “laggards” finally adopt it. There is evidence that early adopters tend to be higher in terms of education and income than do later ones (Rogers, 2003). The anthropologist H. G. Barnett (1953) suggested several “ideal types” of innovator or early adopter: the dissident, who is simply a nonconforming kind of individual; the indifferent, who is for some reason—perhaps merely by virtue of still being young—not strongly committed to conventionality; the disaffected, for whom certain experiences have loosened the commitment to conventionality (e.g., leaving home to go to college); and the resentful, embittered by having failed to achieve success in conventional terms. The final three of these would seem somewhat age graded in the sense that young, middle-aged, and older individuals, respectively, would be most likely to fit the description. By reminding us that people of all ages can have reasons for desiring change, Barnett’s typology perhaps helps account for the otherwise surprising failure to find a general tendency for innovators to be relatively young.

The Limits of Diffusionism

While diffusion has been and remains an important process of culture change, it can be overemphasized. Its easy comprehensibility may help explain the popularity, with the public, of fanciful images of lost continents or intercontinental raft voyages. In a somewhat more scholarly vein, the English biologist G. Eliot Smith (1928) tried to show that civilization had originated only once, in ancient Egypt; significant signs of civilization anywhere else in the

world he attributed to diffusion from the fertile floodplain of the Nile. The German priest Wilhelm Schmidt (1939) attempted to account for particular cultures as the intermingling of customs resulting from the overlapping of cultural “circles” radiating from a small number of centers. Another feature of diffusionism was its almost studied neglect of the systemic aspect of culture as if a culture were not so much a system of interrelated elements as a mere collection of juxtaposed borrowings—a “thing of shreds and patches” (cf. Harris, 1968, pp. 353–354).

There is at least one respect in which it *is* instructive to think of culture as a collection or stock of elements. As early as 1877, Lewis Henry Morgan suggested that culture change naturally tends to accelerate over time because any element of “knowledge gained” has the potential to become a “factor in further acquisitions” (1877/1985, p. 38). Innovations, that is, often involve combinations of pre-existing elements; therefore, the more cultural “material” there is available, the more innovations there will be. Culture, then, is somewhat like a snowball: The more of it there is, the faster it grows. It is important to remember, however, that this “growth” should not be presumed to constitute progress, at least morally, and that this snowballing tendency does not mean that “culture changes itself” since the innovations involved in the process are not themselves cultural unless and until they have been incorporated into a group’s way of life.

Acculturationism and Its Limits

Professional anthropologists, of whom there were by now a growing number (due especially to Boas’s efforts at Columbia University), tended to be skeptical of such extremes; they were more bothered by the observable facts that diffusion was not inevitable when cultures came into contact (whether indirect or direct) and that it was, in any case, only one of several possible results of such contact. The emphasis accordingly shifted from diffusion to *acculturation*, authoritatively defined as “those phenomena which result when groups of individuals giving different cultures come into continuous firsthand contact, with subsequent changes in the original cultural patterns of either or both groups” (Redfield, Linton, & Herskovits, 1936, p. 149).

This broadening of emphasis was to some extent a matter of convenience for American graduate students studying native peoples since these peoples by then had been long subject to the shattering effects of the Euro-American expansion into the New World. But the broadening also redirected attention from cultural elements as such to situations (and even particular events) on the one hand and to groups and individuals and their reactions on the other. Thus, studying acculturation so defined might entail as much attention to history and psychology as to culture!

As a significant example of how the study of acculturation leads to psychological issues, we might begin by

observing that people seem in most times and places to have found it easy to assume that their own culture or subculture is somehow essentially better than most or all other ways of life. Since this interpretation places one’s own culture at the center of the moral universe, it is termed *ethnocentrism*. Ethnocentrism ordinarily brings with it judgmental attitudes; sometimes, it even brings feelings of disgust. Presumably, all humans have ethnocentric tendencies, unconscious if not conscious; these perhaps stem from the fact that each of us is necessarily enculturated from infancy on in some particular way of life rather than in all possible ways.

Scientists, including anthropologists, generally agree in defining culture as a social rather than a genetic acquisition; and they generally regard ethnocentrism, whatever else it may be, as a barrier to the successful study of other cultures or subcultures. Arrogance, judgmentalism, and disgust reduce one’s chances of gaining a more accurate and deeper understanding of other ways of life. To counteract their own ethnocentric tendencies, anthropologists adopt the assumption that no culture or subculture is basically better or worse than any other. This assumption is known as *cultural relativism*. In reference to culture change, ethnocentrism would be expected to create resistance to diffusion. Other things being equal, unfamiliar cultural elements from outside might appear undesirable or threatening simply because they are unfamiliar. There also may be outright hostility toward the out-group itself that would foster a desire to be as different from them culturally as possible. Thus it is that acculturation phenomena include not only diffusion but also intentional resistance to diffusion (Loeb & Devereux, 1943).

Much depends, however, on the attitude of the borrowing society toward the lending one. Although it is common for in-groups to look down on out-groups and their ways, it can happen that an in-group actually looks up to an out-group. Prestige attaching to an out-group of course would facilitate adoption of its cultural elements by an in-group, thus promoting diffusion.

It is sometimes argued that acculturation studies were ideologically tainted by denying or glossing over the effects of exploitation on indigenous peoples and cultures. It is important to recognize, however, that many anthropologists were not only acutely aware of this danger but also actually engaged in lively, open debate about it; an excellent example is the exchange between Victor Barnouw, Bernard J. James, and Harold Hickerson about Chippewa personality (Barnouw, 1979).

The Mid-20th Century

The limitations of acculturation as a focus for studying culture change were sufficiently grave that by the time the concept was achieving clear formulation, some younger anthropologists already were heading in a different

direction—a direction reasserting the importance of focusing on culture itself rather than on psychology or history and on culture as a system of interacting elements. Julian Steward (1955) stressed that a culture's first order of business, so to speak, was to adapt a human group successfully enough to its environment for the society to survive; he paid special attention to the way in which specific environments called forth specific kinds of cultural adaptations. Leslie A. White (1949) shared Steward's stress on culture as a survival mechanism but was more interested than Steward in the trajectory of human culture as a whole—a contrast sometimes connoted by “Culture” compared with “cultures.” The notion of a single human culture may seem odd. Yet it seems likely that no human group is or ever has been *completely* isolated from all others; so if humans are connected, even if only indirectly by patterned interaction, it makes sense to consider us a single social group; in which case, the concept of *a* or *the* socially acquired human way of life, no matter how diverse, finds justification. White argued forcibly that the most important innovations in cultural evolution have been those that led to greater control and consumption of energy; indeed, he wrote of culture as being at heart an energy-capturing system. White and Steward often were termed “neoevolutionists” because their work in some respects constituted a return to the search for scientific laws that had inspired the 19th-century evolutionists.

Leslie White (1949) and Julian Steward (1955) engaged in vigorous debates that tended to enlarge on their differences and minimize their similarities. This situation was to some extent clarified when Marshall Sahlins (1960) proposed calling Steward's focus “specific cultural evolution” and White's, “general cultural evolution.” In a highly influential book, *The Rise of Anthropological Theory*, Marvin Harris (1968) argued convincingly that Steward and White actually had in common what was important and fundamental and new: not that they both believed culture evolved but that they both believed the best way to analyze culture was to begin with the tools and techniques through which people met their everyday survival needs in the environment they inhabited. Changes in (or differences of) environment would mean technological change; technological change would bring change in how people interacted and even in the kinds of groups they lived in; and these changes would trigger changes in how people thought about the world, one another, and themselves. To understand culture change, these materialists taught, we need to acknowledge the primacy of the technological linkage between people and environment; changes in that linkage will be the most potent innovations of all.

Contemporary Approaches to Culture Change

For a time in the years leading up to 1970, it appeared that the anthropological study of culture (and culture change)

might be unified under the evolutionist/materialist banner. The approach was especially appealing to archaeologists (Steward had begun his career as one); the artifactual evidence to which they have direct access is material indeed, so according theoretical priority to technology appealed to them. And indeed, the evolutionist-materialist approach, looking at cultures as adaptive systems, has vanished from the anthropological landscape. But something quite different was also astir, especially among cultural and linguistic anthropologists affected by certain countercultural trends of the 1960s. Thus, we may think of two broad contemporary approaches to culture change: the new acculturationism and the continuation of evolutionism/materialism.

The New Acculturationism

Published only a year after *The Rise of Anthropological Theory* was a very different book indeed: an edited volume titled *Reinventing Anthropology* (Hymes, 1969). Here was revealed a profound skepticism toward and even indictment of the effort to study human culture scientifically. Science, reason, and anthropology (and anthropologists) were associated not with the liberation of human minds but with the exploitation of colonized populations.

Of special importance for the study of culture change was the idea that cultural anthropologists were mistaken about what they had been studying. Though they thought the hunting-gathering people, the pastoralists, the villagers, or the peasants they observed provided glimpses into more ancient ways of life, what they principally offered, it is proposed, are insights into the effects of colonialism and capitalist exploitation. In a sense, the argument is that we have always been essentially studying acculturation, whether we knew and admitted it or not. In part, this is because the anthropologist herself or himself is—and must to some extent remain—a stranger; and whatever he or she writes is not so much an objective picture of the observed by an observer but a subjective account of an interaction between the two.

We noted that diffusionism was taken to its greatest extremes not by professional anthropologists but by a biologist and a priest; similarly, the extreme of this new acculturationism was reached by a journalist, Patrick Tierney (2000), who argued that it was anthropologists themselves (along with journalists) who were responsible for the devastation—by the outside world—of the Amazon and its native peoples. Anthropologists have argued, more modestly, that in past studies the effects of contact (colonization and exploitation) sometimes have been seriously underestimated (e.g., Ferguson & Whitehead, 1992); and many have been at pains, in their own recent work, to highlight rather than ignore the inequality built into the contact situations they study (and in which they participate). Sherry Ortner (1999), for example, introduces her study of mountain climbers and their Sherpa guides by noting that one group has “more money and power than the other.” She

goes on to suggest that whether one is dealing with a colonial, postcolonial, or globalizing context, “what is at issue are the ways in which power and meaning are deployed and negotiated, expressed and transformed, as people confront one another within the frameworks of differing agendas” (p. 17). Greater sensitivity to such issues is an important development. At the same time, declaring that *nothing* about earlier human cultures can be learned by studying recent band, pastoral, and village peoples seems at least as extreme and implausible as considering them to be perfectly preserved “fossils” of those cultures.

Evolutionism-Materialism

Evolutionism-materialism continues to see cultures as adaptive systems and to see this as the key to understanding culture change. There have been ongoing efforts, however, to demarcate subsystems of the system and to interpret culture change as resulting from interaction of these subsystems.

A system is a set of related parts such that change in one part can bring about change in another part. Is culture a system? Here is an example suggesting that it is. Prior to around 1850, most American families lived on farms. On the farm, children were an economic asset because they enlarged the “work force” for what was essentially a family-owned, family-operated business. Children became economically productive at an early age by doing chores such as gathering eggs and feeding animals and of course became more valuable as they matured. One’s children also provided one’s care in old age. Urban life, however, converted children from economic assets to economic liabilities; to feed, clothe, and educate each one takes a lot of money. Parenting of course has its rewards in urban society, but those rewards do not usually include economic profitability! As a result, large families and therefore large households were far more common 2 centuries ago than they are today. On the farm, children commonly grew up alongside their parents and several siblings and sometimes grandparents, too. Today, households on the average are much smaller. One- or two-children households are common, and indeed, about one fourth of American households contain only one person. Thus, the shift in what people do for a living has brought dramatic changes in how children grow up and in home life more generally. Yet one can think of changes in one part of culture that have little or no apparent effect on other parts of culture. In recent decades, for example, the technology for recording and listening to music has changed rapidly from vinyl records to tapes to compact discs; yet it is difficult to think of significant changes in our way of life that have been triggered by these changes. Another contrast of this kind is the transformative effect that the acquiring of horses famously had on the cultures of the American Great Plains compared with the relatively modest effect that acquiring tobacco had on the cultures of Europe. Such contrasts raise the possibility that

there are certain *kinds* of culture changes that tend to be more potent than other kinds in triggering further cultural changes. In other words, considering a culture as a partially integrated system, are some subsystems more determinative than others of the characteristics of the system as a whole? If so, which one or ones?

Several divisions of cultural systems into subsystems have been suggested; especially important and illuminating has been a division into three subsystems designated most simply as technology, social organization, and ideology. Karl Marx (1867/1906), who usually distinguished only two subsystems called base and superstructure, suggested this one in a footnote to Chapter 15 of *Capital*:

Technology discloses man’s mode of dealing with Nature, the process of production by which he sustains his life, and thereby also lays bare the mode of formation of his social relations, and of the mental conceptions that flow from them. (p. 406, note 2)

Note that “technology” here does not refer to everything to which we might commonly apply the term such as the latest leisure devices for watching movies or listening to music but to artifacts and processes more essential to our survival: the technology involved in “dealing with Nature” so as to sustain the lives of human beings—that is, the means by which food is produced and by which raw materials are extracted and made into the things we need and want. Especially fundamental is the tapping of energy sources: getting food to fuel our own bodies, gathering and burning firewood, domesticating plants and animals, mining and burning coal, drilling and burning oil, trapping sun or wind, and even the controlled splitting of atoms (White, 1949).

Note that this seminal sentence not only suggests three subsystems but also places technology in the “driver’s seat” or in the role of what is sometimes called, in analogy to energy production, the “prime mover.” This idea, that how people use the physical environment in order to survive is basic to understanding entire cultural systems, is often known as the principle of infrastructural primacy as suggested by Marvin Harris in his extensive writings on the subject.

But technology includes also the means we use for literally moving ourselves from place to place physically and for staying in touch; thus, there are technologies of transportation and communication. Technology includes, too, some of the means we apply directly to ourselves as physical beings to foster health and control reproduction; there is, then, such a thing as medical technology. And of course when societies pursue their own interests—at least as defined by leaders—as over against those of other societies, they may resort to the weapons of war and hence the importance of military technology.

We might be tempted to think of technology as essentially artifactual; but note that technology here refers not only to the kinds of artifacts employed as societies go

about the business of surviving but also to the behavior patterns required for making and using the artifacts involved: it was not only just stone tools long ago, for example, but also the ways of making and using them; not only just the food—then or now—but also the ways of finding or growing it; not only just the oil drills but also the ways of finding, drilling, and refining the oil.

A complementary point must be stressed regarding social organization: Though we might be tempted to think of it as entirely behavioral (consisting of the patterned ways people interact with one another), “social organization” nearly always takes place in a more or less human-altered (artifactual) environment and often directly involves artifacts, whether a frisbee thrown between friends, the money exchanged in a cash transaction, or the paraphernalia used in a church service. Admittedly, we might say that technology has a kind of artifactual “focus,” social organization a behavioral one; but as cultural subsystems, both technology and social organization are simultaneously artifactual and behavioral.

The situation is different with ideology. Widely shared ideas and beliefs can be associated to a certain extent with artifacts in the form of such documents as constitutions or holy books; but so long as we are thinking of behavior in physical *rather than* mental terms, the ideological subsystem is inherently nonbehavioral. This subsystem is best thought of as essentially neither artifactual nor behavioral but ideational—though it certainly includes ideas *about* artifacts and behaviors. (The idea that cars have four wheels is an obvious example of the former, that people should treat others as they would like to be treated of the latter.) It is important to remember, however, that as a subsystem of *culture*, it includes not any and all ideas but only those we would be willing to say have become part of a way of life—that is, that have undergone cultural incorporation.

At first glance, then, the trichotomy of technology, social organization, and ideology sounds rather like that of artifacts, behaviors, and ideas; it turns out, however, that the trichotomy of artifacts, behaviors, and ideas, helpful as it is for thinking about innovations and about the kinds of things that constitute culture, differs quite significantly from this new trichotomy. We are thinking now not so much about the kinds of elements that compose a system as about the kinds of subsystems whose interaction constitutes the functioning of the system. A biochemical analogy may be helpful: The *constituents* of a single-celled organism are atoms and molecules, but understanding the organism as a functioning system requires identification of major *subsystems*, such as the cell wall, the nucleus, and the cytoplasm. Serving different purposes, the classifications are complementary rather than contradictory. (The terms technology, social organization, and ideology as used largely this way are from Gerhard Lenski [1970], which closely resemble Leslie A. White's [1949] technological, sociological, and

ideological systems; Marvin Harris [1979] coined infrastructure-structure-superstructure while I and my coauthors have offered interfaces-interactions-interpretations [Graber, Skelton, Rowlett, Kephart, & Brown, 2000].)

Among the various contexts in which customary social organization expresses itself (e.g., economic, political, domestic, and ritual), political organization holds a place of special interest with regard to culture change. For one thing, political leaders in large societies can legislate—and have legislated—programs aimed at making individuals or groups who differ culturally from the wider society “fit in.” Such programs, often involving reservations and/or missions and schools for educating children and young people on a nonvoluntary basis, may be termed “forced assimilation”; it cannot be said they have a very proud history.

A very different effect of political organization on culture change occurs when a revolutionary government seeks not to adapt individuals to the prevailing culture but to bring dramatic change to the prevailing culture itself. In the 20th century, for example, several peasant societies underwent rapid industrialization in what may well be termed, after the Chinese case, “cultural revolutions” (Wolf, 1969). This reminds us that culture, though by definition relatively resistant to change, not only does change but also can even do so quite rapidly.

The Course of Culture Change

When we turn to consider the overall course followed by the development of human culture, we find that both the evolutionist-materialist and acculturationist approaches are illuminating.

The earliest solid evidence of human culture consists of simple stone tools dating back to between 2 and 3 million years ago. Our closest living relatives, the chimpanzees, exhibit elementary cultures; but their artifacts are fashioned of perishable materials and therefore would not be archaeologically recognizable. It seems quite likely, then, that culture itself is even older than the stone tools left to us by our early ancestors.

Between 2 million and 1 million years ago, early humans expanded from the tropics of Africa into the rest of the Old World. Because this expansion was chiefly into colder environments, it must have been greatly facilitated by the control of fire, which probably had been attained by half a million years ago and possibly had been attained much earlier. Judging from fire's centrality—literally as well as figuratively in terms of domestic interaction—in the culture of recent hunting-gathering peoples, we can imagine that the acquisition of fire was of enormous significance.

Although our ancestors all remained hunter-gatherers for over 99% of the time since the appearance of the first stone tools, they expanded into many different environments. This

expansion was made possible not only by control over fire but also by the development, probably generally over many generations of trial and error, of different kinds of tools suited to gathering, hunting, and fishing whatever the local physical environment offered. The considerable extent to which culture change was driven by radiation of humans into new environments—achieved, among other life-forms, overwhelmingly by biological rather than by cultural change—goes far to vindicate the evolutionist-materialist view of culture as *essentially* an adaptive system. (Further vindications come from the fact that anthropologists, when they write descriptions not only of bands but also of pastoralists and village peoples, nearly always deem it most enlightening to begin with the physical environment and how the people interface with it to survive; then, they proceed to describe how people interact with one another and only then to focus on how the people interpret reality—their religious and philosophical conceptions. Ethnographically, it works better, as a Marxian metaphor puts it, to ascend from the earth to the heavens than to descend from the heavens to the earth.)

Between 10,000 and 15,000 years ago, populations had grown sufficiently dense in some parts of the world that people had begun settling into villages and growing food in addition to hunting and gathering it. In some places, the natural environment created population “pressure cookers” in which competition for ever scarcer farmland led to warfare between societies, followed by the displacement, destruction, or subjugation of the vanquished. Culture then not only had to accommodate the physical environment but also had to allow for the existence of human groups large enough and well coordinated enough to compete successfully with surrounding groups (Carneiro, 1970). Thus began the process of transforming a large number of small societies into a small number of large ones (Carneiro, 1978; Graber, 1995). With this growth in the size of societies came the complex division of labor and the stratification into rich and poor, powerful and powerless that still characterize human culture today.

By 500 years ago, a few societies had grown large and technologically advanced enough to cross oceans. What we know as the modern system of nations began taking shape. Soon, the steam engine was powering the Industrial Revolution. Transportation and communication accelerated, bringing people together even more than did the increasing density of the population itself; and increased trade made a society’s culture less and less dependent on its own physical environment. Spurred by warfare and the threat of war, science and technology advanced so rapidly that nuclear war, and perhaps other threats of which we are not even aware, confront us with the possibility of self-extinction; and recently, we have learned that centuries of burning hydrocarbons have contributed to depleting earth’s ozone layer and are significantly altering the climate. Fortunately, we also have much greater (and constantly growing) knowledge of our effects on the physical environment,

of how the ever more integrated global economy works, and of how societies and cultures have affected—and continue to affect—one another, reflected in the greater sophistication and sensitivity of the new acculturationism. If this growing knowledge (perhaps aided by good luck) allows us to avoid disaster, we bid passage to continue on the path to becoming a single world society (Carneiro, 1978; Graber, 2006).

Stone tools, agriculture, the steam engine and industrialization, nuclear power—these changes in the technological subsystem of human culture have triggered vast changes throughout all three subsystems. Already making their mark are computers and genetic engineering; on the horizon are, for example, developments including nanotechnology and controlled nuclear fusion. For better or worse, technology seems destined to play a major role in future culture change; but—as Leslie White (1949) observed—whether as hero or villain, we do not know.

Conclusion

To sum up, then, by definition (1) culture resists change; but in fact, (2) it does change; indeed, (3) it can even change rapidly; (4) its overall rate of change appears to have increased; and (5) it differentiated as humans expanded into and exploited different environments and then began integrating as global population density increased; (6) integration continues to dominate the culture-change picture as we enter the 21st century as a major dimension of “globalization.”

Will cultural integration eventually eradicate all cultural differences? This seems unlikely. After all, different households even of the same social class and in a single neighborhood acquire rather different ways of going about the business of everyday life—differences that become quite clear when, say, schoolmates visit each other’s homes; even greater is this impression when new roommates or couples first attempt setting up a new household of their own! The deep similarities of human beings placed limits on the cultural differentiation that allowed our ancestors to *occupy* our planet; our persisting individual differences place limits on the cultural integration that will allow us, we hope, to *live together* on it for a long time to come.

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SOCIAL EVOLUTION

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Social evolution refers to social or cultural change over relatively long periods of time. By *social* is meant having to do with two or more organisms of the same species engaged—directly or indirectly—in patterned interaction; by *cultural* is meant having to do with the way of life of a social group, insofar as that way of life is a social rather than a biological acquisition.

If the price of gasoline goes up, that is a social change (specifically, an economic one). If the price goes high enough and stays high, people's travel habits may actually change; that would be a cultural change. If the means of transportation themselves undergo significant change, that would be a cultural evolutionary change. These distinctions, though not exact, are clear enough to prove useful.

Note that "social," as generally used, is a more encompassing term than is "cultural." Since its culture clearly is a characteristic of a social group, the cultural realm can be considered a subset of the social realm. There seem to have been few if any attempts to systematically distinguish between social and cultural evolution; many scholars, finding it more useful to integrate rather than differentiate the two, have used the hybrid term "sociocultural evolution."

Early Contributions

Ancient treatments of social evolution still worth reading were produced by the Roman writer Lucretius and more

than a millennium later by the Saracen Ibn Khaldun. Famous French writers of the 18th century, including Montesquieu, Turgot, and Condorcet, offered optimistic analyses tending to celebrate what was seen as the inexorable march of *reason*; notably more scientific was Scottish writer John Millar in his 1771 book, *Observations Concerning the Distinction of Ranks in Society* (Harris, 1968, pp. 48–52). More closely associated with social evolutionism today, however, are 19th-century writers. Most often identified explicitly as social evolutionists are the British writers Herbert Spencer and Edward B. Tylor and the American Lewis Henry Morgan; less often classified as social evolutionists but making major contributions nonetheless are England's Robert Malthus and two German authors, Karl Marx and Theodor Waitz.

Spencer, Tylor, and Morgan

Herbert Spencer

When people hear the phrase "survival of the fittest," they are likely to think of the great biologist Charles Darwin; the phrase in fact appears to have been coined by a contemporary of Darwin's, the philosopher Herbert Spencer.

Spencer (1897, 1851/1969) thought of evolution as involving much more than biology. For him, evolution pervaded the inorganic as well as the organic realm.

His voluminous work also treated “superorganic evolution” (which we today would term social evolution) and evolution of “superorganic products” (what we call cultural evolution). Much as cells combine to make up organisms, organisms themselves combine in some species to make up “superorganisms,” or societies. The comparison of societies to organisms has roots in ancient Greece, but Spencer elaborated this idea in greater detail than anybody else before or since. He emphasized three developmental tendencies shared by societies and organisms: (1) growth in size, (2) increasing complexity of structure, and (3) differentiation of function. Generally speaking, larger life-forms, unlike smaller ones, have several types of tissues and organs, each suited to perform its special function; similarly, larger societies, unlike smaller ones, have specialized arrangements for performing different functions. Examples include factories, stores, schools, and churches; less concrete arrangements, such as economic and political systems; the occupational division of labor; and the division of society into rich and poor, powerful and powerless.

Yet this analogy, like any, has its limits—some of which Spencer recognized and discussed, others of which he overlooked or ignored. He admitted, for instance, that the parts of an organism are in direct contact, while the members of a society are not; but he argued that communication considerably reduced this difference. He seems not to have confronted the related—and scientifically awkward—fact that societies by having no membrane or skin are less identifiable entities than are organisms. Spencer’s work had a political as well as a scientific dimension. Unfortunately, he regarded the “survival of the fittest” as a sort of guide for governmental policy, which often led him to oppose programs to assist the poor. His skepticism about the ability of government to do more good than harm—concerning not only poverty but also quite generally—has made him an important inspiration of what today is called libertarianism. Also unfortunately, these rather extreme political views helped cause Spencer’s more scientific writings, such as *Principles of Sociology* (1897), to fall into neglect for several decades. Since the revival of cultural evolutionism in the mid-20th century, however, Spencer has been rediscovered; much of his most valuable work appears in two excellent anthologies (Carneiro, 1967; Peel, 1972).

Spencer’s greatest contribution perhaps was to encourage people to try thinking of society and culture, no less than stones and pinecones, as belonging to the natural world. “Civilisation,” he declared, “is a part of nature; all of a piece with the development of the embryo or the unfolding of a flower” (Spencer, 1851/1969, p. 65).

Edward B. Tylor

If any one person deserves recognition as the founder of anthropology, it is Edward B. Tylor. To students wondering

why they should be expected to learn yet another science, Tylor (1881/1909) suggested that anthropology resembled a backpack. A backpack adds yet more physical weight to be carried, but it more than pays for itself by making everything else so much easier to carry; likewise, he suggested, anthropology more than pays for itself by tying together diverse subjects, thereby making the educational load not harder but easier to bear (p. v).

Anthropology, in the United States, has four subfields: biological, archaeological, cultural, and linguistic. Together they comprise the “study of humanity.” Largest of the four subfields, in number of anthropologists specializing in it, is cultural anthropology. People have followed different ways of life in different times and places; making sense of this diversity is the central task of cultural anthropology. Its key concept is culture itself, for which Tylor (1871/1924) furnished the most famous definition. Culture, he wrote, is “that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society” (p. 1).

Cultural evolutionism’s great early achievement was the defeat of *degenerationism*. According to this theory, human culture had originated at a fairly “high” level after which some cultures “degenerated” to “lower” levels while others “rose” to yet “higher” ones. Foremost among scholars putting degenerationism to rest was Edward B. Tylor himself. Using his extensive knowledge of the anthropological evidence that already had accumulated by around 1865, Tylor (1865/1964) showed that high cultures quite certainly had originated in a state resembling that of the low cultures still observable in some parts of the world and that there was no evidence that any of the latter had come into being by degeneration from a higher condition of culture.

Evidence overwhelmingly favors the conclusion that up until only 10,000 or 15,000 years ago all humans had lived, from our very beginnings as a distinct form of life, in small, nomadic bands that survived by hunting and gathering the wild food sources around them. In view of the ingenuity and durability of foraging culture, anthropologists no longer call it low, our own culture high; but looking past the ethnocentric terminology, we can see that the conclusion drawn by Tylor and others has been reinforced by all subsequent findings. Social evolution surely began everywhere with very small societies; and culture has been transformed in those times and places where, for reasons still being vigorously investigated, societies grew into villages, chiefdoms, nations, and empires.

Though degenerationism had been motivated by religion (especially the story of the Tower of Babel in the Book of Genesis), it did have testable implications; therefore, it could be—and was—rejected through the application of reason to empirical evidence. The defeat of degenerationism was a great step in science.

Lewis Henry Morgan

The surprising facts that a few basic patterns occur over and over and that each pattern has a logical structure of its own were among the discoveries of Lewis Henry Morgan, a prosperous attorney who lived in 19th-century Rochester, New York. As a young man Morgan had taken great interest in the Iroquois Indians of New York, and in 1851, he published a book about them highly respected even today. His anthropological interests reached full flower, however, in his 1877/1985 book, *Ancient Society*. To organize the growing body of knowledge about human cultures of the past and present, Morgan carefully defined three main cultural stages: savagery, barbarism, and civilization. Savagery and barbarism he divided into sub-stages of lower, middle, and upper for a total of seven stages. These terms sound ethnocentric, or culturally biased, to us today; but in Morgan's time and certainly in his usage, they were technical terms carrying but little of the pejorative connotation they later acquired. It is not sufficiently appreciated that Morgan, especially for his time and place, had a very tolerant, sympathetic attitude toward cultural differences. The preface to his book on the Iroquois (Morgan, 1851/1901), for example, declares that "the public estimation of the Indian, resting, as it does, upon an imperfect knowledge of his character, and tinted, as it ever has been, with the coloring of prejudice, is universally unjust" (pp. ix–x).

Morgan's seven stages (1877/1985), partly for reasons of convenience and clarity, were defined mainly with reference to specific elements of technology. Barbarism, for example, was distinguished from savagery by the presence of pottery. This had some strange consequences. Peoples of Polynesia, for example, despite living in large chiefdoms consisting of several permanent villages, were classified as "savages" along with small, nomadic bands of foragers simply because they happened to lack pottery. Yet the criticism later heaped on Morgan for this and other failings was not quite fair; he himself had looked forward to a time when fuller evidence would allow more satisfactory classifications than his own. Recognizing the limitations of both his own scheme and the Stone Age/Bronze Age/Iron Age scheme introduced by Danish archaeologists, he suggested that general subsistence patterns rather than specific artifacts or materials ultimately would provide "the most satisfactory bases for these divisions. But investigation has not been carried far enough in this direction to yield the necessary information" (p. 9).

This was an accurate prediction. Anthropologists now agree that it is not ground-stone tools or pottery that most basically signal the Neolithic but the transition from foraging for food to growing it. The archaeological appearance of pottery around the world correlates fairly well with this transition probably because pottery is too heavy and fragile to have been of much use before people began

settling into villages and growing food some 10,000 years ago; so even in emphasizing pottery, which got him into such trouble over the Polynesians, Morgan had not been too wide of the mark.

Malthus, Marx, and Waitz

Robert Malthus

Thomas Robert Malthus's father held liberal views and was optimistic about the prospects for the betterment of human society. Malthus himself, even in his youth, suspected that social problems were deeply rooted and that there must be real limits to the improvement of society. One theological argument, of course, is that social problems are inevitable because human nature is sinful. One might think this should have settled the matter for Robert, who after all had been ordained at around age 22 in the Church of England. But he also had studied mathematics and shown scientific inclinations; neither he nor his father seems to have regarded the issue as essentially theological.

Searching constantly for stronger arguments, Robert Malthus eventually hit on an idea so persuasive that in 1798 he published an essay laying it out in detail: *An Essay on the Principle of Population*. Humans, he noted, along with other forms of life, tended to reproduce in numbers greater than could be easily supported by available resources. Population inevitably would be "checked," whether by higher mortality (due to famine, disease, or war) or lower fertility (due to abstinence, contraception, or nonreproductive forms of sexual behavior, such as masturbation and homosexuality). These checks on population all entailed either misery or—in Malthus's judgment—wickedness ("vice"); and even at that, they left the population so high, relevant to resources, that social problems, such as poverty and crime, would be chronic. True, periods of relief occasionally would occur after plagues had sharply reduced the population or technological breakthroughs had abruptly increased available resources (especially food); but the power of population was so great that soon there once again would be too many people. Population again would stabilize via the miserable and vicious checks, but it would do so at a level above that of "easy support"; relief from social problems, then, would be rare and temporary.

A key point in Malthus's argument (1798/1993)—which has been under nearly nonstop debate for two centuries now—has been widely overlooked: his claim that population tended to stabilize at a level greater than what resources could easily support meant that there would be not only social problems but also nearly constant pressure for culture change. As he wrote toward the end of *An Essay on the Principle of Population*, the press of population "is constantly acting upon man as a powerful stimulus, urging him to the further cultivation of the earth, and to enable it, consequently, to support a more extended

population” (p. 147). The idea that population pressure could help explain cultural evolution would lie in neglect until the 1960s; when recovered, it was labeled rather misleadingly “anti-Malthusianism.”

Karl Marx

“So what do you want to be when you grow up?” Pressure to find an occupation begins early in our own enculturation. In the small societies in which all people lived until around 10,000 years ago, such a question made no sense; all people grew up to engage in pretty much the same range of activities (except for differing sex roles). The young Karl Marx (Tucker, 1972) hoped—and believed—that society was evolving toward a way of life that would be far more fulfilling than either the modern or ancient situation—a society in which the individual, far from being forced to become one certain “thing” in the division of labor, would be free “to do one thing today and another tomorrow, to hunt in the morning, fish in the afternoon, rear cattle in the evening, criticise after dinner, just as I have a mind, without ever becoming hunter, fisherman, shepherd or critic” (p. 24).

Marx and his collaborator Friedrich Engels (Tucker, 1972) believed that conflict between haves and have-nots was the prime mover of social evolution; and it was class struggle, they thought, that soon would usher in a very different kind of society. The productive powers of industrialization harnessed to a centrally planned economy would ensure that the merely animal needs of all people were efficiently met. People then would work not out of “mere animal necessity” but to fulfill their essential nature. Marx and Engels despised Malthus for his pessimism about improving society; in their view, ideas like his hindered positive social change by making excuses for the status quo. On the other hand, they found some inspiration in the work of Lewis Henry Morgan; they particularly liked his emphasis on the importance of technological changes in the human past. They too constructed a set of stages; it differed somewhat from Morgan’s, however, and has been less influential.

When moralists condemn modern society for its “materialism,” they usually are referring to love of physical things—cars, clothes, boats, or condominiums. In intellectual history, however, the word *materialism* has a rather different meaning. The materialist perspective is well suggested by a declaration of the ancient Greek philosopher Democritus: “Nothing exists but atoms and the void.” In this spirit, Karl Marx thought that the mental world created by a human society must be understood in terms of how the organisms composing the society were managing to survive and reproduce. As Marx wrote in 1859, “It is not the consciousness of men that determines their being, but, on the contrary, their social being that determines their consciousness” (Marx as cited in Tucker, 1972, p. 4).

Marx and Engels believed that materialism had both political and scientific implications. Though they considered

these deeply intertwined, their subordination of the scientific to the political is clear. “The philosophers have only interpreted the world, in various ways; the point, however, is to change it” (Marx as cited in Tucker, 1972, p. 109). It remained for the Russian leader V. I. Lenin to reach the extreme conclusion that the scientific search for truth must not be allowed to stand in the way of political revolution. In anthropological theory, the main political and scientific developments of materialism sometimes are distinguished respectively as dialectical materialism and cultural materialism. Cultural materialism refuses to subordinate scientific analysis to political agendas (Harris, 1979, pp. 157–158). Our understanding of social evolution has been invigorated by the cultural-materialist attempt to understand culture and culture change as reflecting the actual conditions—demographic, environmental, and technological—in which people as creatures struggle to survive and reproduce.

Theodor Waitz

Theodor Waitz was the precocious descendant of a long line of German Protestant preachers and teachers. His intellectual maturation took him from theology to philosophy, then to psychology, and finally to incipient anthropology. Showing superb intellectual judgment, Waitz (1859/1975) proved ahead of his time (1) in conceiving of general anthropology as a new empirical science, (2) in stressing the biological unity of humankind as one species, and (3) in arguing that what biological differences there were between human populations (“races”) were *not* relevant to accounting for their observable cultural differences. The usual idea, he noted, was that a people’s conditions of culture reflected their basic capacities; he reversed this by arguing that the relevant capacities actually resulted from the conditions of culture. Franz Boas, often credited with this breakthrough, acknowledged that it was Waitz who actually had been first to express clearly what would become fundamental to modern anthropological research. Robert Carneiro’s *Evolutionism in Cultural Anthropology* (2003) is helping secure for Waitz the credit he deserves in this regard. When Waitz died of typhoid fever at only 44, anthropology lost perhaps its greatest mind.

Recent Theories

In the early 20th century, anthropology turned away from cultural evolutionism. Though the 19th-century evolutionists had been among the most enlightened people of their time, their work inevitably was tainted by the prevailing interpretations of reality, including assumptions of racial and cultural superiority. Even the great evolutionists Spencer, Tylor, and Morgan were disparaged as “armchair speculators”; what was needed, it was asserted, was actual fieldwork in order to learn firsthand about the history and

functioning of small-scale societies before they disappeared from the face of the earth forever.

The emphasis on fieldwork produced mountains of new and better information about the cultures of the world; yet the urge to make systematic sense of all this new, chiefly descriptive material soon gave rise to a resurgence of cultural evolutionism. Early contributors—most notably, perhaps, Spencer—were resuscitated, their more promising ideas reconsidered, reformulated, and extended. This movement, sometimes termed *neoevolutionism*, was led by two American anthropologists, Julian Steward and Leslie A. White. Most of Steward's work (e.g., 1955) had the modest goal of elucidating the effects of specific environments on the cultures of the people inhabiting them (cultural ecology). White's work (e.g., 1949) offered more ambitious generalizations about the course of human culture as a whole; he was impressed especially by the relationship between cultural evolution and how—and how much—energy was used by human societies. Steward and White and their followers engaged in vigorous debates, which, though initially fresh and illuminating, eventually seemed to be generating more heat than light. In 1960, a small but influential book of essays titled *Evolution and Culture* argued cogently that the approaches of Steward and White were better seen as complementary than as opposed (Sahlins & Service, 1960). Though this cleared the air, it pointed no new direction.

In 1965, a new path was opened when American anthropologist Don E. Dumond and Danish economist Ester Boserup independently proposed that population growth under certain conditions could be an important cause of certain kinds of culture change. (That they had been unaware of each other's work was confirmed in conversation with Dumond in 1994. Their insight had been hinted at as early as 1798 by Malthus himself; but the scholarly world had long overlooked this, in part because what Malthus *stressed* had been the dependence of population on cultural conditions rather than the converse.) Impressive theories soon were proposed for the major transformations of cultural evolution. Though “population pressure theory” attracted the most attention in the 1970s, it continues to be a significant and promising specialty within sociocultural evolutionism.

Agricultural Origins

The old theory of agriculture was that it was a difficult invention, which once achieved spread rapidly from a single origin because it made life much easier and more secure. Anthropological progress in the 20th century made this less and less tenable. In several parts of the world, archaeologists accumulated evidence that the domestication of plants and animals had been a long, gradual process of change in which species found wild in local environments came slowly to resemble the domesticated forms of today.

Cultural anthropologists, meanwhile, were learning that hunting-gathering peoples possess extensive knowledge of the plant and animal life around them. The fact that plants grow from seed, for example, was not a profound mystery but common knowledge. Furthermore, the foraging life, even in marginal environments, such as the Kalahari Desert in South Africa, proved to be considerably less difficult than had been believed. Neither the archaeology nor the ethnology seemed to fit with the old theory. If foraging for food was usually a relatively easy lifestyle, why did people ever begin growing food? And why, when they finally did (after millions of years of foraging), did it happen so slowly and in so many places?

The pieces of the puzzle were assembled neatly by the archaeologist Mark Nathan Cohen. Influenced by earlier writers, especially Ester Boserup, Cohen (1977) proposed *population pressure* as the key. The beginnings of agriculture some 10,000 years ago approximately coincided, Cohen pointed out, with the end of the long process of human expansion throughout the habitable portions of the planet. As population continued to grow with nowhere new to go, global density would have begun to increase rapidly; wild plant and animal food sources gradually were ever less sufficient for human survival. Our ancestors took up farming only when and to the extent that they had to.

An especially nice feature of this theory is that it explains why, after several millions of years of human existence, agriculture cropped up in so many places within a mere few thousand years. Study of recent foragers demonstrates that individuals move rather freely between bands and that the bands themselves move frequently over the landscape. Both kinds of movements often are in response to resource distributions. (Among the Mbuti pygmies, for instance, newlyweds go to live with either the bride's or groom's band, depending usually on where food is most plentiful at the time.) These “flux” mechanisms, then, distribute population relative to resources (Turnbull, 1968). During the human expansion out of the tropics into the rest of the world, an expansion that began 1 to 2 million years ago, our ancestors had been foragers too; it therefore is a safe bet that flux mechanisms operated day in and day out over the millennia, constantly distributing and redistributing population relative to food resources. When expansion at last had to end but population kept growing, the pressure on wild resources would have increased sharply all over the world. Cohen's (1977) theory thus tied together findings of archaeologists and cultural anthropologists to produce the best general theory we have of this great transformation in cultural evolution.

A genuine problem, however, is the fact that archaeological evidence of hunter-gatherers throughout the New World is not as ancient as the theory implies. However, if new findings continue pushing back our estimates for the peopling of the New World, Cohen's (1977) theory will be more strongly confirmed.

Agricultural Intensification

Before 1965, social scientists long had thought of agricultural change as a cause of population increase rather than as an effect of it. More food would mean more people—that was the whole story, and its author was believed to have been Malthus. In 1965, however, Danish economist Ester Boserup argued that the evolution of agriculture was less a cause than an effect of increasing density of human population.

Boserup (1965) noticed that small-scale societies growing food without plows and draft animals often resisted this seemingly superior technology even when it was offered free by the government. She suspected that this was more than blind adherence to traditional ways. The technology being offered could squeeze more food from a given amount of *land*; but what if traditional methods yielded more food for a given amount of *labor*? Boserup's detailed study of several forms of agriculture convinced her that those involving simple tools and long periods of fallow indeed were more labor efficient. The greatest single reason seemed to be that at low population densities, people could afford to farm only a small portion of their land each year. By the time they returned to a given plot to plant a garden, forest had reclaimed it. This seeming disadvantage was in fact a huge advantage: Forested land could be cleared well enough for planting merely by slashing down the young forest vegetation, burning it, and sowing seed in the ash. Stumps of larger trees were simply planted around. Neither plowing nor even hoeing was necessary. Such "low-tech" farming paid off very handsomely for no more labor than it took. Fire was the key, and low population density was the necessary precondition.

So why had agriculture in fact changed in some parts of the world? Probably, Boserup wrote, due to increasing density of human population (1965). When land had to be planted before forest had had time to reclaim it, fire was less effective for clearing because fire does not destroy the roots of thick grass (not a problem once forest has taken over). Hoes and eventually plows had to be adopted due to increasing population pressure.

Before Boserup (1965), scientists had thought of land as either cultivated or uncultivated. An important feature of her analysis was a five-stage sequence based on the *frequency* with which land was cultivated. The least intensive stage involved cropping about once every 20 years, the most intensive more than once a year, which usually required much labor for fertilizing and irrigating. In presenting this set of progressive stages, Boserup's work harked back to a 19th-century approach used by such scholars as Lewis Henry Morgan that had fallen into prolonged disfavor among anthropologists. But Boserup's stages allowed land use to be measured more accurately than ever before; her work deservedly had a large and continuing effect on anthropology in general and on sociocultural evolutionism in particular.

Political Evolution

For most of the human past, people lived in small bands, each containing no more than a few dozen individuals controlling their own affairs entirely locally. Even when people in some places began settling in villages some 10,000 years ago, the local community remained self-governing. Perhaps 7,000 or 8,000 years ago, there arose the first multicommunity societies: chiefdoms in which one person had achieved effective political control over two or more villages. In the following millennia, some of the chiefdoms coalesced into states: multicommunity societies with a central government strong enough to tax, draft, and legislate. With this came social cleavages—familiar to us today—between town and country, rich and poor, rulers and ruled. The cultures of state-level societies differ greatly from the cultures of band and village societies; they differ much less among themselves. When Cortes first encountered the Aztecs, for example, he found that their society reminded him of life back in Spain: fields, markets, churches, and—sad mark of civilization!—beggars in the streets. Social growth indeed causes culture to evolve dramatically in certain definite ways, as Herbert Spencer had insisted; to this extent, cultural evolution may be considered a function (in the mathematical sense) of social evolution.

Chiefdoms and especially states developed independently in several places around the world; but in most places, humans continued living in bands or villages. What made the difference? In 1970, Robert L. Carneiro identified three kinds of circumstances that seemed to foster political evolution. The first is environmental circumscription—fertile land more or less hemmed in by mountains, deserts, or water. Here, as agricultural intensification made land ever more scarce, defeat in war increasingly would leave the losers with nowhere to go to escape subjugation. Chiefdoms and eventually states would result. A second circumstance is resource concentration—productive resources, such as lakes or streams rich in seafood, so attractive that people try to stay near them. A third circumstance is social circumscription—being hemmed in not by geographical features but by other societies.

The term *social circumscription* is one Carneiro borrowed from Napoleon Chagnon (1974), who had observed that population growth among the Yanomamo Indians of the Amazon Basin led to villages splitting and spreading more deeply into the tropical forest around them. Due to such splitting, the average village size—around 100 people—seemed fairly stable through time. At any given time, though, the more centrally located villages were the largest. Perhaps, Chagnon suggested, this was because, being surrounded by other villages (usually hostile), central villages were less able than peripheral ones to resolve internal conflicts by splitting.

It is tempting to think that human societies, like complex organisms, have a natural tendency to grow larger. Chagnon's (1974) work suggests instead that the natural

tendency is for societies to stay about the same size, even when overall population is growing, due to splitting. It seems possible that the tendency to resolve social conflict by splitting is a deep and universal propensity that had had to be suppressed before large societies ever could evolve in the first place. If a growing population is surrounded by rich, unoccupied territory, it will expand easily into that territory; but it will do so Yanomamo-like, and the average society size will remain approximately constant due to splitting. Increase in this average size would be expected only when the opportunity to expand was somehow inhibited. Inhibited expansion would lead to inhibited splitting; if societies could no longer split fast enough to offset population growth, larger societies—chiefdoms, states, empires—eventually would be forged, and culture would have to be transformed concomitantly. This process would tend to unfold in precisely the kinds of conditions Carneiro had identified: environmental circumscription, social circumscription, and resource concentration.

It is possible to formulate mathematical definitions for inhibition of both geographical expansion and political splitting. The assumption that splitting would not be inhibited until expansion was inhibited proves fruitful and leads to an exact mathematical theory of the relationship between population density and political evolution (Graber, 1995). This theory fits, in a general way, with evidence not only on prehistory but also on the 20th century (Graber, 2006); but this general fit scarcely constitutes a rigorous test of the theory.

Industrialization

Coal might appear obviously superior to firewood as an energy source for an industrializing society; but historically, industries initially shifted to coal only because firewood grew scarce. In some—not all—the transition was easy to make, and in some industries, coal ultimately proved superior in some ways; but the shift originally was prompted not by coal's superiority but by firewood's scarcity (Wilkinson, 1973).

Rural life, requiring much physical labor, might appear intrinsically harder than urban life; one therefore might assume that people gladly took advantage as industrialization afforded growing opportunities to move from country to city. Yet British historian Joan Thirsk showed that the earliest industrial centers in England took root in regions in which agricultural populations had grown so dense that families no longer could survive on their meager acreages. As centuries passed, people grew accustomed to having to hold a job to earn a living and generally accepted it as a fact of life (with occasional objectors, including the young Karl Marx). But the "opportunity" to become paid workers rather than self-sufficient farmers appears to have been, in the first place, a matter not of preference but of survival.

Poverty in the countryside, however, was only part of the story. The other side was capitalists who could employ those needing work and make other investments of resources, without fear of being taxed or "plundered" to death by authoritarian governments as soon as big profits began rolling in—as seems to have happened in the states and empires of antiquity, such as China, as Marx and others have suggested.

Ancient civilizations also had had a plentiful supply of both poor people and profit seekers. Why had industrialization not occurred? Possibly because most governments, by controlling the huge irrigation systems on which everyone's survival depended, had nearly absolute power; and they could not resist using this power to limit commerce whenever doing so was in their short-term interest. In western Europe, however, agriculture was based not on irrigation but on rainfall, which no government could control. Accordingly, commerce could flourish (Harris, 1977).

As Richard G. Wilkinson argued in his 1973 book, *Poverty and Progress*, it appears that industrialization had important roots in population pressure. Pressure on firewood caused the turn to fossil fuel, pressure on land, the turn from farm to factory. Industrialization has transformed how humans live—our culture. This cultural evolutionary transformation in its dependence on population pressure resembles earlier key transformations: agricultural origins, agricultural intensification, and political evolution.

Ongoing Processes

Sociocultural evolution has not stopped; here are four important ongoing processes, the first of which, however, is not itself essentially sociocultural.

Biological Evolution

The roots of cultural evolutionism are intertwined with the biological theory of natural selection—a theory arrived at independently by A. R. Wallace and Charles Darwin and made famous by Darwin's book of 1859, *On the Origin of Species*. Yet biological and cultural evolution each have "rules of their own"; confusing the two is a grave error—one that marred the work of thinkers such as Herbert Spencer, and that has reappeared in recent decades.

A key difference is that once a species is intelligent enough for its ways of life to depend greatly on learning, those ways of life can change far faster than can the species's biological makeup; the steam engine, the automobile, and the computer clearly did not need to wait on biological evolution in order to transform our way of life. Artifacts, customs, and ideas can spread rapidly within a generation; biological evolution happens only over generations. Biological evolution can occur rapidly but only in simple life-forms, such as microorganisms, that have very short generation times. Indeed, the rapid evolution of microbes is

what causes our antibiotics to “wear out” so quickly. By filling certain microbes’ environment (our own bodies) with drugs, we wipe out all those that have no resistance to that drug; but if even a single “bug” contains a gene making it resistant to the drug, that is precisely the one that will survive and reproduce, giving rise to a new strain—a resistant strain, for which a new antibiotic will have to be sought. Thus, there is an ongoing war between us and the germs that infect us, a war in which they fight with the weaponry of biological evolution, and we, of cultural evolution.

Yet biological evolution is a continuing process even within large, slowly reproducing species like our own. No generation has exactly the same genetic makeup as did the previous generation; chance alone is sufficient to guarantee this. Life, Darwin wrote, is somewhat like a great, ancient tree in which existing species are the green buds. Wherever the tree is growing, evolution is occurring. But are biological changes taking human evolution in any particular *direction*? This is a difficult question. Scientists used to speculate that humans of the distant future may be small-bodied, swollen-headed, toothless and hairless creatures with senses so weak that everyone would require extensive artificial assistance of the kind pioneered by eyeglasses and hearing aids. Yet such speculations seem outmoded now that genetic engineering is beginning to bring our genetic makeup as a species under our own conscious control—a rather forbidding responsibility.

It is tempting to believe that history could easily have developed in a way quite different from what it has. According to this view, we would not now face the unsettling prospect of engineering human genes had biology’s history been different—if, for example, Darwin had died, as did many in his time of some childhood disease. Social evolutionism, however, offers a different perspective. It is well to remember, after all, that another biologist of the time, Alfred Wallace, quite independently hit on basically the same theory at around the same time. And in fact, history presents many examples of similar occurrences, treated in the writings of William F. Ogburn, A. L. Kroeber, and Gerhard Lenski. Social evolutionists find the dependence of individuals on cultural conditions a more illuminating perspective than the conventional one according to which great individuals mysteriously “produce” history and culture as if by magic.

Population Growth

Destruction of the ozone layer, pollution of the environment, reduction of biodiversity—while these ominous processes seem to continue, the number of human beings keeps growing. Are we indeed, as some would have it, a kind of “cancer” on the planet, an uncontrolled malignancy that destroys the “healthy tissue” around it?

This gloomy image is quite misleading. Though human population is still growing, it is doing so at a slower rate.

As industrialization spreads, children change economically from being valuable assets to being expensive liabilities; accordingly, people have fewer of them. Dozens of the advanced industrial societies already are producing too few children to maintain their population. Meanwhile, many social problems have causes unrelated to so-called overpopulation. Some of the poorest people in the United States occupy some of the least populated areas, and some of the world’s poorest nations are among the least densely populated.

It might be objected that even if population growth is slowing and even if it alone is not responsible for all social problems, things might be better if there were fewer people. Some people, on hearing that the world’s population is expected to increase by about 50% in the coming decades, may be inclined to declare, “Our systems simply cannot support that many people!” Such people, however, are forgetting a key fact: *Culture evolves*. The population of the future will be supported not by *our* way of life but by *theirs*. Artifacts, customs, and beliefs will have changed; and for all we know, those future people will be better off, on the whole, than we are today.

Sociocultural evolution provides some reason to suspect that a stable population, which sounds so good to most people, would deprive human culture of its greatest single source of dynamism—population growth itself. The origins of agriculture, agricultural intensification, political evolution, industrialization—all appear indebted to population growth. However, population growth’s role in a few major cultural transformations of the past does not mean that it is essential for all culture change; it scarcely seems likely that people would stop seeking better cures for disease, for example, simply because population had stabilized. Furthermore, the absence of population growth does not necessarily mean the absence of population pressure. Indeed, Thomas Robert Malthus (1798/1993) believed that populations, when they do stabilize, tend to do so at a level too high to be easily supported by existing resources, creating constant pressure for culture change. If he was right, then even a population stable numerically is inherently unstable culturally.

Technological Evolution

Technology keeps changing; the evidence surrounds us. One need not have lived long, for example, to have seen the spread of personal computers, microwave ovens, and cell phones. These innovations alter how we live just as life in the early 20th century was altered by, say, automobiles and telephones. Of course, some innovations prove more far-reaching than others; the microwave oven, a welcome convenience, seems unlikely to reshape life to the extent that the automobile has.

Is it possible to identify a class of innovations that are of particular cultural evolutionary significance? Some

anthropologists, following Leslie A. White (1949), believe that breakthroughs in energy use are just such a class. From this perspective, four milestones of technological evolution can be identified: use of tools, control of fire, application of the steam engine, and control of nuclear power (Asimov, 1972). Human societies always have relied heavily for survival on the making and using of tools. Stone tools date back over 2 million years; tools of softer materials, such as digging sticks, spears, and clubs may be much older still. Indeed, it is quite possible (as Darwin himself speculated) that an increasing reliance on tools created the evolutionary pressure that made us into upright bipeds: Tool users with hands and arms less used for locomotion would have survived and reproduced better than tool users who continued getting around on all fours.

Tools allow the body's energy to be concentrated on small areas—points and edges that can cut and penetrate where the unaided body would fail. Teeth are hard and sharp but very limited. Consider the difference between a stone chopper held in your hand and an incisor tooth held in your gums. The power of your swinging arm can be transferred to the edge of the chopper; but if you tried to swing your head in a similar arc to cut a branch from a tree or smash open a bone, the results would be less satisfactory.

The energy driving hand tools is generated in the human body. Use of energy generated outside our bodies originated when humans got control of fire—a milestone probably reached by half a million years ago. Getting energy by burning firewood is chemically similar to getting energy by eating food; but the former allowed our ancestors to expand out of our tropical evolutionary cradle.

Useful as fire was (especially in helping trigger the Bronze Age and Iron Age a few thousand years ago), it began to significantly replace animal—including human—muscle power only with the refinement of the steam engine in the 1700s. As firewood became scarce in England, people turned to coal; and as coal mines deepened, water seepage and flooding of the mines became a chronic problem. Pumping water from coal mines was the necessity that mothered the refinement of the steam engine; because steam engines increasingly were fueled by coal, coal mining itself helped increase the demand for coal. The steam engine, meanwhile, found innumerable industrial applications by converting heat energy to mechanical energy, as in textile factories, where it was used to drive huge looms; indeed, the steam engine often is considered to have been the most important single innovation for industrialization.

When we burn either firewood or fossil fuel (coal, oil, natural gas), we are indirectly using solar energy “trapped” by photosynthesis. (The same applies when we energize our bodies by eating food.) The first genuine departure in this respect occurred only with control over nuclear power achieved a few decades ago. Fission, used to generate electricity in coal-poor societies, is efficient; but fuel is expensive, and hazardous wastes are produced. Nuclear fusion—the means by which stars produce heat and light—is

even more efficient; moreover, the fuel is cheap, and wastes are not hazardous. The problem is containing the extremely high temperatures involved: So far, fusion literally remains too hot for us to handle. In future decades, however, controlled fusion could become a practical energy source. Cultural evolutionism can suggest that so fundamental a change in energy use could usher in a new stage of cultural evolution; foreseeing what that stage would be like, however, is well beyond its current ability. Meanwhile, we must cope with the fact that nuclear power's unprecedented potential for destruction places our very survival in doubt. As Leslie A. White wrote in 1949, concerning the advent of nuclear power,

The mastery of terrestrial fire was tolerable, but to create energy by the transformation of matter is to play with celestial fire. Whether it can be done with impunity remains to be seen. The new Prometheus may also be the executioner. (p. 362)

Adaptive Radiation

Mammals are ubiquitous. After the dinosaurs died out some 60 million years ago, mammals underwent a spectacular process of expansion into different environments. Many lived on the ground; some burrowed into it. Some, like the whale, returned to the water where life had originated eons earlier. Others took to living in the trees; these are the Primates from which we humans recently sprang. (Our grasping hands, rotating arms, and stereoscopic vision all reveal our tree-dwelling roots.) Mammals even took to the air as the bats of today remind us.

When a life-form expands into a new environment, any traits that happen to help individual organisms survive and reproduce there will grow more common as generations pass. Assuming the form does not die out, then, it will be modified by natural selection for living ever more effectively in the new environment. When a single form of life successfully expands into many environments, the process is termed *adaptive radiation*. Adaptive radiation ordinarily involves the development of new species in the new environments. That is, the cumulative effects of natural selection eventually make the populations in different environments so different from one another that interbreeding between them is no longer possible—that is, they have become separate species.

A few human traits, such as skin color, do appear to reflect natural selection in different environments. Near the equator, where the sun's rays strike the earth directly year-round, a dark skin aids survival and reproduction by affording protection from skin cancer; far from the equator, though, a light skin seems to offer protection against rickets, a bone disorder, which can result from too little exposure to sunlight. Yet this and other geographically based differences between human populations are quite superficial; the ultimate biological proof of this lies in the fact that a healthy male and female from anywhere in the world are capable of mating to produce fertile offspring.

Clearly, humans have managed to go “all over the place” while remaining a single species.

That a single species—especially a large-bodied one—should have done this is remarkable indeed from a zoological and ecological standpoint. Other large-bodied species remain confined to relatively narrow environmental ranges. Chimps and gorillas, our closest living kin, inhabit still the tropical forests of our early ancestors.

Clearly, the secret of our success is culture. Humans have adapted to new environments, for the most part, not biologically but culturally. Culture allows us to create, within hostile environments, a “little environment” friendly to us. Control of fire, for example, meant we could create little enclaves of warmth in the coldest corners of the earth. Now, half a million years later, we live with the fish, not by evolving fins and gills but by surrounding ourselves with submarines; and we are venturing into airless space, not by evolving the ability to do without oxygen but by surrounding ourselves with space shuttles and stations. It even is conceivable that we will be able to modify other planets to suit our needs.

Conclusion

Human social evolution up to the present dramatically suggests the value of culture in promoting the survival and reproduction of culture bearers. Biological evolution adapts species to environments; cultural evolution adapts environments to species. Long before the advent of space stations, Herbert Spencer (1897) had seen deeply into the profound significance of culture as an adaptation allowing our species to venture into new environments by creating the following:

A secondary environment, which eventually becomes more important than the primary environments—so much more important that there arises the possibility of carrying on a high kind of social life under inorganic and organic conditions which would originally have prevented it. (Vol. 1, pp. 13–14)

As an approach, social evolutionism is historically associated especially with the 19th century; but the approach is still alive because social evolution itself is a continuing process.

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EVOLUTION

Science, Anthropology, and Philosophy

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The fact of evolution pervades modern thought from astronomy to psychology. It is safe to assume that no academic discipline has escaped the influence of an evolutionary framework. Our present worldview is grounded in a serious consideration of time, change, and evolution; it is a remarkably different explanation for this universe, life-forms on earth, and our own emerging species than was given by natural philosophers only 2 centuries ago.

Rocks, fossils, artifacts, and genes offer compelling and sufficient evidence for a dynamic view of this planet and those organisms that have existed before and do now live on it (Coyne, 2009; Dawkins, 2009; Fortey, 1998; Mayr, 2001; Ridley, 2004). Yet facts do not interpret themselves. Consequently, interpretations of evolution vary greatly from materialism through vitalism and spiritualism to mysticism (Birx, 1984). In this arc of evolution (Birx, 2006a), there is a glaring difference between the materialist stance of Charles Darwin and the mystical outlook of Pierre Teilhard de Chardin (Birx, 1991). Each interpreter of evolution comes to the theory with a different set of ideas, issues, and values within a specific orientation. Perspectives range from a planetary focus to a cosmic approach.

Modern anthropology embraces the fact of evolution, viewing the recent appearance of humankind within a sweeping geological framework. Our biological structures and functions, as well as societies and cultures (Harris, 1968;

Morgan, 1877/1963; Tylor, 1871/1958; White, 1949, 1959), have changed throughout time and will continue to do so. One fascinating prospect for our species is its future adaptation to and survival in outer space, whether for living on neighboring planets or elsewhere in this expanding universe.

Earliest Speculations

The idea of evolution did not originate with the thoughts of Charles Darwin in the middle of the 19th century. Nor did this naturalist have the last word on his own theory of “descent with modification” (as he put it). Yet in terms of science and reason, the conceptual revolution of organic evolution received its factual foundation with Darwin’s pivotal writings on the history and diversity of life-forms on this planet.

In fact, the idea of evolution had been glimpsed by several natural philosophers in ancient Greece during the pre-Socratic Age (Whitlock, 2009): Thales, Anaximander, Heraclitus, Xenophanes, and Empedocles. They recognized the biological similarities between the human being and other animals and held to the dynamic history of this universe. One is tempted to refer to them as protoevolutionists, since they anticipated (to varying degrees) the thoughts of Darwin and Alfred Russel Wallace more than 2,000 years later.

The emerging concept of organic evolution received an unfortunate intellectual impediment with the philosophical writings of the ancient Greek thinker Aristotle (384–322 BCE), who taught that species are eternally fixed in the natural world. However, he did acknowledge the biological similarities among groups of animals thereby fathering both comparative biology and a natural taxonomy. Even so, he ignored the biohistorical significance of fossils, referring to them as being merely chance aberrations in rock strata. Aristotle's interpretation of life-forms as representing a static hierarchy of fixed species (his comprehensive concept of the great chain of being, or so-called ladder of nature) had an enormous influence on later naturalists, philosophers, and theologians; subsequently, these thinkers were not predisposed to accepting the mutability of species throughout earth history.

The Roman philosopher Lucretius (96–55 BCE) wrote that this planet itself, over time, had produced plants and animals. He also claimed that organisms, including intelligent beings, inhabit other worlds in this universe. But his anti-Aristotelian worldview was not taken seriously by those thinkers who dogmatically clung to the traditional interpretation of life-forms as fixed species.

During the Italian Renaissance, Leonardo da Vinci (1452–1519) did recognize both the biological and historical significance of fossils as the remains of once living organisms. He had discovered marine fossils embedded in the top rock strata of the Alps; three centuries later, Darwin would have a similar experience in the Andes. Unfortunately, Leonardo never recorded his own thoughts on the history of changing life-forms throughout the thousands of years of geological time; he thought our earth to be at least 200,000 years old. His genius may have imagined the mutability of species but, if so, he never wrote about this idea in his notebooks.

Age of Enlightenment

Following the so-called Dark Ages and Middle Ages, the Enlightenment represented an exciting time for academic scholars during which serious thinkers criticized the dogmatic church and oppressive state in favor of science and reason (Cassirer, 1955). The courageous French philosophers of this time called for open inquiry and the extension of the scientific method from the natural sciences to the emerging social sciences. By taking a historical perspective, emphasizing the value of freedom and individualism, and anticipating ongoing progress in the special sciences (both natural and social), these enlightened thinkers established an intellectual atmosphere that paved the way for the coming of anthropology as a distinct discipline.

With the natural philosopher Denis Diderot (1713–1784) as its major editor, the *Encyclopédie* (1751–1772) represented a practical outcome in the devotion to both scientific research and critical thinking, and it was a project exemplary

of this age. In fact, achieving the completion of this unique project was Diderot's supreme accomplishment. With the publication of this multivolume work, extensive knowledge was now accessible for both academic scholars and general readers.

The nature-oriented thoughts of the Enlightenment gave a major impetus to the growth of several earth sciences: historical geology, comparative paleontology, and prehistoric archaeology (as well as ongoing advances in biology). Rocks, fossils, and artifacts were revealing an incredible explanation for life-forms on earth that was far different from the biblical story of Creation in Genesis. Furthermore, extensive travels by naturalists led to the discovery of other societies with different cultures subsequently contributing to the need for a specific science of humankind itself.

Representative of the optimistic outlook during the Enlightenment is the future vision presented by Marquis de Condorcet (1743–1794), who is remembered primarily for his extraordinary book titled *Sketch for a Historical Picture of the Progress of the Human Mind* (1795/1980). As a result of astonishing advances in science and technology throughout the forthcoming centuries, Condorcet held that one practical consequence would be that human beings will eventually achieve and enjoy an indefinite life span.

Influential Scientists and Provocative Philosophers

Once the fact of evolution was established, it had an overwhelming influence on several major thinkers in science, philosophy, and theology. The pivotal writings of Charles Darwin represented a scientific revolution that seriously challenged those ideas, beliefs, and values that were embedded in the traditional, static worldview, an outlook that had stymied both creative and critical thought for centuries. A dynamic interpretation of nature now replaced the old conceptual framework grounded in fixity and permanence. Some naturalists were eager to consider the far-reaching implications of evolution for understanding life, our species, and this universe. Some philosophers and theologians were courageous enough to consider the startling consequences of evolution for appreciating reality itself.

Jean-Baptiste de Lamarck

In 1809, following the Enlightenment, the French natural philosopher Jean-Baptiste de Lamarck wrote the first serious work on organic evolution, titled *Zoological Philosophy* (1809/1984). This book appeared exactly 50 years before the publication of Charles Darwin's major work, *On the Origin of Species* (1859). However, Lamarck's interpretation of evolution was essentially conceptual and speculative, lacking the sufficient empirical evidence and a testable explanatory mechanism that Darwin would later

offer to convince other biologists of the fact that species are mutable and have evolved throughout natural history.

To his lasting credit, Lamarck had studied the fossil record in rock strata. He correctly concluded that the sequence of remains in the geological column clearly demonstrated that life-forms have evolved during earth history. His idea that plants and animals are mutable and change over time challenged the entrenched concept of fixed species. Unfortunately, Lamarck was unable to persuade his contemporary naturalists that species have evolved throughout planetary time. His explanation for organic evolution in terms of the inheritance of acquired characteristics through use and disuse was not convincing; for example, his own idea that the long neck of a giraffe is directly due to the accumulated results of stretching, over countless generations, to reach the leaves of ever-higher trees remains a preposterous explanation in the history of biology. In addition, Lamarck's vitalist orientation was not in step with the naturalism espoused by most biologists. Likewise, his ludicrous claim that complex animals, such as our human species, can actually will those biological changes that are needed by them to adapt and survive in changing environments has been verified neither by evidence nor by experience since his time.

In fact, at first, Darwin was reluctant to acknowledge the influence that Lamarck had had on the early development of his own evolution framework. Nevertheless, Lamarck had been brave enough to maintain the heretical idea that species change through time.

Charles Darwin

Charles Darwin (1809–1882) is referred to as “the father of evolution,” a designation he richly deserves for his life-long dedication to science to substantiate the mutability of species (Birx, 2009a). With focused energies, he was able to amass overwhelming empirical evidence from various fields, thereby documenting the fact of evolution for other naturalists. His scientific theory of organic evolution and explanatory mechanism of natural selection represented a conceptual revolution in both science and philosophy, with devastating consequences for traditional theology.

As a young naturalist in England, Darwin was primarily interested in rocks and beetles; over the years, his research shifted from geology to biology. After university studies in medicine and theology, his comfortable life was altered dramatically when captain Robert FitzRoy accepted him for the position of a naturalist aboard the HMS *Beagle*; this survey ship would sail for 5 years (1831–1836) in the Southern Hemisphere, with its primary purpose being the mapping of the coastlines of South America. This extensive trip would prove to be a voyage of discovery for the emerging scientist (Darwin, 1839/2000; McCalman, 2009).

When Darwin boarded the *Beagle*, he was an amateur geologist who accepted both the then-taught fixity of species and the beliefs of Christianity. But his own

worldview would change radically as a result of three fortuitous events: his critical study of Charles Lyell's three-volume *Principles of Geology* (1830–1833), his unique experiences as an astute observer of nature in the Southern Hemisphere (especially during his 5-week visit to the Galapagos Islands), and his beneficial reading of Thomas Robert Malthus's *An Essay on the Principle of Population* (1798/1803).

Questioning and then rejecting the story of Creation as presented in Genesis, Darwin began to envision a dynamic web of life-forms changing over space and throughout time. Lyell's sweeping geological framework offered an immense period of planetary history within which Darwin could imagine the slow and continuous mutability of species. Furthermore, not only the fossil record in rock strata but also the geographical distribution of different organisms argued for the evolution of life-forms throughout biological time. In short, the earth is a massive graveyard of past species and a changing stage for the emergence of new ones, as well as a global museum of previous cultures and human activities. Finally, in 1838, Darwin's reflections on Malthus's vivid description of the living world as a “struggle for existence” gave to him his explanatory mechanism of natural selection. Thus, in merely 7 years, Darwin the geobiologist had become convinced that species either evolve or become extinct within changing environments throughout organic history. He referred to his evolution theory as “descent with modification,” but he had no immediate plan to get his disturbing interpretation of life into print.

With the luxury of time, Darwin's ongoing scientific research in biology and critical reflection on dynamic nature included the rigorous study of worms, pigeons, orchids, and barnacles as well as numerous other species (Boulter, 2009). Suddenly, in 1858, his scientific life of isolated contentment was abruptly disrupted when he learned that the naturalist Alfred Russel Wallace, while living in Indonesia, had come forth with both a theory of evolution and the same explanatory mechanism of natural selection to account for the history of life on earth.

Consequently, in 1859, Darwin quickly published his major work, *On the Origin of Species* (Darwin, 1859), which saved his priority as being the father of evolution. He was also fortunate to have three major naturalists defend his counterintuitive and most controversial theory: Thomas Huxley in England, Ernst Haeckel in Germany, and Asa Gray in the United States. Even so, Darwin had deliberately left out any consideration of the human animal. However, 12 years later, his *The Descent of Man* (1871) actually focused on our own species (Darwin, 1871).

Darwin's materialist theory of organic evolution held incredible, if not disquieting, ramifications for viewing the place of our human species within earth history. As had Huxley and Haeckel, Darwin himself now wrote that our species is closest to the three great apes (orangutan, gorilla, and chimpanzee), with which the human animal shares a common ancestral origin. And he thought that the

remains of this shared group would be found in the fossil record of Africa. Also, Darwin maintained that the human being differs merely in degree rather than in kind from these three great apes. This was not a claim that endeared him to those who believed that our species is unique and therefore occupies a special position in this universe. Nevertheless, Darwin's evolution theory gave to the emerging discipline of anthropology a scientific foundation that is quintessential for understanding and appreciating the origin and history of humankind.

With dynamic integrity, Darwin clung to his materialist outlook, thereby giving an atheistic interpretation of organic evolution, while his cosmological perspective remained agnostic at best. He even reflected on the evolution of the human brain with its mental activity, as well as pondering the emergence of moral conduct from earlier ape behavior.

Following the pervasive and overwhelming influence of Darwin's writings, the early anthropologists speculated on and searched for fossils and artifacts to document the biological and sociocultural evolution of the human animal, respectively. Other anthropologists wrote about the evolution of languages, kinship systems, political organizations, and magical-religious belief systems. Evolution research continues to enlighten and inspire the science of anthropology, with remarkable evidence discovered each year. One may eagerly anticipate new findings in genetics, paleontology (Brasier, 2009), primatology, and evolutionary psychology.

No doubt, during his frequent strolls down the Sandwalk behind Down House, the aging Charles Darwin reflected on his incredible experiences during his voyage on the HMS *Beagle* (especially his visit to the primeval-like Galapagos Archipelago). Yet one may argue that it was Lyell's geological perspective that had had the greatest lasting influence on the young naturalist. It gave to Darwin in particular, and to anthropologists in general, a vast framework of time and change within which one could comprehend organic evolution and the recent appearance of humankind on planet earth.

Herbert Spencer

Today, the English thinker Herbert Spencer (1820–1903) is primarily remembered for coining the famous expression “the survival of the fittest,” a phrase that Darwin himself later used in his own writings on organic evolution. But Spencer's greatest achievement was authoring a 10-volume work titled *Synthetic Philosophy* (1862–1893), a comprehensive interpretation of reality that dealt with cosmology and biology as well as sociology, psychology, and ethics. This worldview is grounded in a universal force and a crucial distinction between the now knowable world of human experience and the forever unknowable realm of ultimate reality.

Taking time and change seriously, Spencer presented his cosmic perspective in *First Principles* (1862/1958),

Volume 1 of the 10-volume grand synthesis (Spencer, 1862–1893). In it, he offers his evolutionary view of this dynamic universe. He speculates that the cosmos evolves from maximum simplicity (homogeneity) to maximum complexity (heterogeneity), as does the history of life on earth. Then, the cosmos and life devolute back to ultimate simplicity. He further speculated that there is an endless series of cosmic cycles, each finite cycle identical in structure but different in content.

Spencer likened the evolution of a society to the evolution of an organism, referring to a human society as the *superorganic*, which is distinct from nature itself but follows the same progressive process from simplicity to complexity and then devolutes back to simplicity. Thus, planetary evolution is from the inorganic through the organic to the superorganic. Spencer rejected religious creationism in favor of scientific evolutionism. In anthropology, he called for the empirical description and comparative study of societies and their cultures within an evolution framework. Ultimately, his ruthless individualism became the foundation for social Darwinism. Nevertheless, his ideas paved the way for the sociocultural evolutionists of the 20th century, for example, V. Gordon Childe, Marvin Harris, Julian H. Steward, and Leslie A. White (among others). No doubt, ongoing research in anthropology will provide an even clearer view of human evolution in all of its aspects.

Thomas Huxley

Referred to as “Darwin's bulldog” in England because of his enthusiastic support for the fact of evolution, Thomas Henry Huxley (1825–1895) contributed to science through his own comparative research in anatomy and paleontology. He accepted the evolution framework, with its vast geologic perspective and compelling paleontological record. His scientific imagination could even see earth history represented in a piece of chalk, even though our present knowledge of rocks, fossils, and genes was not available to him. At a time when most naturalists still held to the fixity of species, Huxley boldly argued that organisms either evolved throughout earth history, or they became extinct. His writings and lectures greatly helped to spread the scientific theory of biological evolution to both academic specialists and the general public.

Huxley is best remembered for defending the scientific theory of biological evolution at the University of Oxford's Museum of Natural History in the summer of 1860 (Darwin was ostentatiously absent). The heated confrontation between biblical fundamentalist Samuel Wilberforce, Bishop of Oxford, and materialist evolutionist Thomas Huxley ended with a victory for science and reason over religious shortsightedness and myopic beliefs. Nevertheless, the “battle” between religious creationists and scientific evolutionists continues, and it is as contentious today as it was during Darwin's time.

In 1863, concerning our own species, Huxley presented his pithecometra hypothesis (1863/1959): The human animal differs merely in degree rather than in kind from the two African great apes (gorilla and chimpanzee), and, in turn, our species is closer to these great apes than they are to the two lesser apes (gibbon and siamang). This position was also maintained by Ernst Haeckel and several years later by Charles Darwin himself. No doubt, the disturbing claim that the human animal is closely related to the living apes through organic evolution has contributed significantly to the continuing outrage against evolutionary biology and biological anthropology.

To represent his own position of scientific naturalism, Huxley coined the term *agnosticism*, as he was not certain whether a personal God exists or not. Even so, Huxley never believed that the process of evolution represented a divine plan or intelligent design. The philosophical scientist Ernst Haeckel was a pantheist (God is nature), while Charles Darwin kept his atheism to himself.

Huxley's interpretation of evolution differed from Darwin's view. Influenced by Charles Lyell's theory of uniformitarianism in historical geology, which held that geological structures change slowly over immense periods of time due to natural forces, Darwin's support of gradualism in organic evolution held that species change slowly over vast periods of time due to biological variation and natural selection. However, doubting that natural selection alone could account for the transformation of species, Huxley thought that new species could have "suddenly" appeared as a result of periodic rapid changes in biological evolution. Considering the enormous age of this planet and the awesome number of species that have existed on it (almost all of them having become extinct), it seems reasonable to assume that different rates of evolutionary change are represented in the fossil record.

Ernst Haeckel

Known as "Germany's Darwin" for daringly advocating and rigorously defending organic evolution, Ernst Haeckel (1834–1919) dedicated his research activities to many scientific areas, especially comparative embryology and marine biology. He not only contributed to the empirical evidence that supported organic evolution, but also seriously considered the far-reaching consequences of the evolutionary sciences for both philosophy and theology. His most successful book was *The Riddle of the Universe* (1899), in which he presented an evolutionary worldview that courageously challenged those traditional ideas and embedded beliefs that had pervaded Western thought for centuries (Haeckel, 1899).

Haeckel's evolutionary philosophy is grounded in a process monism (his law of substance); this position claims that dynamic reality is essentially a cosmic unity. Therefore, he held that human existence is a product of and totally within material nature. Moreover, for him, the evolving universe itself is eternal in time and infinite in space.

Haeckel had no patience for those thinkers who ignored the fact of evolution and its atheistic consequences. He rejected the common earth-bound and human-centered view of reality, which had taught that our species holds a special place in cosmic immensity. Moreover, by extending the fact of evolution beyond earth, Haeckel speculated that life-forms, including intelligent beings, exist on other planets elsewhere in this universe. As such, he anticipated the new research area of exobiology.

Inspired by Charles Darwin's *On the Origin of Species* (1859), Haeckel expanded the evolution theory to include the emergence and history of the human animal. He claimed that the evolution of our species could be traced back to a "missing link" represented by an ape-man without speech, *Pithecanthropus alalus*, whose fossil remains he thought would be found somewhere in Asia. (Darwin held Africa to be the cradle of humankind.) For Haeckel, this ape-man once existed between the earlier prehistoric apes of the alleged Asian landmass Lemuria (now vanished) and our own species of today. In the early 1890s, the naturalist Eugene Dubois discovered the hominid specimen *Pithecanthropus erectus* at the Trinil site on the island of Java in Indonesia. This remarkable find inspired other naturalists to search for similar fossil evidence in Africa and Asia. Haeckel also claimed that the human animal and the two African great apes (gorilla and chimpanzee) differ merely in degree rather than in kind.

In fact, as an artist in science, Haeckel drew the first tree of life diagram and, subsequently, many other illustrations that showed the evolutionary relationships among organisms as naturalists understood the historical web of life at that time. In general, Haeckel's basic ideas remain in step with modern thought. Today, his rigorous evolutionism may be seen in the writings of Richard Dawkins and Daniel C. Dennett (among others).

Peter Kropotkin

In Russia, Prince Peter Alekeyevich Kropotkin (1842–1921) became known for his original research in geography, zoology, anthropology, and sociology. He spent time in Siberia, where he studied the influence of past glaciers on its environment. He also carefully observed the group behavior of tribal communities and wild animals, deriving an important generalization about the adaptation and survival of societies, that generalization being his concept of mutual aid (social cooperation).

Although an evolutionist, Kropotkin differed from Darwin in maintaining that the natural selection of individuals was necessary but not sufficient to account for the survival and therefore successful evolution of social animals, including our own species. Kropotkin stressed that mutual aid is also crucial for the adaptation and reproduction of species (Kropotkin, 1902/1914; Montagu, 1952). In fact, for him, mutual aid is the key to understanding and appreciating the evolution of the human being; in human

social evolution, from bands and tribes to chiefdoms and states, mutual aid has played a crucial role in both protecting individuals and ensuring the survival of groups.

Kropotkin (1922/1968) even held that the biological origin of mutual aid was the foundation of a universal ethics for our own species. Therefore, he saw a sound anthropology resulting from the convergence of evolutionary science and a community ethics grounded in mutual aid. For him, collective thought and social action enhances the life, harmony, unity, and evolution of human communities. Extending his naturalism and humanism into politics, Kropotkin advocated communist anarchism.

In the 20th century, evolutionary biology in Russia received a devastating setback due to the politically motivated ideas concerning heredity defended by Trofim D. Lysenko (1898–1976), who sided with the philosophical views of Jean-Baptiste de Lamarck and Ivan Vladimirovich Michurin rather than the scientific discoveries of Gregor Johann Mendel and Hugo DeVries.

Yet it was the Russian biochemist A. I. Oparin who proposed a scientific explanation for the material appearance of life on this planet. In his groundbreaking book *The Origin of Life* (1923), he extended Darwin's naturalist theory by arguing that inorganic development had paved the way for the emergence of organic evolution in terms of biochemical advances in the waters of a primordial earth billions of years ago. Oparin had rejected all nonmaterialist explanations for the origin and evolution of life on this planet, as well as the assumption that life on earth is unique in this dynamic universe.

Friedrich Nietzsche

One may argue that the German philosopher Friedrich Nietzsche (1844–1900) is the most influential thinker of the recent past. Yet it is not often realized that he was greatly influenced by the evolution theory of Charles Darwin (Birn, 2006c). Reminiscent of Heraclitus in ancient Greece, Nietzsche took time and change seriously, seeing our species as being totally within the flux of reality. And like the scientist Darwin, the philosopher Nietzsche presented a strictly naturalist worldview. Nevertheless, Nietzsche's vitalistic interpretation of organic evolution is far removed from Darwin's materialist explanation for life-forms on earth (including the human animal).

Nietzsche was deeply concerned with the cosmological implications, ethical ramifications, and religious consequences embedded in the fact of evolution (as he saw them). For him, "God is dead!" and, therefore, this dynamic world has no meaning or purpose other than those values that humankind creates for its existence (Nietzsche, 1883–1885/1993). Likewise, if everything changes, then ideas and beliefs and values also change throughout time. In fact, Nietzsche called for a rigorous reevaluation of all values to overcome the complacency and mediocrity that he held to be pervasive in modern civilization.

Darwin neither concerned himself with questions about the beginning of this universe and the origin of life nor speculated on the future of our species and the end of this cosmos. Instead, he focused his time and effort on demonstrating (as best he could) the fact of evolution in terms of empirical evidence and logical argumentation. In sharp contrast, however, Nietzsche was always eager to grapple with those metaphysical issues that the evolution framework posed for both philosophy and theology.

Nietzsche's philosophical anthropology gives priority to no particular society or specific culture. His own position emphasizes the value of human creativity within the history of a creative universe in general and the process of creative evolution in particular.

Nietzsche's worldview stresses three essential ideas that are compatible with the evolution theory as he interpreted it: The dynamic universe is ultimately a will to power; the further evolution of the human animal will bring about a superior form, the *overbeing*, which will be as intellectually advanced beyond our species of today as the human being is now biologically advanced beyond the lowly worm, and the eternal recurrence of this same universe as his all-encompassing conception of reality itself.

In his sweeping vision of the eternal recurrence, Nietzsche maintains that this finite cyclical universe will repeat itself forever. He argued that space and the amount of matter or energy in reality is finite, but time is eternal. Therefore, only a finite cosmic series of objects and events and relationships is possible. Consequently, this identical sequence repeats itself an infinite number of times; there was no first sequence and there will be no last sequence. Since each cosmic cycle is absolutely identical, there is no evolution from universe to universe within this endless repetition. As a result, Nietzsche himself and everything else in reality has a form of natural immortality.

The eternal recurrence remains an engaging idea in modern cosmology, especially in terms of an oscillating model for this dynamic universe.

Henri Bergson

Critical of Charles Darwin's mechanistic and materialistic interpretation of organic evolution, the French philosopher Henri Bergson (1859–1941) offered a vitalistic explanation for biological history in his major work, *Creative Evolution* (1907/1998). Unlike the early scientists who defended Darwin's naturalism, for example, Huxley and Haeckel, Bergson argued that it was only a philosophical interpretation of organic evolution that would disclose the essential aspect of diverging life-forms on earth over countless millions of years and, furthermore, would reveal the unique value of the human being in terms of its immediate awareness of real time and creative evolution.

Bergson set forth his essential philosophical stance in his book *An Introduction to Metaphysics* (1903). To grasp

the significance of his conceptual orientation, it is necessary to understand Bergson's crucial distinction between science and metaphysics: Science is interested in a rational (mathematical and logical) analysis of the appearance of diverse and fixed material objects in external space; in sharp contrast, metaphysics is concerned with intuitively grasping the creative flux of events in the unity of reality as evolving consciousness in internal time or duration. Bergson gave preference to intuition over reason, that is, metaphysical insights over scientific information. He argued that it was only through intuition that a human being could appreciate both the flux of time and the creativity in evolution.

As a vitalist, Bergson (1907/1998) held that an invisible life force, or *élan vital*, causes the awesome creativity throughout organic evolution on our planet. He maintained that this metaphysical principle is needed to account for the emergence of an enormous diversity of species that has appeared over countless millions of years on earth. For him, the diverging evolution of life-forms has taken three major directions: plants with torpor, insects with instinct, and animals with consciousness. Bergson focused on the evolution of animals, which demonstrated (for him) a direction toward ever-increasing complexity and ever-increasing consciousness. So far, this direction has reached its peak in the human animal with its self-consciousness. In fact, in our own species, Bergson maintained that self-consciousness is the *élan vital* conscious of itself. He even envisioned, as human evolution continues, the emergence of a community of mystics.

Vitalism is not taken seriously by most modern evolutionists, who give priority to science and reason rather than to metaphysical speculations and mystical beliefs. Thus, neo-Darwinists interpret organic evolution within a strictly naturalistic framework.

John Dewey

Greatly influenced by the Darwinian theory in science, the American philosopher John Dewey (1859–1952) presented his own dynamic outlook as “instrumentalism,” a version of pragmatism. Having abandoned his early interest in Hegelian idealism, he wholeheartedly embraced the evolutionary paradigm with its far-reaching naturalistic implications for comprehending the place of humankind within this universe. Therefore, he saw our species within the organic history of this planet and earth within the cosmic history of this universe. His mature position gave no credence to idealism or spiritualism.

In his essay, “The Influence of Darwin on Philosophy” (1910), Dewey had called for philosophers to take the fact of evolution seriously (Dewey, 1965). In doing so, the entrenched two-world interpretation of reality as matter and spirit is discredited, as is a dualistic view of the human being as mortal body and immortal soul. Dewey best presented his own philosophy in *Experience and Nature*

(1925/1958), a book that rigorously advocates the value of human experience and scientific inquiry.

Dewey understood the human animal as the recent product of biological evolution, a natural process within which there is always an interaction between organisms and their environments. He saw the discoveries in anthropology as being crucial for any sound interpretation of humankind within nature. Additionally, Dewey appreciated both the scientific method and the use of human concepts as means for solving problems in the natural and social worlds. For this philosopher, knowledge and wisdom come from experiencing nature itself; facts and concepts and values are derived from reflecting on experiences within nature. For Dewey, ideas and beliefs and hypotheses have adaptive value, as do critical thinking and social action. He claimed that advances in science and philosophy are only possible when there is an active community of free inquirers in a democratic society. Not surprisingly, Dewey completely rejected both Spencer's social Darwinism and Nietzsche's ruthless individualism.

John Dewey remains an inspiration for all naturalists and humanists, particularly those dedicated to education. For the scientific philosopher as active pragmatist, the evolutionary perspective allows for the ongoing transformation of our species in terms of adapting to and surviving in an endlessly changing universe. Thus, the enlightenment and fulfillment of humankind requires taking seriously both philosophical reflection and scientific research.

Božidar Knežević

In Serbia, the historian Božidar Knežević (1862–1905) developed a unique interpretation of evolution that grew out of the ideas of Charles Darwin and Herbert Spencer (among others). Although he adopted a cosmic vision, his bold speculations focused on the history and future of life on earth. Within the ascent and then descent of this immense universe, Knežević saw our species as being only a part of the evolution and then the devolution of organisms on this planet. As such, the naturalist taught that neither the planet earth nor the human animal is at the center of cosmic reality; consequently, he held that each is an ephemeral event in the material universe.

Knežević (1901/1980) saw both cosmic and planetary history as a semicircle of evolutionary ascent from an initial chaos followed by a devolutionary descent back to an ultimate chaos. He held that this universe is utterly indifferent to the fleeting incident of human existence, and in time, everything will disappear in the endless flux of cosmic reality.

Even so, Knežević was convinced that other planets, stars, galaxies, and universes exist and undergo this pervasive semicircular history within the infinity of superspace and the eternity of supertime. On earth, after the appearance of vertebrates from invertebrates, the fossil record shows the sequential emergence of these groups: fishes, amphibians,

reptiles, birds, and mammals. Most recently, one sees the appearance of the human animal. Subsequently, when planetary devolution sets in, our species will be the first organism to vanish, followed by this series of extinctions in the remaining groups: mammals, birds, reptiles, amphibians, fishes, and lastly all of the invertebrates. This semicircular process will occur on other planets with life-forms, including intelligent beings superior to our species (in each case, the last form to appear is the first form to disappear).

Božidar Knežević was a brave spokesperson for science, reason, evolution, and open inquiry. He was a futurist who courageously advocated naturalism and humanism. His acknowledgement of the inevitable extinction of our own species and, in fact, of all that exists is a sobering but relevant reminder of the finitude of life-forms, which needs to be taken seriously in our modern worldview (particularly with the present growing concern for the environment).

Alfred North Whitehead

With its emphasis on time and change, the evolution framework had a significant influence on 20th-century thought. This outlook inspired serious thinkers to see creativity in this world in terms of an expanding universe and emerging species; it also resulted in a deep concern for dynamic philosophy and process theology. This focus on pervasive change throughout cosmic time is exemplified in the impressive writings of Alfred North Whitehead (1861–1947), who was interested in not only scientific discoveries but also metaphysical speculations. He sought to include the recent findings of both relativity physics and evolutionary biology in his comprehensive worldview that reflects their implications for understanding and appreciating the value of human experiences and feelings within an ever-changing universe. Whitehead taught first in England and then in the United States, distinguishing himself at the University of Cambridge and later at Harvard University. His academic life passed through three distinct stages; it moved from mathematics and logic, through a concern for education and the history of science, to natural philosophy and metaphysics (Whitehead, 1920/1964, 1925/1967, 1929/1969).

Whitehead's major work is *Process and Reality: An Essay in Cosmology* (1929/1969). It is a systematic interpretation of change that aims to incorporate both the being of eternal objects and the becoming of actual occasions. This ongoing interaction between being and becoming results in the all-encompassing creativity of endless reality. In terms of pervasive experiences and feelings, all objects and events continuously interact in the evolutionary advance of this eternal and infinite universe. As such, there is an integrated and essential unity (through experiencing and feeling) of human perception and reality itself, that is, a unity of internal mental activity with external physical activity throughout the extensive continuum of this cosmic epoch.

As a panentheist, Whitehead merely distinguished between God and Nature (for him, they are neither separate nor identical entities); both are interacting forever, as there is no ultimate end or final goal to the creative process of an endless reality. However, there have been and will be other finite cosmic epochs, each with its own physical laws and unique creativity. In short, Whitehead's dynamic cosmology clearly illustrates how extremely abstract an interpretation of evolving nature may become. Within this philosophy of organism, the experiencing human being is the concrescence of all its actual occasions within a continuously flowing space-time continuum.

Pierre Teilhard de Chardin

There is a crucial distinction between the fact of evolution in science and those interpretations of evolution that exist in the philosophical literature. Evolutionary viewpoints range from materialism through vitalism and spiritualism to mysticism. Furthermore, for some thinkers, there is a serious need to synthesize science and theology into a comprehensive philosophical system that will embrace both established facts and personal beliefs. Such an audacious attempt had been made by Pierre Teilhard de Chardin (1881–1955), an eminent French geopaleontologist and devout Jesuit priest, who accepted both the truth and challenge of evolution, despite the inevitable problems and tragic consequences his unique vision would cause him from some myopic religionists and his intolerant superiors (Birn, 2006d).

Because of his interest in both science and theology in terms of evolution, Teilhard was eventually silenced by the Roman Catholic Church for his unorthodox views on original sin. He was then exiled from France to China, where his geological research at Zhoukoudian, the significant fossil hominid site near Peking (now Beijing), and his subsequent scientific writings made him world famous (Aczel, 2007). Teilhard's involvement as a geologist with this *Sinanthropus pekinensis* discovery resulted in his intense reflections on the meaning and purpose of human evolution within dynamic reality. Consequently, he authored his major but controversial philosophical book, *The Phenomenon of Man* (1975; written in 1938–1940, 1947–1948, and first published in 1955 in French). Unfortunately, the Vatican denied him permission to have it published. Quintessentially, the book argued for a teleological and mystical interpretation of human existence on earth based on theistic evolution (what today is referred to as an appeal to an intelligent design within the historical process of the natural world).

Teilhard worked with those geologists, paleontologists, and anthropologists who were dedicated to unearthing the remains of fossil hominids in the Eastern Hemisphere, from Africa to Indonesia. He himself spoke of an anthropogenesis, that is, the emergence and ongoing evolution of our species. He also called for an ultra-anthropology, that

is, a rigorously comprehensive view of humankind within this evolving world. Of course, for many, evolution was a devastating challenge to traditional theologies and religious beliefs. It required a reinterpretation of God, personal immortality, human free will, and the divine destiny for our species. In their dynamic worldview of reality, both Teilhard and Whitehead were panentheists, seeing God and Nature as continuously interacting in an ongoing process of creative evolution.

Teilhard's unique synthesis (1975) is based on four fundamental conceptual assumptions: (1) The unity of this process universe is ultimately grounded in spiritual energy; (2) cosmic evolution reveals the design of ever-increasing complexity and ever-centralizing consciousness; (3) organic evolution on the finite, spherical earth reveals three consecutive and essential layers (matter or the geosphere, life or the biosphere [Vernadsky, 1926/1998], and thought or the noosphere); and (4) the end goal of human evolution will occur on this planet with the formation of a theosphere. For this Jesuit scientist, converging and involuting human evolution will eventually form a collective consciousness at the Omega Point, which is the ultimate destiny for our species on the earth. Then, this collective consciousness will detach itself from this planet, transcend space and time, and unite itself with a personal God as a result of a final mystical synthesis.

In the last analysis, Teilhard's cosmology (Heller, 2009) is actually a planetology. Incredible as his vision may seem, it is nevertheless to Teilhard's lasting credit that he accepted the fact of evolution at a time when the worldwide religious community was either skeptical of it or rejected it outright. Actually, by foreseeing the future unity of our human world through converging advances in science and technology, Teilhard had glimpsed our age of the Internet.

Marvin Farber

In the history of philosophy, there has been a contentious debate between the objectivists who gave preference to the natural world and the subjectivists who gave preference to the human mind. This clash in metaphysics continues today; some philosophers claim that the material universe is the starting point for any sound cosmology, while others ground their worldview in the reflective ego as the alleged center of any true ontology. However, if philosophy takes the factual theory of organic evolution seriously, then any metaphysical framework must embrace both a dynamic universe independent of human thought and the recent emergence of our species within the sweeping history of life-forms on this planet.

As a distinguished American philosopher, Marvin Farber (1901–1980) devoted his academic activities to the intellectual defense of a cosmic naturalism over a myopic subjectivism (Farber, 1968a, 1968b). Although he studied and contributed to phenomenology as a method of inquiry, his own refreshing naturalist standpoint recognized the

severe limitations of restricting philosophical investigations to merely the content of a human mind. Farber accepted the fact of evolution, realizing the far-reaching implications that this scientific theory holds for philosophical ideas and religious beliefs. Consequently, his unabashed atheism and pervasive naturalism were in stark contrast to all idealist positions in the philosophical literature and all theistic interpretations in religious thought.

Farber had been greatly influenced by the writings of Ludwig Feuerbach and Karl Marx (among others). He was indebted to the cosmic perspective of Giordano Bruno and the evolutionary framework of Ernst Haeckel. His inquiring mind was always open to crucial findings in the natural and social sciences, as well as advances in logic. He was particularly receptive to the ongoing discoveries in anthropology, a discipline he thought to be especially important to any sound understanding of and proper appreciation for human existence in terms of both science and philosophy. To him, the facts and concepts of scientific anthropology are indispensable for modern philosophy.

Incorporating the evolutionary perspective, Farber held that humankind is merely a newcomer in earth history, and its vulnerable existence is a fleeting event within the flux of cosmic reality. Therefore, one must come to grips with the ephemeral status of mental activity in this universe. Moreover, for him, the ongoing discoveries in paleo-anthropology, as well as research in primatology and genetics, offer a striking confirmation of human evolution and the close relationship between our own species and the great apes.

Because of his commitment to the special sciences, uncompromising materialism, and sobering interpretation of human evolution, the wise Marvin Farber stood almost alone in modern philosophy. Nevertheless, his enlightened stance against ignorance and superstition would gladly welcome all forthcoming findings in scientific anthropology and evolutionary science. As Farber saw it, the goal of human research is to increase freedom, happiness, and longevity (with the issues in ethics taking priority over those themes that still surround epistemology and metaphysics).

One may anticipate a neo-Enlightenment with a renewed emphasis on science, reason, and humanism. For now, however, and with prudent courage, our species must have the will to evolve and fulfill itself on earth and later elsewhere in a godless universe.

Research and Speculation

The ramifications of evolution open up new areas for scientific research, especially in anthropology with its focus on humankind. Although opposition to the fact of evolution continues, it does not stifle rational speculations on the awesome possibilities that evolution holds for both the future of our species and the probable existence of life-forms on other worlds.

The Neo-Darwinian Synthesis

At the beginning of the 20th century, scientists were divided into two distinct groups concerning the primary force behind organic evolution: One group argued that the explanatory mechanism of natural selection accounted for the emergence of new species over vast periods of time, while the other group maintained that genetic variation held the key to understanding and appreciating biological evolution. However, before 1959, it became obvious that genetic variation and natural selection, taken together, explained the appearance of new species throughout the history of life-forms on earth. As a result, populations (or gene pools) became the focus of evolutionary research, particularly in terms of probability and statistics. As such, neo-Darwinism, or the so-called synthetic theory of organic evolution, now represents the scientific foundation for modern biology.

The writings of several scientists helped to popularize the emerging synthesis in evolution theory: Theodosius Dobzhansky, Sir Julian Huxley, Ernst Mayr, and George Gaylord Simpson (among others). Their informed books spread the facts and concepts of evolution theory, as well as defended evolutionary biology from the uninformed positions of dogmatic biblical fundamentalists and myopic religious creationists. Ongoing discoveries in paleoanthropology and human genetics, as well as improved dating techniques, gave greater empirical evidence to support the fact of human evolution (despite those attacks that still challenge the enormous age of this earth, the mutability of species, and the great antiquity of our own species). The recent completion of the Human Genome Project opens up new areas of research for the genetic engineering of species, including our own.

Sociobiology: Nature and/or Nurture

In 1975, the appearance of a groundbreaking book titled *Sociobiology: The New Synthesis*, from the American naturalist Edward O. Wilson, caused a major debate among anthropologists, including other scientists and philosophers (Wilson, 1975). A specialist in entomology who focused on the biology and behavior of ants, Wilson boldly extended organic evolution in order to include our own species in terms of seeing human behavior influenced by the inherited genetic makeup of the human animal. His position intensified the nature versus nurture controversy in the academic world, with Wilson himself giving priority to genetic inheritance over sociocultural influences. He has also rigorously advocated protecting and preserving the diversity of life-forms on earth (Wilson, 1992).

Since 1975, and especially with the mapping of the human genome, it is becoming clearer that genes play a substantial role in providing the propensity for causing favorable and unfavorable variations, for example, illness and disease, as well as both desirable and undesirable

behavior in species (including in our own). Not surprisingly, some thinkers vehemently object to manipulating the human genome, despite those incredible advantages that this scientific breakthrough will offer for human existence and evolution. Admittedly, sociobiology holds great promises and serious perils. Of course, determining the biological characteristics and behavior patterns of the human being through genetic engineering necessitates that sociobiological research follow stringent ethical guidelines.

As with the origin of any science, there are those people who are at first skeptical of the value of a new field of inquiry and protest the emerging science. However, as time passes and the overwhelming benefits become obvious, the new science is accepted and eventually praised. One may assume that this change of attitude will be true for the emerging science of sociobiology, as well as evolutionary psychology and genetic engineering.

The human being is a complex product of both biology and culture. For the anthropologist, as well as the scientist and philosopher, the fact of biocultural evolution makes it clear that inherited and learned mental activity are grounded in the material brain and that the material organism (no matter how complex) is grounded in the DNA molecule. Consequently, all aspects of the human being are the result of evolution and, therefore, they are subject to scientific inquiry within a naturalist framework.

Anthropology: Facts, Concepts, and Perspectives

As the comprehensive study of evolving humankind, anthropology is that discipline that is devoted to research in those areas that are relevant to understanding and appreciating *Homo sapiens sapiens* within the natural world (Bollt, 2009; Hublin, 2006). These areas range from genetics, paleontology, and archaeology to sociology, psychology, and linguistics. The more anthropologists search, the more fossils and artifacts they find that shed light on the emergence of our species over several million years. Each discovery helps to complete the developing picture of hominid evolution (Birn, 1988; Shubin, 2009; Tattersall & Schwartz, 2000). Of particular significance are those discoveries in primatology that clearly show the undeniable similarities between our human species and the four great apes in terms of genetics and psychology. Research in cross-cultural studies reveals the astonishing diversity of human thought and behavior from society to society throughout history.

In paleoanthropology, three discoveries have been especially important: *Ardipithecus ramidus* ("Ardi"), *Astralopithecus afarensis* ("Lucy"), and *Homo floresiensis* ("Hobbit"). Although interpretations of these three hominid species vary among anthropologists, who debate specific conclusions from the fossil specimens, there is no

denying the empirical evidence itself. Today, it is exciting to speculate on what remarkable fossil specimens are still in the earth waiting to be discovered by future anthropologists.

A perplexing question still haunts some anthropologists: What is the uniqueness of our species? One answer offered was that the human animal is the only toolmaker—until it was discovered that chimpanzees make and use simple tools (as do a few other animals). A second reply was that only our species has self-consciousness that allows it to communicate through language—until ape studies showed that the pongids have self-awareness and are capable of learning symbolic communication. More recently, it has been argued that only humans stand erect and walk upright with a bipedal gait; that is, only humans are capable of sustained bipedality. However, chimpanzees and bonobos are able to walk erect for short distances. It seems that the only uniqueness of our species that separates us from the other living hominoids is about 6 million years of biological evolution (Rachels, 1999). Huxley, Haeckel, and Darwin himself got it correctly back in the 19th century: Man differs merely in degree rather than in kind from the great apes.

Religious Creationism or Scientific Evolutionism

During the 19th century, two fundamental questions remained to be answered: What is the age of this planet? Have species always been fixed throughout earth history? As evidence accumulated in geology and paleontology, it became increasingly obvious to naturalists that our planet is millions (actually billions) of years old and that species have changed over time (with most species eventually becoming extinct). This emerging evolution framework held devastating consequences for all orthodox conceptions of earth, life-forms, and our species. In 1860 at the University of Oxford, England, the infamous Thomas Huxley and Samuel Wilberforce confrontation exemplified the intense conflict between the new evolution paradigm in science and an outmoded static worldview in religion.

The fact of evolution challenged not only traditional science and philosophy but also natural theology. Darwin himself was disturbed by the materialist implications of his own evolution theory for religious beliefs. In fact, his wife, Emma, even felt compelled to delete all of her husband's views on theology and religion from his *Autobiography*, which was published posthumously in 1887; not until 1958 did an unexpurgated edition of Darwin's life, written by himself in 1876, appear in print (Darwin, 1969).

In England, to reconcile evolutionary science with Christian faith, religious naturalist Philip Gosse argued that God had placed fossils in the earth in order to merely suggest that organic evolution had taken place, although in reality (so thought Gosse) species are fixed and earth had been suddenly created only about 6,000 years ago. Not surprisingly, his bizarre but provocative book *Omphalos: An*

Attempt to Untie the Geological Knot (1857) convinced neither scientists nor theologians.

During the 20th century, reacting to the materialist ramifications of organic evolution, some religionists argued against the new dynamic outlook by first defending biblical fundamentalism and then advocating so-called scientific creationism (Isaak, 2007). Both viewpoints gave priority to beliefs rather than to facts. In 1925 at Dayton, Tennessee, the infamous John Scopes "Monkey Trial" had best represented this ongoing clash between science and religion over the factual theory of organic evolution.

In an attempt to reconcile modern science with traditional theology, some religionists now maintain that the universe in general and evolution in particular manifest an intelligent design (Petto & Godfrey, 2007). Ultimately, this is a religious position not supported by scientific evidence. Despite all the ongoing attacks, continuing research in all areas of science (from genetics to paleontology) confirms the fact of evolution and the close biological relationship between our species and the great apes. In fact, an honest examination of human history clearly shows that even complex religious beliefs and theological systems have evolved, over thousands of years, from simplistic explanations for interpreting the natural world. No doubt, exciting discoveries in the future will further strengthen the evolution framework. Finally, in light of ongoing changes in human societies and their cultures, one wonders what the religious beliefs and theological systems of human beings will look like 2,000 years from now.

Evolutionary Humanism, Transhumanism, and Posthumanism

Grounded in science, reason, and an open-ended perspective, evolutionary humanism emphasizes the ongoing development of human beings within a strictly naturalistic framework. It maintains the unity of mental activity and the organic brain, and places our species totally within biological evolution. With optimism, evolutionary humanism argues for the improvement of our species in order to increase its health, happiness, and longevity (overcoming illness, disease, and physical disability). With the advances in science and technology since the middle of the 20th century, especially in genetics, the innovative ideas and pragmatic values of this movement for human enhancement would seem increasingly plausible for guiding our evolving species.

Extending the evolutionary framework, some scientists and philosophers see the human being as an unfinished species that will continue to change as a result of implementing nanotechnology and genetic engineering (Harris, 2007; Savulescu & Bostrom, 2009; Sorgner, 2006; Young, 2006). Both the ideas and values of transhumanism (going beyond the human of today) have been put forward by several visionary thinkers: Nick Bostrom, Fereidoun M. Esfandiary, Sir Julian S. Huxley, Michel Houellebecq,

and Julian Savulescu (among others). Through human intervention, these thinkers argue, our species will be improved in its biological and psychological makeup, just as *Homo sapiens* of today is a biopsychological advance over *Homo erectus* of the distant past.

Reminiscent of Friedrich Nietzsche's conception of the overbeing, some thinkers even speculate that the transhuman will be the "missing link" between the human of today and the posthuman of the remote future. In fact, the posthuman may even be a new species far beyond both humans and the following transhumans. Of course, one cannot imagine the nature of the posthumans. It is likely that these cosmic overbeings will travel to and live among the stars.

Exobiology and Exoevolution

In 1836, during the end of his 5-year voyage on the HMS *Beagle*, Charles Darwin revisited the tropical Brazilian rainforest. He admired this lush environment and thought how great it would be, if it were ever possible, to experience the scenery on another planet. Therefore, at least once, the young naturalist glimpsed the forthcoming science of exobiology or astrobiology as the search for life-forms on other worlds (and if they are found, their study).

In the history of philosophy, major thinkers like Giordano Bruno (1548–1600) and Immanuel Kant (1724–1804) envisioned living beings inhabiting other planets. Today, with advances in technology, scientists are seriously scanning the heavens in hopes of detecting indisputable evidence that organisms exist elsewhere in sidereal reality (Boss, 2009; Lamb, 2001). The size and age of this material universe, with its billions of galaxies each having billions of stars, argues for the existence of countless planets. If the same physical laws and chemical elements pervade this cosmos, then it seems reasonable to assume that earthlike worlds harbor life-forms among the stars, perhaps even sentient beings similar to or even advanced beyond ourselves.

In our own solar system, the earth has those necessary natural conditions that have allowed for the origin and evolution of biological forms over the past 4 billion years. Beyond this solar system, extrasolar planets may have similar life zones that permit the existence of organisms. Thus, planetology becomes cosmology as the probability of and interest in biological evolution are extended to include this entire universe. Likewise, exobiology implies exoevolution, that is, the evolution of life-forms on different worlds, where organisms are adapting to changing habitats far different from those environments on earth (Birx, 2006b). In the distant future, both exobiology and exoevolution may offer intriguing areas for scientific research.

Even if forms of life are never found elsewhere in this universe, it does not mean that they do not exist on worlds that will remain beyond the detection of our human species

(Webb, 2002). Moreover, organisms may have existed in the remote past before the formation of the present galaxies or will emerge in the distant future in new galaxies. And there may have been, are, or will be other universes with life-forms very similar to or far different from those organisms that have inhabited or are now inhabiting earth. One can only speculate on what the consequences might be if our human species ever encounters superior intelligent beings evolving among the stars.

Conclusion: Ongoing Reflections and Open Inquiry

Since the convincing writings of Charles Darwin, interpretations of organic evolution have evolved from the narrow materialism of early evolutionists to the comprehensive naturalism of modern neo-Darwinists. Advances in those special sciences that support biological evolution include ongoing discoveries in paleontology, comparative biology, anthropology, and population genetics, as well as more accurate dating techniques in geology and biochemistry. Progress in these special sciences is an increasing challenge to vitalistic, spiritualistic, and mystical interpretations of our species and organic evolution.

Two exciting and promising but controversial areas in modern evolution research are transhumanism and exoevolution. With the rapid advances in nanotechnology and genetic engineering, an increasing ability to design the DNA molecule will allow humans to alter and improve species, including our own, and to design new organisms for specific purposes both on earth and in outer space; as such, one may speak of emerging teleology in terms of human intervention and technological manipulation. The successful journey of human beings into outer space will require our species to adapt to and survive in different environments, both artificial and natural. If life-forms are discovered elsewhere in this universe, then scientists and philosophers will be able to study the evolution of organisms on other worlds.

Quo vadis, Homo sapiens? In those countless centuries to come, the human being may even transform itself into a new species, *Homo futurensis*. Of course, designer evolution will require establishing ethical guidelines while promoting open inquiry. For now, the primary focus must be on those steps that need to be taken to ensure the continued biodiversity of life-forms on this planet, including the ongoing fulfillment of humans on this earth before they venture to the stars.

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EVOLUTION/CREATION CONTROVERSY

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The evolution/creation controversy is an acrimonious debate that has been ongoing since 1859, particularly in the United States of America. This debate contrasts the biological theory of evolution with a literal interpretation of the creation story in the Judeo-Christian Bible, asserting these views as incompatible. Although largely about the validity of the biological theory of evolution, this debate also encompasses subjects ranging from cosmology through geology to physics. The media has so sensationalized this debate that it is important to set aside common misconceptions about the nature of this controversy to view it from a broader perspective. The theory of evolution has long been widely adopted by the world's scientific community. Evolution has been taught without dispute in most of the world's developed nations. It has also been accepted by the majority of world religions. The Catholic Church and most Protestant denominations, for example, find no conflict between their theological beliefs and evolutionary theory. In the United States, many deeply religious people view the theory of evolution as a compelling scientific explanation for the diversity of life on this planet.

The evolution/creation controversy is not a debate of faith versus science. Rather, it is a political and legal war involving some fundamentalist Christians, mostly situated in the United States, who are opposed to the theory of evolution on the grounds that it contradicts their specific interpretation of the account of Creation found in the Judeo-Christian Bible.

This chapter will outline the evolution/creation controversy, providing summaries of the theories under debate, definitions of belief systems involved in the debate, an overview of debate history and important events in the United States, reasons why this controversy continues today, and ways that this controversy can be alleviated. This chapter closes with a list of the most relevant references and suggestions for further reading.

Theory of Evolution

The Development of the Theory of Evolution

The theory of evolution was first presented by British naturalist Charles Darwin in his 1859 book, *On the Origin of Species by Means of Natural Selection*. Prior to Darwin, several scientific findings from the late 1700s set the stage for the theory of evolution. These included fossils and geological formations suggesting an ancient earth. The idea of species transmutation was discussed by philosopher Erasmus Darwin, grandfather to Charles, and Charles was influenced by these ideas as he traveled around the world as a naturalist in the 1830s, regarding geographical variation in life-forms. Darwin began writing what became the earliest draft of *On the Origin of Species* in the 1830s and refined his arguments and observations through further experiments in the 20 years leading up to its publication.

The Theory of Evolution

Evolution is a process, which over many generations, results in heritable changes in the gene pool of a population. In *On the Origin of Species*, Darwin suggests the mechanisms by which life diversifies. These can be reduced to five basic ideas:

1. The high rate of reproduction within a species makes it impossible for all individuals to survive, and therefore, it creates a struggle for resources both within and between populations.
2. Within a species, there is great variation in the traits represented, and within each specific environment, certain traits will enhance the chances an individual has of surviving and reproducing.
3. Variation in traits is heritable and can be passed down to offspring.
4. Individuals and their offspring with traits best allowing them to obtain resources are more likely to survive and be able to reproduce.
5. Over many generations, new species arise through the specific pressures in a certain environment acting on which traits are more advantageous for individuals to pass down.

Natural selection is the process by which advantageous traits become more represented in a population over generations, since individuals with these traits are better able to survive and reproduce.

Contemporaneous Reception of This Theory

Most scientists accepted Darwin's theory of evolution readily because of the thoroughness of Darwin's arguments. Darwin was aware of weaknesses in his ideas and active in seeking evidence opposed to his theory. Although scientists and the educated public became fast supporters of evolution, the reception in England's religious communities was divided. Some conservative Anglicans, including Samuel Wilberforce, the Bishop of Oxford, opposed evolution because it necessitated a change in the divine order. In contrast, many educated Christians, including more liberal Anglicans, embraced evolution as the blueprint of God's work in the world.

Early Controversy and Darwin's Response

The most famous manifestation of controversy immediately following the publication of *On the Origin of Species* involved Wilberforce arguing against evolution at a meeting for the British Association for the Advancement of Science in 1860. Botanist Joseph Hooker and physiologist Thomas Huxley debated as supporters for evolution. Following the debate, scholars noted that Darwinism was taken out of context by the public and articulations of dissenting views about this scientific theory were depicted as a war between science and religious faith. Although personally an agnostic, Darwin was sympathetic to those

with devout religious beliefs and was distressed at the confusion and dissent his theory caused. To make his theory more blatantly compatible with God-directed evolution, Darwin inserted the words "by the Creator" in the last sentence in the second edition of the *Origin of Species* published in 1860. Thus, the final sentence read,

There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved. (p. 490)

Although evolution was made more overtly palatable for those with religious beliefs with this inclusion, Darwin removed this reference to a creator in the third and subsequent editions. A small minority of conservative Christians in the 19th century and onward continued to oppose evolutionary theory (McCalla, 2007).

Modern Reception of This Theory

Since the 1860s, the theory of evolution has been almost universally accepted by academics and is now recognized as a unifying model for life on earth, from foundational to modern biology (Brooks & Wiley, 1988). Evolution is supported by overwhelming evidence from many diverse scientific disciplines (Bleckmann, 2006). It has become increasingly influential in all branches of scholarship, as details of its particulars have been refined through thousands of peer-reviewed publications, books, and complementary hypotheses and theories (Patterson, 1999). Evolution is supported by all known professional organizations of scientists, who perceive it as one of the most captivating theories of the modern day. A large group of fundamentalist Christians, primarily located in the United States, opposes evolutionary theory. They are called creationists.

Creationism

The Judeo-Christian Creation

Although there are myriad creation stories in various world religions, the creation story from the Judeo-Christian Bible is the specific account on which the vast majority of evolution/creation debates center. For this reason, this will be the only creation account presented in this chapter. The Judeo-Christian Bible asserts in Chapters 1 and 2 of *Genesis* that the world was created by God in 6 days and that God rested on the 7th day. According to this account, the Creation can be summarized as follows:

- *Day 1*: Light, day, and night were created.
- *Day 2*: Sky and water were created.

- *Day 3:* Land, seas, and all types of plants were created.
- *Day 4:* Stars, sun, and moon were created.
- *Day 5:* All sea life and all birds were created.
- *Day 6:* All terrestrial animals and humans were created.
- *Day 7:* God rested from his work, since all was complete.

Contemporaneous and Modern Theological Interpretations of the Creation Story

Creationism must be carefully differentiated from a belief in the Judeo-Christian God as the creator of life and the universe because the majority of Judeo-Christians maintain a belief in a Creator God that is consistent with evolutionary theory. Nineteenth-century theological scholarship suggested that the Bible's creation story should not be taken as scientific or historical truth but instead interpreted as a figurative, mythical account, which has religious but not literal meaning (McCalla, 2007). This type of biblical interpretation has been continued by most Christian groups today. Many Christian denominations, for example, may perceive the "days" of the creation myth as being much longer periods of time, such as ages of the world, or take nothing more literal from the story than the idea that God created the world. As numerous theologians note, Christian writers as far back as St. Augustine in the 5th century have approached the creation with great imagination at God's creative powers and the methods by which he executed this Creation (Van Till, 1998). Evolution is, according to this line of belief and many modern theologians, a reasonable mechanism through which the Judeo-Christian God created and complexified life by setting this macroevolutionary process in motion. However, these mainstream Christian beliefs about the origins of life contrast with varied origination beliefs held by many Americans and a minority of other fundamentalists worldwide who are termed creationists.

Old Earth Creationism

Old Earth creationism was one belief widely held by fundamentalist Christians before the 1960s and is still held by some today. According to various types of Old Earth creationism, life was created by the Judeo-Christian God in literal 24-hour days, as described in *Genesis*, although life was created recently on an old Earth. Fundamentalists with this belief saw the theory of evolution as incorrect because it contradicted a literal reading of the Bible. However, Old Earth creationists accepted the scientific consensus by geology and cosmology that Earth was billions of years old. Old Earth creationism is represented to the present day by major creationist organizations including Hugh Ross's Reasons to Believe (Pennock, 2003).

Young Earth Creationism

Young Earth creationism, a belief widely held by creationists since the 1960s (Pennock, 2003), can be summarized in the following beliefs:

1. The world was created in six literal 24-hour days.
2. The universe, matter, and life were created from nothing.
3. Earth is only around 10,000 to 12,000 years old.
4. A worldwide flood as described in *Genesis* happened around 6,000 to 12,000 years ago, creating modern geological features, such as mountains, canyons, and fossils.
5. A single-celled organism is not the ancestor of all living things. Organisms are not capable of developing this level of complexity through natural selection and mutation.
6. Plants and animals were created as types and can vary only within fixed limits.
7. Humans do not share a common ancestry with apes.

The Young Earth creationist belief perceives all scientific findings, which contradict these assertions—including evolutionary biology and modern geology—to be false science, since true science should confirm a literal biblical interpretation of the creation story. Young Earth creationism also views Old Earth creationism as an incorrect belief.

The majority of creationist lobbying since the 1960s has been done by Young Earth creationists. Two of the most active organizations supporting Young Earth creationism are Answers in Genesis (Pennock, 2003), led by Ken Ham and the Institute for Creation Research (McCalla, 2007; Scott & Branch, 2006), founded by Henry Morris and led by John Morris. The strength of their faction is evidenced in the number of organizations, Web sites, magazines, summer camps, and radio and television programs supporting them (McCalla, 2007).

Creation Science

Creation science is a manifestation of Young Earth creationism and the field of creationist inquiry, which was active from the 1960s to the 1980s (McCalla, 2007). It asserts that the Young Earth creationist account of the origins of life is more consistent with scientific facts than the evolutionary model of origins. Creation science presents evolutionary theory and the creation story as equivalent scientific models through which to perceive life and the universe but claim Young Earth creationism as the superior scientific model. They adhere to all beliefs held by Young Earth creationism. In addition, creation scientists argue that the evolutionary model is filled with inconsistencies and use four main claims to do so:

1. The second law of thermodynamics makes the theory of evolution impossible, since organisms cannot become increasingly complex.
2. Statistical probability suggests that the evolution of life by chance is astronomically unlikely.
3. Radiometric dating techniques giving an age of 13.5 to 14 billion years to the universe, around 4.5 billion years to Earth, and around 2.8 billion years to life are unreliable and no more than guesses.
4. Evolutionists commonly disagree amongst themselves, which shows that the field of evolutionary biology is not rooted in fact but belief.

Intelligent Design

Intelligent design is a field of creationist inquiry, which has been active since the 1980s. Intelligent design is creation science without the biblical foundation (McCalla, 2007). It asserts that life and the universe are better explained by an intelligent designer working in a directed fashion rather than by random processes, such as natural selection. Intelligent design is promoted as a scientific theory, not a religious belief system. This field of inquiry does not insist on a literal 6-day creation interpretation of *Genesis* but maintains the involvement of a supernatural being in all scientific events, particularly those that science cannot yet explain. In addition to the arguments against evolution put forward by creation science, some principal claims of intelligent design are as follows:

1. An intelligent designer exists who created life-forms.
2. This intelligent designer can be detected by looking for specified complexity in organisms.
3. Evolution cannot account for the great complexity of living cells. A cell's protein arrangements are so intricate and codependent that any change would render the entire mechanism useless. This necessitates entire complex mechanisms in living organisms originating at one time, which would not be possible without an intelligent designer to bring these into being. Biochemist Michael Behe originated this opinion (McCalla, 2007).
4. Certain mathematical theorems prove that evolutionary theory cannot account for the informational complexity of the DNA in living organisms. An intelligent designer must therefore have created DNA intact. Mathematician William Dembski originated this opinion (McCalla, 2007).
5. Evolutionists oppose intelligent design theory due to their own ideological biases, not based on valid scientific reason.

Non-Creationist Beliefs in the Evolution/Creation Debate

Theistic Evolution

Theistic or God-directed evolution is a commonly held Christian belief, which accepts all evidence related to evolution that is also accepted by the world's scientific community (Beverly, 2002). This belief is held by the Catholic Church, as well as most Protestant denominations. As well as supporting scientific findings, theistic evolutionists believe in the Judeo-Christian God as the sole creator of the universe and the initiator of the principles of nature such as scientific laws and evolution. In addition, they believe that humans are unique among all life-forms in having a spiritual nature, as well as a physical one, and are called to a special relationship with God. Theistic evolutionists are not creationists and generally oppose literal creationist beliefs and lobbying because they believe both

are incongruous with science and reason and therefore show Christianity in a negative light.

Evolutionary Naturalism

Evolutionary naturalism, a worldview present for hundreds of years, has become more prevalent since the publication of *On the Origin of Species* in 1859 (Van Till, 1998). Individuals with this perspective believe that nothing exists beyond the natural world and that there is no higher power. Seemingly inexplicable phenomena have a rational cause that will be discovered. In explaining a phenomenon, the principle of Occam's razor suggests that the explanation involving the fewest assumptions is the most likely one. Since there is a scientific explanation for every process and action in the universe, the existence of a higher power is an unnecessary assumption. Reason does not suggest that belief in a higher being is warranted.

Manifestations of the Evolution/Creation Debate in the United States

From 1859 and onward, a small group of conservative Protestants objected to evolutionary theory on the grounds that it contradicted a literal interpretation of scripture. They became known as fundamentalists based, in part, on their insistence on the literal, verbal inerrancy of scripture (McCalla, 2007). These fundamentalists viewed the creation story as both historic and scientific truth, with each "day" of creation lasting a literal 24 hours. By the 1920s, this group had banded together in a vocal minority within Protestant denominations in the United States, with some creating the World's Christian Fundamentals Association (WCFA) in 1918 to battle within the church against evolution and nonliteral theological interpretations.

Outside the church in the public education system, a text titled *Civic Biology* by George Hunter was widely used in science classes from 1914 to 1925. This text explained the theory of evolution, including human evolution. However, since the mid-1920s, there has been considerable legal controversy surrounding the teaching of evolution in public schools. Much of the evolution/creation controversy in the United States is centered around which origination "theories" are taught in the education system.

Legal Actions in the 1920s

In response to public demand by creationists, antievolution bills were introduced in Arkansas, Mississippi, and Tennessee in the 1920s. This bill was called the Butler Act in Tennessee (McCalla, 2007). Such bills were drafted and considered in at least 12 more states, including Louisiana. They made it illegal for human evolution to be taught in state-funded science classes at elementary and secondary schools and on university levels. It was not illegal to teach

evolutionary theory in general but only illegal to teach that part of evolutionary theory that suggested humans were descended from Primates.

The State of Tennessee v. John Thomas Scopes, Tennessee: 1925–1927

In 1925, the American Civil Liberties Union in conjunction with prosecutors from Dayton, Tennessee, wanted to test the constitutionality of Tennessee's new Butler Act (Larson, 1997). Local substitute high school teacher John Thomas Scopes agreed to act as defendant after teaching human evolution to a biology class. Scopes's supporters, with the exception of leading defense lawyer Clarence Darrow, were advocates of theistic evolution. The creationist prosecution, led by William Bryan, directed arguments not against unbelief but against other Christians who did not interpret the creation story literally. Despite favorable testimony from many distinguished scientists and widespread support from the public, Scopes was found guilty. The case was dismissed in 1927 on a technicality by the Tennessee Supreme court.

This trial and its appeal, despite being the most publicized evolution trial of the 20th century, did not accomplish the outcome that the American Civil Liberties Union had hoped for. Laws banning the teaching of human evolution in Tennessee, Mississippi, and Arkansas would remain the same for the next 40 years.

Evolution in the U.S. Education System: 1926–1960

The biologist Alfred Kinsey published the first U.S. high school science textbook in 1926, and this included clear and detailed sections on Charles Darwin and evolutionary theory. In the aftermath of the Scopes trial, subsequent editions of Kinsey's text reduced or eliminated these definitions, such that by the 1930s, this and other science texts used in U.S. schools presented little information on evolution (Bleckmann, 2006). Evolution was often not taught in school districts with a large proportion of creationists, although it continued to be taught in more liberal areas of the country. This persisted until the late 1950s, when Soviet scientific advances, such as the launch of *Sputnik I* in 1957, caused Americans to reexamine science education in the United States (Moore, 2001). New biological sciences curriculum textbooks were developed that outlined evolutionary theory explicitly. Use of this new textbook only prompted further resistance from creationists at the teaching of evolution (Moore, 2001).

The Advent of Young Earth Creationism and Creation Science: 1961–1968

In 1961, Young Earth creationism and creation science arose as the result of the publication of *The Genesis Flood*:

The Biblical Record and Its Scientific Implications by John Whitcomb and Henry Morris. This work was founded partly on the flood geology theories of Seventh Day Adventist George McCready Price, who argued that Earth is young and the flood was a worldwide event. This belief was called creation science in the hope that it would be accepted by the scientific community.

However, *The Genesis Flood* has been heavily criticized by scientists since publication (Moore, 2007). Since the early 1960s, scientists have perceived creation science as a misleading field of pseudo-science in which creationists disregard all research findings that contradict a Young Earth creationist belief. Many assertions made by creation science, including those regarding thermodynamics, radiometric dating, and statistical probability, have been exposed as either misinterpretations or unequivocal errors by scientists. Despite this widespread criticism from the scientific community, creation science gained a large public following.

Beginning in 1961 in California, Young Earth creationists, in conjunction with the Creation Research Society, took a new approach (Bleckmann, 2006). Instead of demanding that evolution be omitted from school curricula, creationists lobbied the state board of education to teach creation alongside evolution in science classes. They argued that equal time should be given to each origination model, that science texts be rewritten to include creationist "theories," and that a new textbook be adopted in California. Despite objections from their scientific advisors, California's state board of education implemented this change to the curriculum. Similar laws were proposed in 10 other states throughout the 1960s and passed in Louisiana and Arkansas while New Mexico passed a law requiring an evolutionary disclaimer sticker on textbooks. The most famous trial of this period was the Epperson trial in Arkansas.

Susan Epperson v. The State of Arkansas: 1968

At the urging of the Secretary of the Arkansas Education Association, high school biology teacher Susan Epperson challenged the Arkansas law making it illegal to teach human evolution in 1968. The U.S. Supreme Court overturned the law nationwide, ruling that the board of education must maintain religious neutrality and human evolution could be taught anywhere in the United States. This trial set an important precedent for future legal proceedings (Scott & Branch, 2006).

The Aftermath of the Epperson Trial: 1968–1981

Following the Epperson trial, creation science was the only creation model useful for further lobbying, since it was presented as a scientific model and not a religious belief. Many smaller lawsuits followed, which resulted in

further ground gained for the teaching of evolution in the United States (Moore & Miksch, 2003).

(Evolutionists have not lost any trials since the Scopes trial [Moore & Miksch, 2003], although they have lost ground through legislation.)

*William Willoughby v. H. Guyford Stever,
District of Columbia: 1972*

Creationist William Willoughby sued National Science Foundation director Guyford Stever in 1972 for using public funds to publish a textbook that included descriptions of evolution, which he deemed religious. This case ruled that the science textbooks were not religious material, and the textbooks were published. This verdict applied to the District of Columbia (Moore & Miksch, 2003).

*Wright v. Houston Independent
School District, Texas: 1973*

This case ruled in 1973 that teaching evolution is constitutional and does not promote a religious belief. This verdict applied to Louisiana, Mississippi, and Texas (Moore & Miksch, 2003).

Daniel v. Waters, Tennessee: 1975

This 1975 case overturned a Tennessee law requiring equal teaching time for creation and evolution in state public schools. The verdict (creation need not be taught alongside evolution) applied to Kentucky, Michigan, Ohio, and Tennessee (Moore & Miksch, 2003).

Hendren et al. v. Campbell et al., Indiana: 1977

This 1977 case ruled that the Creation Research Society's text *Biology: A Search for Order in Complexity* was religiously biased and therefore unconstitutional for use in public schools. The verdict applied to Marion County, Indiana (Moore & Miksch, 2003).

*Crowley v. Smithsonian Institute,
District of Columbia: 1980*

This 1980 case ruled that the government should give funds to promote evolutionary presentations in museum exhibits but should not give funds to promote creation science. The verdict applied to the District of Columbia (Moore & Miksch, 2003).

Kelly Seagraves v. The State of California: 1981

Creationist parent Kelly Seagraves charged the state of California in 1981 with violating her right to free exercise of religion due to the teaching of evolution to her children in public schools. The case was dismissed,

and evolution continued to be taught in California (http://ncse.com/webfm_send/60).

Creation Science Lobbying: 1981

Bills sponsored by creationist organizations, which demanded the balanced treatment of creation science and evolution in public schools, were passed in Louisiana and Arkansas in 1981. Equal amounts of classroom time were required for the presentation of each "theory." However, these bills were quickly challenged by scientists, human rights groups, and some members of the dissenting public. The challenge in Arkansas resulted in a well-publicized court case in 1981 (Nelkin, 1982).

Thus far, twenty years of litigation had provoked both camps, making the creation/evolution debate even more heated.

*William McLean v. The Arkansas
Board of Education: 1981–1982*

Judge William Overton ruled in 1982 that requirements to teach creation science alongside evolution advanced the claims of a particular religion. Creation science was declared a religious belief and could no longer be taught in science classes. This verdict applied to Arkansas alone but set a precedent for future trials (Moore & Miksch, 2003; Overton, 1982).

Edwards v. Aguillard, Louisiana: 1987

This 1987 case overturned laws nationwide requiring equal teaching time for creation science and evolution. Creation science was deemed a type of religion and could no longer be taught in public schools. Two federal Supreme Court judges dissented from this verdict, including Justice Scalia. Justice Scalia ruled that although creation science could not be taught in science classes in the United States, teaching the scientific evidence against evolution was admissible and could be considered a secular matter (Moore & Miksch, 2003; Pennock, 2003).

The Advent of Intelligent Design: 1987

Following the *Edwards v. Aguillard* trial, creationists changed their lobbying approaches, seizing on Justice Scalia's words and requesting the evidence against evolution rather than a literal 6-day creation be taught in science classes. The intelligent design (ID) movement emerged nationwide, continuing the creationist debate (Pennock, 2003). ID bypassed constitutional objections by eliminating all references to the Bible and the Judeo-Christian God from a creation science framework. ID creationism united Old Earth and Young Earth creationists, forcing them to suspend their differences in belief while opposing evolution as a unified force. Proponents have stated that through ID

they wish to reestablish Western culture's theistic basis and combat the materialist worldview promoted by evolution.

The ID movement was spearheaded by law professor Philip Johnson until the early 1990s, when members of Seattle's Center for Science and Culture at the Discovery Institute began acting as public spokespeople. Leaders are primarily politicians and philosophers such as Stephen Meyer, Bruce Chapman, and John West Jr., although some scientists, including biologists Dean Kenyon, Paul Chien, and Scott Minnich, molecular biologists Douglas Axe and Jonathan Wells, and biochemist Michael Behe are also involved.

The well-known ID textbook *Of Pandas and People* was written in 1989 by ID researchers Percival Davis and Dean Kenyon for use in public schools, and the influential *Icons of Evolution* by Jonathan Wells followed in 2000 (Pennock, 2003). Further textbooks and popular pseudo-scientific theological books advocating ID were published throughout the late 1980s to the early 2000s and widely read by creationists.

ID's influence has been far-reaching in the U.S. school system (Pennock, 2003). In 1999, the Kansas state board of education voted to de-emphasize evolutionary teaching in all public schools, including universities. Several other states, including Ohio, have incorporated critical analysis of evolutionary theory into the biology curriculum. A model lesson plan, eventually challenged and deemed inappropriate by the Ohio Board of Education in 2004, presented material from textbooks on ID.

ID has been subject to great criticism and thoroughly dismissed by scientists and most other scholars, who note that it is impossible to test using the methods of science and therefore cannot be science (Pennock, 2003). The scientific community has refuted all ID propagated criticisms of evolution, countering the claims of ID researchers.

The ID research program, although in existence for 20 years, has failed to produce a single peer-reviewed research publication in support of this theory. Mainstream scientists suggest that empirical evidence does not support a supernatural origin of life over a naturalistic one and that arguments against evolution are not proofs of ID. The legal battle in America has largely involved ID from 1987 onward (Pennock, 2003).

*Ray Webster v. New Lenox
School District, Illinois: 1990*

This 1990 case ruled that creationist teacher Ray Webster could not teach creation science to his classes. The verdict applied to Illinois, Indiana, and Wisconsin (Moore & Miksch, 2003).

Philip Bishop v. Aronov, Alabama: 1991

This 1991 case ruled that physiology professor Philip Bishop could not present ID material to his classes at the University of Alabama (Moore & Miksch, 2003).

*John Peloza v. Capistrano
Unified School District, California: 1994*

This 1994 case ruled that requirements to teach evolution did not violate a creationist teacher's right to free speech. The verdict applied to Alaska, Arizona, California, Hawai'i, Idaho, Montana, Nevada, Oregon, and Washington (Moore & Miksch, 2003).

This ruling encouraged ID advocates to present their arguments in a way that would avoid ID being regarded as a religious belief (DeWolf, Meyer, & DeForrest, 1999).

*Hellend v. South Bend
Community School Corporation: 1996*

This 1996 case ruled that schools must prevent teachers from teaching creationism in the classroom, since this is an expression of religion. The verdict applied to Illinois, Indiana, and Wisconsin (Moore & Miksch, 2003).

*Edwards v. California
University of Pennsylvania: 1998*

This 1998 case ruled that Professor Edwards could not present his religious beliefs in the classroom and was required to follow the curriculum decisions of the California University of Pennsylvania (<http://openjurist.org/156/f3d/488/edwards-v-california-university-of-pennsylvania>).

ID, The Wedge Document: 1998

In light of their lack of legal success, spokespeople for the ID movement announced in 1998 that their approach to realizing the goals of their organization would be termed the "wedge strategy" (Pennock, 2003). They released a document that, in addition to affirming their movement's fundamental ideological commitments, outlined their plan for the implementation of these in wider culture. This strategy can be summarized as follows:

- *Phase 1:* Scientific research, writing, and publication
- *Phase 2:* Publicity and opinion making
- *Phase 3:* Cultural confrontation and renewal

Although no refereed research publications have been produced, observers note that the ID movement has proceeded to phases 2 and 3. The lack of scientific support for ID has not prevented the gain of public success for the movement. ID has been widely publicized through popular books, debates, seminars, conferences, editorials, and favorable reports by conservative papers, such as the *Weekly Standard* and the *Washington Times*. As a result of the wedge strategy, ID is perceived by many Americans as a viable alternative to evolutionary

theory that should, in fairness, also be taught in public schools. A March 2007 poll found that 48% of the U.S. public agreed that “God created humans pretty much in the present form at one time within the last 10,000 years or so” (Kahle, 2008, p. 72), while a May 2007 poll found 60% of the respondents believed in a literal 6-day creation. In contrast, 95% of U.S. scientists polled in 1996 accepted human evolution (Bleckmann, 2006). Despite this strong scientific consensus, numerous members of the public have been influenced by ID marketing campaigns.

The notion behind the wedge strategy is to establish a minimal legal position, which can then be expanded through further court cases thus creating a wider wedge from a narrow crack. Some later court cases advanced the aims of ID, while most refuted it.

*Freiler v. Tangipahoa Parish
Board of Education, Louisiana: 1999*

This 1999 case ruled that when presenting evolution, teachers should not read a disclaimer saying that the school board did not specifically endorse evolution or oppose ID or biblical creation. The verdict applied to Louisiana, Mississippi, and Texas (Moore & Miksch, 2003).

*Rodney LeVake v. Independent
School District 656, Minnesota: 2000*

This 2000 case ruled that creationist teacher Rodney LeVake could not present the evidence against evolution to classes against his school board’s instructions. The verdict applied to Minnesota (Moore & Miksch, 2003).

Moeller v. Schrenko, Georgia: 2001

This 2001 case ruled that creationism is not science, and it is appropriate for public schools to use a biology textbook that states this. This verdict applied to Georgia (Moore & Miksch, 2003).

*Selman v. Cobb County
School District, Georgia: 2005*

This 2005 case ruled that stickers informing students that evolution is only a theory, not a fact, should be removed from all biology textbooks. The verdict applied to Cobb County School District, Georgia (<http://www.talkorigins.org/faqs/cobb/citizensforscience.html>).

*Tammy Kitzmiller v. Dover
Area School District, Pennsylvania: 2005*

This 2005 case ruled that ID should be removed from public school science curricula. The verdict applied to the Dover Area School District, Pennsylvania (McCalla, 2007).

The Continuing ID Controversy

The trials mentioned here are only a few of many trials on the evolution/creation controversy, the majority of which go unreported by the media. The National Center for Science Education reports that in a recent 2-year period, there were 143 different trials from 34 different states (Pennock, 2003).

In many of these recent court cases, ID advocates have used a number of arguments to implement the wedge strategy in public life (Pennock, 2003). They argue that students should be taught the controversy about evolution and presented with evidence against evolutionary theory to develop critical thinking. However, scientists feel that this would be an inaccurate presentation of current scholarship to students (Beverly, 2002). Accepted scientific theories, such as the theory of gravity, do not typically have evidence presented against them in classrooms. In addition evolution is not controversial within the scientific community; it is only politically and religiously controversial. Either ID-advocated inclusion would have implications for students about the validity of evolution. Despite continuous criticism from the scientific community and numerous legal verdicts against ID, the ID movement continues to be active and well supported by creationists to the present day.

Why Does the Evolution/Creation Controversy Continue?

A number of factors perpetuate the evolution/creation controversy in the United States. Some researchers suggest that although hierarchies based on power, money, and celebrity are supported in U.S. society, intellectual hierarchies based on specialist knowledge are not readily accepted (Pigliucci, 2003). In contrast with places such as Europe, the U.S. education system is, to some extent, seen as a democratic process in which different opinions should be taught for the sake of variety (Pigliucci, 2003). Scholars note that this mind-set has had disastrous consequences for science teaching. The best-accepted scientific theories about life have, for generations, not been presented clearly to students, and as a result, a number of common misconceptions persist about the theory of evolution (Pigliucci, 2003). These perpetuate the evolution/creation controversy.

Misconception #1: Argument That “Evolution Is Only a Theory”

One common misunderstanding is that the use of the term *evolution* as a theory means that it is no more than a guess or wild speculation. In science, a theory is a complex and well-conceived working hypothesis for how a given system functions. Many theories are accepted as well-established scientific principles. Science constructs working hypotheses

to ask and answer queries on a subject, which are tested in specifically designed experiments to yield clear results. These experiments and their results can be repeated and verified by other scientists. Evidence for or against a hypothesis is thus gathered through measurement, calculation, deduction, observation, and experimentation. This evidence can be presented to an international scientific community and can be assessed by all, and when a new discovery is made, theoretical explanations change. Scientific theory can thus be seen as the best explanation at a given time in history to account for the evidence available.

Misconception #2: Science “Contradicts” Religion

While science is based on testable, replicable methods, religion is a belief system through which the world is perceived, which comes from a different source of human experience. Many scholars note that science, in itself, does not support or refute religion. Rather, it is the worldview of the individual interpreting the science (Pennock, 2003; Van Till, 1998) that can make science seem for or against a particular religious belief. A scientist who does not believe in a higher power may reduce reality to the material, sensory world and may feel that understanding the mechanisms by which something works eliminates the need for any other types of explanations. In contrast, a scientist with theistic belief may see each new discovery as a testament to a higher being, with the mechanisms of this discovery revealing information about the way this power has worked in the universe. In this way, science and religion are capable of adding meaning to one another. A poll in the 1990s by the University of Georgia revealed that 40% of working physicists and biologists in the United States claim to have strong spiritual beliefs. This suggests that faith and science are, for many experts, not mutually exclusive.

Although religion and science are not intrinsically incompatible, this is one of the common misconceptions perpetuated by the evolution/creation controversy. Many scholars note that the notion that one must choose between believing in science or religion, evolution or creation, is false and even contradicts Darwin's own writings (Bleckmann, 2006; Pennock, 2003; Szebenyi, 2005; Van Till, 1998).

Misconception #3: Creationism Is as Scientifically Valid as Evolution

Although versions of creationism such as ID are still taught in U.S. schools, this does not mean they are valid scientific alternatives on par with evolutionary theory. There are many areas of active research in evolutionary biology and many disagreements among scientists on the specifics of the evolutionary mechanism; however, evolution has remained unchallenged in its main particulars for well over a century. There is no ongoing scientific debate about the

validity of evolutionary theory. Rather, the scientific community and numerous court hearings worldwide have declared that the theory of evolution is scientifically sound, while creationism is not.

Misconception #4: Scientists Think Evolutionary Theory Explains How Life Originated

A further misconception about evolution is that evolutionary theory has shown how life on Earth originated. Scholars note that this misconception inflames many creationists, who may otherwise be more open to evolutionary ideas. Although biological evolution is supported by the results of thousands of experiments, life's origins have not yet been determined. Darwin suggested in 1871 that life may have originated in some ancient pond, and biochemist Stanley Miller conducted famous “primordial soup” experiments in the 1950s. Miller found that in specific environmental conditions meant to mimic Earth's atmosphere billions of years ago, amino acids could be produced using a mixture of chemicals and adding electricity. Since proteins found in living organisms are made from amino acids, they were seen as a precursor to life. However, more recent researchers think that Earth's early atmosphere was unlike that simulated by Miller. New theories suggest that life may have originated on solid substrates and not in an aqueous environment at all. How life originated is currently an open area of scientific investigation.

The American public continues to see creationists pitted against modern evolutionary theory.

Manifestations of the Evolution/Creation Controversy in Other Countries Worldwide

Although the evolution/creation debate has had the most far-reaching influence in the United States, many other countries have been influenced by creationist teachings, and some smaller movements have emerged worldwide.

Australia

Australia has a growing fundamentalist Christian and creationist population. In 1980, the Queensland state government allowed creation science to be taught in schools. Since this time, the teaching of creationism alongside evolution has been a widespread problem in Australian schools, and some lawsuits have resulted (Beverley, 2002).

Europe

In Europe, there have been a few unsuccessful efforts by creationists to have forms of creationism, such as ID, taught in various European schools. Presentation of any form of creationism in schools was strongly opposed in 2007 by the

European council, who deem it a type of religion and not science (Feedback, November 2007).

Middle Eastern Countries

In some Islamic Middle Eastern countries, such as Saudi Arabia and Sudan, it is illegal to teach evolution in schools. Other countries such as Turkey and Egypt have much public support for creation science (Pitock, 2007).

Future Directions: Ways to Alleviate the Controversy

Experts suggest that the primary way to lessen the evolution/creation controversy worldwide is through improved science education (Beverley, 2002; Moore, 2007; Pennock, 2003).

Teach Evolution Clearly

The theory of evolution is considered the most plausible explanation for the diversification of life presently known to science; therefore, it has been suggested that evolutionary theory alone be taught in classrooms. It has also been suggested that teachers not present the controversy surrounding evolution or the evidence against evolution because these approaches mislead students about evolution's validity. Activities to educate students about the nature of science and to develop their scientific inquiry skills could be presented instead (Beverley, 2002; Moore, 2007; Pennock, 2003; Pigliucci, 2003; Moore, 2007).

Do Not Mix Science and Religion in the Classroom

Experts also suggest that science be taught in a religiously neutral way to avoid either misrepresenting the facts of science or offending individuals who are religious believers. Teachers might consider avoiding reference to their personal beliefs while in the classroom, since this may bias students and perpetuate the controversy (Beverley, 2002; Moore, 2007; Pennock, 2003).

Improve Teacher Education

Teacher training and continuing education could include training on how to teach evolutionary theory.

Scientists suggest that through these types of improved science education, the evolution/creation controversy can be alleviated (Moore, 2007; Pennock, 2003).

Conclusion

Despite the acceptance of evolutionary theory by the worldwide scientific community, the topic continues to be

controversial. Murray and Buffaloe noted that "the vast mainstream of theistic interpretation has long ago assimilated the concept of evolution into its faith perspective, along with modern astronomy, the atomic theory, and other scientific findings" (1983, p. 464). However, creationists from fundamentalist groups worldwide assert that no compromise is possible between evolution and religious faith. This extreme stance has also led some scientists to believe that evolution and spiritual belief are incompatible. The evolution/creation controversy has endured since 1859 and shows no sign of abating in the near future. Experts predict that this acrimonious debate will persist for some time to come.

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PART X

PRIMATE RESEARCH

PRIMATE TAXONOMY

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Primate taxonomy contributes to the science of anthropology by providing an evolutionary framework for the biological and cultural origins of human behavior. But taxonomy involves methods and principles that are not always readily accessible to the anthropologist who may depend upon the results of taxonomic research to interpret the evolution of human behavior. This juxtaposition of disciplines is particularly challenging for the anthropologist when taxonomic research either fails to provide a resolved classification for humans or other primate groups, or it requires the reevaluation and even falsification of long established units of classification. These taxonomic challenges are relevant to anthropological interpretation because the units of taxonomic classification are arranged to reflect hypotheses about evolutionary relationships. With these practical and conceptual challenges in mind, this review will examine the principal developments and issues of contention, as well as the main outlines of primate taxonomy at the beginning of the 21st century.

Taxonomy

The modern system of classification (the rules for naming and arranging taxa) is derived from the binomial system of Linnaeus who provided a genus and species epithet unique to each species and placed them within a hierarchal arrangement of successfully inclusive groups.

These units were proposed at a time when the similarities and differences among groups were seen to be the result of common design rather than shared descent. Following the publication of *On the Origin of Species* (Darwin, 1859), the widespread acceptance of evolution represented a major theoretical development where taxonomic units could now be seen to represent organisms sharing descent from a common ancestor. In practice, the process of classification was not radically altered as many approaches to recognizing groups or organisms were intuitive. Taxonomists often produced classifications based on characteristics that were thought to be particularly important for the evolution of a group or represented an amalgam of various characteristics to give some level of apparent coherence or stability in classification. Classifications also often emphasized overall similarity so that groups such as the reptiles and the great apes were each grouped together because they appeared to be more similar to each other than to other groups of species. As research into the theory and method of classification developed during the 20th century, there was an increasing awareness that similarity alone could not be assumed to indicate a close evolutionary relationship. The evolutionary challenge for taxonomists was to identify those similarities that provided evidence of common descent rather than those that may have evolved in different lineages or those that are misleading because they represent primitive retentions that have been lost in some

members of the group, so the remaining species are grouped together because they share ancestral characters.

Taxonomy and Systematics

A direct correspondence between evolutionary relationship and taxonomic classification was made possible through the development of *cladistic* methodology. The first detailed outlines of this method were made by Daniele Rosa (1918), but it did not become popular until after the English translation of Hennig's *Phylogenetic Systematics* (1966). Following a decade of sometimes contentious debate in the 1970s and early 1980s, cladistics became the standard methodology for reconstructing evolutionary relationships and identifying natural, or *monophyletic*, groups that include all descendants of a hypothesized common ancestor. Monophyletic groups are recognized by the shared presence of one or more unique features that are assumed to have been present in the common ancestor and therefore retained in all the descendants. As speciation occurs, each individual descendant may evolve further unique features that are in turn inherited by their descendants. This process results in a hierarchy of groups that are each characterized by uniquely shared features, or *synapomorphies*. Synapomorphies for a particular group represent ancestral features for member taxa. For example, the presence of at least one flat nail on the foot represents a primate synapomorphy, but within the primates, the presence of a flat nail on any individual primate species provides no information on their evolutionary relationships with other primate species. Similarly, the presence of body hair exemplifies modern mammals as a natural group but is uninformative about the evolutionary relationships of particular mammal groups or species with each other.

Perhaps the most fundamental consequence of cladistic reasoning for primate taxonomy was the requirement that all natural groups be monophyletic. The criterion for monophyly required that all members had to be not only descended from a unique common ancestor but also that *all* descendants were included in the group. In some non-cladistic classifications, there was an emphasis on separating out groups based on their sharing primitive features. This resulted in artificial, or *paraphyletic*, groups that failed to represent the actual pattern of evolutionary descent by leaving out taxa that had lost the primitive features due to the evolution of more derived features. Only by grouping organisms together according to their shared derived features is it possible to eliminate paraphyly. A classic example is the family Pongidae, which was originally designated to encompass all the great apes. But this group is paraphyletic because at least one great ape species is more closely related to humans than other great apes (see below under monophyly of hominoids).

Cladistic classification is always comparative. It is not sufficient, for example, to note that within the primates,

monkeys share with hominoids (apes and humans) the presence of a fused jaw. This comparison only indicates that they are similar to each other in this respect. What is necessary for understanding this similarity as evidence for an evolutionary relationship is that these two groups are more similar in sharing the presence of a fused jaw than a third group, such as the prosimians (that do not have a fused jaw). To have some confidence that the unique similarity of the monkey and hominid jaws is inherited from a unique common ancestor not shared with prosimians (these three taxa together representing the in-group), it is necessary to demonstrate that the feature is absent from a fourth, external out-group. Theoretically, all other life-forms comprise the out-group, but in practice, the out-group is more circumscribed. For example, comparison of Primates with an out-group comprising other mammal orders shows the presence of a fused jawbone to be relatively rare outside the Primates, being found in a few groups such as wombats, mystacinid bats, and pigs. This occasional occurrence in the out-group suggests that within Primates the fused jaw bone represents a separate development supporting the hypothesis that the fused jaw shared by monkeys and hominoids is the result of their being more closely related to each other than prosimians and that together (as anthropoids) they represent a natural phylogenetic group.

If the distribution of synapomorphies was consistent, then there would be only one hierarchical set of characters and only one classification. In practice, the distribution of unique features may indicate more than one possible set of evolutionary relationships and arrangement of taxa. Species A may share one or more unique characters with Species B but also share one or more unique characters with Species C. In this situation, systematists will choose the larger set of characters as being more likely to represent the correct evolutionary relationship because it minimizes the number of times it is necessary to explain the independent origin of false similarities originating in lineages that have already separated. There are also problems created by the loss of features—the Madagascan primate *Daubentonia* lacks a toothcomb, a feature that otherwise defines all prosimians, for example. If other features are consistent with *Daubentonia* being a prosimian, then this anomaly is viewed as the loss of a toothcomb rather than its never having been present (which would require that *Daubentonia* not be a prosimian as currently defined).

When a small number of taxa and characters are being analyzed, it may be a relatively simple procedure to sort out the best supported set of relationships. With larger numbers of taxa and characters supporting different relationships, the sorting procedure becomes much more complicated and requires computer algorithms to sort through the different possibilities. Even then, it may not be possible to find a consistent answer, especially where the numbers of characters supporting different evolutionary relationships are identical or nearly so. One confounding problem in primate

taxonomy is that some classifications that are characterized as being cladistic include analysis of features where some or all of the conditions of the in-group are also present in the out-group. This practice is not cladistic and may result in erroneous evolutionary relationships.

It is the nature of systematics that after years of comparative study, it may still be impossible to resolve the evolutionary relationships and classification of one or more taxa, and it is never possible to predict whether further study may not result in the discovery of other derived features that support an alternative to the accepted theory of relationship. It may not be possible for any one technique or only one aspect of an organism's biology to consistently and accurately reflect evolutionary relationships. It is probably a truism that organisms will always show features that could support more than one theory of relationship. In this respect, some taxonomic categories may always be ambiguous.

Molecular Taxonomy

The application of *molecular techniques* to primate classification is widely characterized as a powerful tool for resolving the classification of primates, particularly where morphology has previously given uncertain or ambiguous results. Molecular evidence is also widely seen to represent a better alternative to morphology because molecular techniques allow rapid comparison of many taxa without being confronted with the necessity of engaging in extensive and prolonged comparative analysis of individual characters to identify homologies as is the case for morphology. Instead, there is the apparent simplicity of analyzing the presence or absence of just four base pairs that may replace each other in different species. In the absence of each character being individually justified, the molecular technique is widely seen to be reliable because thousands of bases can be compared with the intuitive assumption that the sampling of large numbers increases the likelihood of finding a correct relationship.

The evolutionary problem for primate taxonomy represented by morphological and molecular techniques is that they do not always produce the same result. A widely accepted principle of molecular systematics is that strongly supported molecular similarities are correct even when they conflict with morphologically based classifications—although this determination is not always consistently applied—sometimes, molecular results are rejected when they conflict with strongly accepted morphologically based classifications. Molecular similarity was originally validated as evidence for evolutionary relationships by its general correspondence with well-established morphologically based classifications. Morphological evidence was later treated as suspect and usually rejected when not supported by molecular similarity. Currently unresolved

incongruities between molecular and morphological evidence include the monophyly of Madagascan lemurs, the relationships of tarsier and other primates, and the monophyly of great apes.

Although widely seen as a panacea for systematics and classification, molecular systematics lacks a comprehensive theory of homology (a principal of similarity that identifies a unique common ancestry). Evidence for molecular homology is limited to a set of four nucleotides and their relative position (sequence order). As in morphological data, shared similarity in DNA sequences can be due to primitive retention, reversal, or nonhomology (e.g., convergent). DNA sequences are further inherently ambiguous because substitutions leave no evidence of former replacement that would indicate whether matching base pairs represent primitive retention, convergence, or unique derivation. To match homologous base pairs shared between different primate species it is necessary to artificially make the genes the same length by creating changes to the relative positions by creating gaps between bases as inferring associated base substitutions. This alignment procedure requires mathematical models that generate a compromise fit to minimize gaps and substitutions. The resulting homology of each base is the product of the overall similarity created by the algorithms. In this procedure, there is no empirical evidence for the homology of individual bases and no way to know what bases represent primitive retentions or uniquely shared novelties, the latter being essential for cladistic analysis. Other potential problems include inadequate out-group sampling (often just a few species) in characters in the out-group being overlooked, the continued use of noncladistic techniques, such as distance measures that only measure overall similarity, and other methods such as maximum likelihood, which are based on theoretical models of what the correct phylogeny should be.

Taxonomic Categories

Taxonomic classification represents a list of named groups arranged in a hierarchical series of subordinating units based on the species, genus, family, order, and class categories along with various other intermediate or higher ranks. As monophyletic groups, these taxonomic labels may represent a natural classification for evolutionary relationships, but the number of groups, their scope, and their rank are entirely arbitrary. There is no necessary corresponding taxonomic significance for the same rank (e.g., family) compared between different lineages. For example, the family Hominidae may include only 1 (humans) or 6 species (humans and great apes) depending on how broadly the category may be applied. Similarly, the Hylobatidae (lesser apes) encompass a single genus and about 11 species. In contrast, the family Cercopithecidae (Old World monkeys) comprises at least 22 genera and

80 species. In some cases, restricted higher-level taxonomic categories are used to emphasize how particular primates are seen to be more different or more evolutionary significant than others. This has occurred with the use of Hominidae as a restricted family rank. Focusing on taxonomic ranks rather than evolutionary relationships can impede rather than advance the understanding of primate taxonomy.

The smallest evolutionary units of taxonomy represent a major area of research in primate taxonomy. Over the last century, there has been a continual expansion of the number of species with a concurrent debate over whether various subspecies represent geographic variants or distinct species in their own right. Naturally, the search for an objective and universal definition of a species has been a constant concern, not only for primate biologists but also for taxonomy in general. One criterion has been the absence of interbreeding, but this becomes problematic for taxa that are geographically isolated and do not interbreed simply as a geographic constraint. Some systematists favor the identification of the smallest cluster of monophyletic organisms that can be separated by a unique combination of character states. This approach has been extended to the use of DNA sequences such that any unique DNA sequence shared by some individual organisms may constitute a distinct species. In practice, primate species are identified with respect to particular places and times, and their resulting taxonomic status may or may not be controversial.

Defining Primates

Primate Characters

The modern concept of Primates has its origins with Karl Linnaeus's 1735 work *Systema Naturae*, where he proposed the group Anthropomorpha to include monkeys (*Simia*), sloths (*Bradypus*), and humans (*Homo*) based on their sharing the presence of a single pair of pectoral mammary glands. This classification was historically important for including humans within the taxonomy of other organisms for the first time. The name of the order was then changed to Primates in 1758 when Linnaeus also excluded sloths while also adding lemurs, bats (later removed by Johann Friedrich Blumenbach), and apes (the latter under *Simia*). A more extensive set of similarities was also identified to include the presence of four upper and four lower incisor teeth, parallel-sided lower anterior teeth, a pair of projecting canineline teeth in the upper and lower jaws, limbs terminating in hands or structures that functioned like hands, arms that were separated by clavicles, locomotion mostly on all four limbs, tree climbing, and fruit consumption. This new definition accommodated lemurs while excluding sloths, and it applied to bats if they were broadly viewed as having grasping feet.

Subsequent classifications frequently separated humans by placing them in their own group such as Bimanes, or Bimana, while the remaining four-handed primates were classified as Quadrumanes, or Quadrumana. Many early taxonomists regarded the possession of two hands in humans as sufficient justification to separate them from the rest of the animal kingdom. In 1811, Karl Illiger separated *Homo* from all other animals by their erect posture, and he also applied the term Prosimii for lemurs and lorises while *Tarsius* was placed in the Macrotarsi to emphasize their development of highly elongated tarsal bones. Separation of humans from other animals largely persisted until 1883 when William Henry Flower included the genus *Homo* in a classification that persisted into the 20th century. He also divided the primates into the suborders Lemuroidea (lemurs, lorises, tarsiers) and Anthropoidea (monkeys, apes, humans). The Lemuroidea was further subdivided into the families Lemuridae (lemurs, lorises, bush babies), Tarsiidae (tarsiers), and Chiromyidae (aye-aye). These primates came to be known as the "lower" or most primitive primates with lemurs being the most primitive of all. Tarsiers were initially grouped with galagos before being separated into their own group (Macrotarsi), leaving galagos, lemurs, and lorises in the Prosimii. As a separate family, tarsiers were then again grouped with lemurs, lorises, bush babies (Lemuridae), and the aye-aye (Chiromyidae) in the suborder Lemuroidea until this name was replaced by the Prosimii. Tarsiers were then separated from the prosimians by Pocock in 1918, who grouped them with anthropoids in a new suborder called Haplorrhini where the tarsiers were labeled the Tarsoidea and the anthropoids in the Pithecoidea (now Anthropoidea). The remaining prosimians were renamed the suborder Strepsirrhini. The haplorrhine classification was largely overlooked until the 1970s and 1980s when various features were widely seen to indicate a closer relationship between tarsiers and anthropoids than prosimians. Further support for the Haplorrhini was also found in various molecular comparisons of DNA although other studies continued to support the inclusion of tarsiers within the Prosimii.

Flower grouped the New and Old World monkeys, and hominoids (apes and humans) together under the Anthropoidea. The New World monkeys were further divided into the families Hapalidae (marmosets), and Cebidae (larger prehensile-tailed monkeys). The Old World monkeys were placed in the family Cercopithecidae comprising with two subfamilies, Cercopithecinae and Colobinae. Apes were initially assigned to the family Simiidae while humans were represented by the family Hominidae. The emphasis on distinguishing primitive taxa reflected a widely held notion that it was possible to line up lower primates in a sequence of increasing complexity leading to "higher" primates from prosimians to anthropoids.

The definition of primates also continued to evolve. In an effort to further clarify the primates definition, St. George Mirvart proposed a broad set of features in 1873: presence of nailed digits, clavicles, orbits encircled by bone, three types of teeth during the life of an individual, a brain with a posterior lobe and calcarine fissure, innermost digits opposable for at least one pair of limbs, a thumb with or without a flat nail, a well-developed cecum, and pendulous penis, scrotal testes, and two pectoral mammary glands. The possession of a thumblike digit to one part of limbs accommodated the inclusion of humans. These characters are all taxonomically problematic because they are not specific to primates and therefore not cladistically informative for understanding the monophyly of primates. The three teeth types also occur in some marsupials and placentals, such as pigs and bears. Most mammals also have a well-developed cecum and scrotal testes also occur in carnivores such as cats. Two pectoral mammary glands are present in sloths, bats, and flying lemurs, and a posterior cerebral lobe with calcarine fissure also occurs in tree shrews. The clavicle is found in other mammals and even reptiles. Possession of an opposable thumb or big toe is not restricted to primates, but it is rare in other mammals. Of these features, only the development of at least a flattened nail on the big toe is distinctive for extant primates.

Primates are often characterized as having thumbs and big toes that are divergent, flattened nails at least on the big toe and a postorbital bar behind the eye. These features are individually present (although rare) in some other extant mammals, but only primates have all. But all living primates (tarsiers, lemurs, anthropoids) share at least six unique characteristics of the cheek (molar) teeth: (1) low rounded cusps (bunodont) with the sides of the upper molars being filled out rather than concave, (2) anterior outer cusp (paraconid) of the first lower molar positioned more toward the cheek (buccal) than the anterior of the tooth, (3) upper molars with a shallow angle (entoflexus) between the protocone and metacone, (4) trigonid (anterior half of the lower molar) not much taller than the (posterior) talonid, (5) talonid at least as long and broad as the trigonid, and (6) an oblique crest between the hypoconid and metaconid (cristid obliqua). Since these are all hard tissue features, and teeth are often the only fossil remains of extinct primates, they can be used to determine whether various fossils fall within Primates as characterized by its living members.

Recognizing Fossil Primates

The primate fossil record often presents a taxonomic challenge because in the absence of soft tissue features, all taxonomic assignments must rely on the evidence of hard tissue features. The scope of evidence is further reduced

for many fossil taxa where skeletal material is incomplete and in some cases limited to a few bones or teeth. Some fossil taxa may remain chronically indeterminate until sufficiently complete samples are found. Integration of fossils within the taxonomy of living primates requires recognition of the same diagnostic features, but this is often lacking or is poorly documented for fossils, particularly those that are represented by only a few dental or other fragments. A recent example is the *Anthrasimias gujaratensis*, represented by three molars and one deciduous premolar. It was characterized as the earliest Asian fossil anthropoid recorded to date even though there were no diagnostic characters identified as being anthropoid or even primate. Efforts to classify fossils in relation to living taxa using parsimony or other computational methods may also be confounded by a prevalence of missing character states that contribute to poorly resolved phylogenies, even though the evolutionary relationships and taxonomic groupings may be unproblematic for the living taxa. Many fossil taxa remain, at this time, subject to future evaluation and the likelihood that the monophyly of some groups will be rejected and new taxonomic categories will be recognized. With this contingency in mind, the taxonomic arrangement of all fossil primate taxa must be regarded as subject to future revision.

A major question in primate classification has been the identification of its most primitive representatives in the fossil record that may not exhibit all features present in extant primates. This has been the situation for Plesiadapiformes, a group of fossils from the Paleocene, Eocene, and Oligocene of North America and Europe mostly represented by fragmentary jaws with teeth or isolated teeth. They conform to primates in their dental characteristics, but some skulls (such as for *Plesiadapis*) lack a postorbital bar. The typical primate's grasping hands and feet and flattened nails are also missing in *Plesiadapis*, but *Carpolestes* had a grasping foot with flattened nail as well as a grasping hand. This range of variation suggests that the defining features for all modern primates may have emerged at different times with mammals first evolving into primates in their dental characteristics and later in their skull, hands, and feet. This pattern of similarity may be interpreted taxonomically in two different ways. Either the definition of primates is limited to dental features in which case Plesiadapiformes are included within the primates, or the definition of primates is limited to the inclusion of all features found in modern primates in which case Plesiadapiformes may be considered an extinct primate relative but not a member of Primates as defined by the living taxa. Either way, the Plesiadapiformes represent the closest fossil primate relative, but this relationship may be represented by two different taxonomic arrangements according to whether the order Primates is defined to include or exclude the Plesiadapiformes (after Schwartz, 1986):

(a) *Inclusion within Primates***Order Primates**Suborder Plesiadapiformes
Suborders of living primates(b) *Exclusion from Primates***Order Plesiadapiformes**Order Primates
Suborders of living primates

The taxonomic status of other proposed primate fossils are more problematic. *Eosimias* and *Bahinia* have been identified as anthropoids even though they apparently lack dental features characteristic of living primates. Other fossils such as *Wailkia* and *Siamopithecus* are dentally primate, but their relationships within Primates are problematic because of inconsistencies between apparent similarities that would relate them either to anthropoids or prosimians.

Primate Classification

The living primates are represented by about 355 proposed or recognized species. The taxonomic composition of primates will continually be modified according to new interpretations of evidence about relationships, as well as new discoveries that alter the taxonomic position of known species or add new species and even genera. An increasing number of primatologists working in primate classification have rapidly increased the number of recognized species, although some may be poorly supported and possibly erroneous. There may also be differences over whether individual primate groups are recognized as species or subspecies, so the total number of primates will likely vary over time as well as between different classifications.

Primate classifications of living primates are represented by two alternative subordinal arrangements. The oldest classification divides Primates into the suborders Prosimii (lemurs, lorises, tarsiers) and Anthropoidea (monkeys, apes, humans). Prosimians were originally viewed as an assemblage of primitive primates in contrast to the more “advanced” simians (monkeys, apes, and humans). In this context, prosimians were a group by default—what was left over after exclusion from the anthropoids. Over the latter half of the 20th century, increasing interest has focused on an alternative division of the Primates into the suborders Strepsirrhini (prosimians without tarsiers) and Haplorrhini (tarsiers along with monkeys, apes, humans). Strepsirrhini refers to the presence of a nostril with a lateral slit or crease (*strepsis* means “twisting,” referring to the upward twist at the back end of the nostril slit), a primitive condition found in most mammals. Haplorrhini refers to a simple or unadorned (*haplos*) condition, although tarsiers and various New World monkeys are morphologically strepsirrhine in having laterally creased nostrils. The contrasting theories of relationship generate two possible classifications depending on whether tarsiers are more closely related to lemurs and lorises (Prosimii) or to the anthropoids (Haplorrhini). Table 61.1 illustrates alternatives with respect to the living Tarsiiformes represented by the single genus *Tarsier* with about seven species and Lorisiformes represented by the families Lorisidae (lorises of Africa, India, and Southeast Asia) and Galagonidae (galagos and bush babies of Africa). A third infraorder, Chiromyiformes, has also been proposed for the Strepsirrhini to represent the monotypic aye-aye, *Daubentonia madagascarensis*, which is otherwise usually placed within the Lemuriformes. The three main alternative classifications are illustrated below with example sources.

Table 61.1 Higher Classifications of the Primates

Suborder Prosimii (Martin, 1990)	Suborder Strepsirrhini (Shoshani et al., 1996)	Suborder Strepsirrhini (Groves, 2001)
Infraorder Tarsiiformes	Infraorder Lemuriformes	Infraorder Lemuriformes
Infraorder Lemuriformes	Infraorder Lorisiformes	Infraorder Lorisiformes
Infraorder Lorisiformes		Infraorder Chiromyiformes
Suborder Anthropoidea	Suborder Haplorrhini	Suborder Haplorrhini
	Semisuborder Tarsiiformes	Infraorder Tarsiiformes
	Semisuborder Anthropoidea	Infraorder Anthropoidea

SOURCES: Groves (2001); Martin (1990); Shoshani et al. (1996).

NOTE: Martin (1990) proposing two suborders with tarsiers grouped with lemurs and lorises; Shoshani, Groves, Simons, and Gunnell (1996) also proposing two suborders but with tarsiers grouped with anthropoids; and Groves (2001) with the same subordinal arrangement but separating the aye-aye (*Dubentoniidae*) of Madagascar as a distinct infraorder (*Chiromyiformes*).

Tarsier Relationships

Tarsiers are unique among primates in having scales around the nipples and under the tail, a tail that is longer than the body, a head that can turn 180 degrees in either direction, and a bulging, immobile eye larger than the brain. They also have sinus hairs outside the nasal cavity, hairs on upper and lower lips, the longest tarsal bones, and three fully developed cusps on the anterior part of each lower molar and pointed cusps on all teeth anterior to molars, and tarsiers are the only specialist primate carnivore. A principal question in prosimian classification concerns the relative position of *Tarsius*, a primate genus that has been controversial from the beginning of modern primate classification when it was at first not even recognized as a primate (Linnaeus later classified it as the primate *Simia syrichta* in 1758).

The distinctiveness of tarsiers has often represented a taxonomic distraction with the differences emphasized by its frequent allocation to a group of high taxonomic rank and uncertainty about its evolutionary relationships with other primates. Tarsiers have been closely identified with both prosimians and anthropoids. Their inclusion within prosimians was emphasized in earlier classifications, but current morphological evidence is limited to relatively few—but potentially significant—uniquely shared features. Tarsiers along with other prosimians have a clawlike nail (called a grooming claw in Lemuriformes and Lorisiformes) on the second toe of the foot (tarsiers are unique in also having a claw on the third toe). Tarsiers are unlike other prosimians in lacking a set of slender, elongate incisors (four or two) and canines that are either horizontal or upwardly tilted. Collectively, these teeth are characterized as a “toothcomb” used in grooming and sometimes feeding. Tarsiers have only two small, vertical anterior teeth, and in this respect, they do not have a toothcomb. One possibility is that tarsiers have lost the full set of anterior teeth found in other prosimians. This possibility is illustrated by the sifaka lemur where there are only four toothcomb teeth compared with six in other lemurs and loris. If tarsiers lost a further two teeth, then there would no longer be a recognizable toothcomb structure, and it has been suggested that the two anterior teeth of *Tarsius* show a similar transverse rounded shape with lateral borders to the outer anterior teeth of other prosimians.

In contrast to the few proposed uniquely shared similarities between tarsiers and prosimians, a relatively large number have been proposed for tarsiers and anthropoids. If all or most are correct, then they would provide less ambiguous evidence than molecular studies that have been divided between those that support a prosimian relationship and those that support an anthropoid relationship. Some of these features are problematic. Tarsier eyes lack a tapetum (a reflective layer of the retina) and in this respect are more like anthropoids than prosimians where a tapetum is said to be present, but several species of *Eulemur* and possibly *Varecia variegata* also lack a visible tapetum

(i.e., lack light reflection), although it is not known whether this indicates the absence of a tapetal layer. The completely fused upper lip of tarsiers is often characterized as an anthropoid trait, but it does not apply to various New World monkeys that have a groove (philtrum) down the midline of the upper lip indicating that fusion is not complete. Tarsiers and anthropoids have haemochorial placentation, but the similarity may be superficial, resulting from different developmental paths. The apparently short, anthropoid-like face of tarsiers (that is even shorter than some anthropoids) may be an artifact of enlarged eyeballs extending over the snout, and the partial postorbital closure in tarsiers and New World anthropoids involves different bones. In these and various other characteristics the correct homology and morphology is in dispute while some others such as the inability to manufacture vitamin C in tarsiers and anthropoids may be valid. In view of the morphological and molecular disagreements, the taxonomic position of tarsiers currently remains beyond consensus.

Fossil Prosimians

The fossil record is replete with many prosimian fossils that range from relatively complete skulls that are sometimes associated with postcranial remains and the many more largely fragmentary jaw fragments and isolated teeth. The absence of soft tissues that may otherwise provide critical evidence and the disparity of fossil representation render the accurate placement of many fossil taxa highly problematic, and many may remain irresolvable unless more complete fossils are found in the future. Some fossil prosimians are considered to lie outside the modern families and have been classified as members of families that are no longer extant, including the Protoadapinae, Omomyidae, Microchoeridae, and Adapidae. Membership within these families is sometimes problematic and influenced by assumptions about the relative size, location, and geological age of relevant fossils.

Monophyly of Lemuriformes

The lemurs of Madagascar comprise the families Cheirogaleidae (dwarf/mouse lemurs), Daubentoniidae (the aye-aye), Megaladapidae (Lepilemuridae; sportive lemurs), Lemuridae (lemurs), and Indriidae (indri). These families have traditionally been regarded as a monophyletic group called the Lemuriformes while the remaining prosimians were represented by the Lorisiformes (galagos and lorises). This monophyly has been challenged in some studies that support placement of the Cheirogaleidae within Lorisiformes and isolating the Daubentoniidae as a separate prosimian infraorder. These different systematic relationships may be represented by three principal alternative taxonomic arrangements (see Table 61.2).

Table 61.2 Alternative Classifications for Prosimian Primates

Suborder Prosimii (Schwartz, 1986)	Suborder Strepsirrhini (Shoshani et al., 1996)	Suborder Strepsirrhini (Groves, 2001)
Infraorder Lorisiformes	Infraorder Lorisiformes	Infraorder Loriformes
Family Cheirogaleidae	Family Lorisidae	Family Lorisidae
Family Lorisidae	Family Galagidae	Family Galagidae
Family Galagidae	Infraorder Lemuriformes	Infraorder Lemuriformes
Infraorder Lemuriformes	Family Cheirogaleidae	Family Cheirogaleidae
Family Lemuridae	Family Lemuridae	Family Lemuridae
Family Indriidae	Family Indriidae	Family Indriidae
Family Megaladapidae	Family Lepilemuridae	Family Lepilemuridae
Family Daubentoniidae	Family Daubentoniidae	Infraorder Chiromyiformes
Infraorder Tarsiiformes		Family Daubentoniidae

SOURCES: Groves (2001); Schwartz (1986); Shoshani et al. (1996).

NOTES: Schwartz (1986) with three infraorders to include tarsiers and the Madagascar Cheirogaleidae grouped with lorises rather than lemurs. Shoshani, Groves, Simons, and Gunnell (1996) with two infraorders to exclude tarsiers. Groves (2001) with three infraorders to separate the aye-aye (Daubentoniidae) from all other lemurs.

Taxonomy of the Anthropeidea

In anthropoids, olfaction is further diminished while vision becomes functionally dominant and the orbits are more consistently directed forward. Major defining features include postorbital closure of the postorbital bar; fusion of the lower jaws at birth or, as with the frontal bones, early in development; a single-chambered uterus (also in anteaters); hemochorial placentation characterized by concentration of blood vessels into at least one disklike structure; and development of the amniotic sac membranes by folding in and around the growing fetus in contrast to invagination as found in tarsiers. Molar cusps are relatively low in height, the number of premolars is reduced from four to three, the lower molars no longer have an anterior cusp, and a large cusp is consistently present on the posterior upper molars. The following taxonomic arrangement within the Anthropeidea (treated here as a suborder) is stable to the superfamily level:

Suborder Anthropeidea (after Groves, 2001)

Infraorder Platyrrhini (New World monkeys)

 Superfamily

 Family Cebidae

 Family Aotidae

 Family Atelidae

 Family Pitheciidae

Infraorder Catarrhini (Old World monkeys, apes, humans)

 Superfamily Cercopithecoidea

 Family Cercopithecoidea (Old World monkeys)

 Superfamily Hominoidea (apes and humans)

The New World monkeys are characterized by a platyrrhine nose where the nostrils are oriented laterally

and separated by a fleshy septum. Since this feature is also found in many other mammals, it does not constitute a character supporting platyrrhine monophyly. Monophyly of Platyrrhini is supported by several morphological features, including separation of the frontal bone from the sphenoid and the presence of an external auditory meatus. Monophyly of this group is also supported in molecular reconstructions. Old World monkeys and hominoids have a catarrhine nose with a narrow nasal septum separating nostrils that are closely adjacent and more forward directed. They also have only two premolars in the upper and lower jaws (compared with three in New World monkeys) and the possession of an ectotympanic tube forming the opening of the ear. Some Old World Oligocene fossils also have three premolars, and the Old World fossil monkey *Aegyptopithecus* lacks an ectotympanic tube like the New World monkeys. These fossil taxa may represent extinct taxa that do not lie within the Catarrhini but are nevertheless more closely related to the Catarrhini than Platyrrhini.

Fossil Anthropeidea

Most fossils characterized as anthropoids exhibit sufficient features to be recognized as primates with confidence. But the earliest claimed Asian anthropoid, *Anthrasimias gujaratensis* of India at 54.5 million years ago (mya), lacks any described anthropoid or even primate features, so uncertainties over the phylogenetic position and taxonomic identification of such fossils remain a persistent problem. Other fossils such as (*Branisella*) can be recognized as anthropoid but cannot

be placed within the two extant infraorders, while other fossils can be placed within one or the other but only as extinct families or superfamilies. Examples include Parapithecidae within the Platyrrhini and Pliopithecidae (east Asia, Europe) within the Catarrhini. A variety of extinct families has been proposed for the Hominoidea including Dendropithecidae, Dryopithecidae, Proconsulidae, Ramapithecidae, and Victoriapithecidae (Africa) with various levels of general acceptance.

Monophyly of Hominoids

Hominoids comprise humans, great apes, and lesser apes. Their monophyly appears to be well supported and the category is taxonomically stable for living taxa. Hominoids are most well known for the absence of an external tail in contrast to all other primate groups. Hominoids also exhibit major alternations of body shape including a thorax that is broader than deep, a dorsal position of the scapula, an elongate clavicle, a broad separation between the infra-orbital foramen and a suture between the zygomatic and maxillary bones, a variable articulation of the ulna and triquetral, and a postnatal ossification in the distal humeral and proximal radial epiphyses. The lesser apes represent a well-established and stable taxonomic category represented by a single family Hylobatidae (gibbons and siamangs) comprising about 15 species in Southeast Asia. The number of recognized genera varies from one (*Hylobates*) to four (*Hylobates*, *Hoolock*, *Nomascus*, *Symphangulus*) due to different perspectives over their overall divergence or phylogenetic age.

The taxonomic arrangement of the remaining hominoids is far less settled with respect to the relationship between humans and great apes. Great apes are represented by three genera, *Pongo* (one or two species of orangutan in Southeast Asia), *Gorilla* (two or three species of gorilla in Africa), and *Pan* (two species in Africa). From the early to mid-20th century, African apes were increasingly seen to be more closely related to humans than orangutans. Darwin had also expressed this view, although this was a speculation based on the presumption that Africa rather than Asia would provide the necessary selection pressures for the evolution of humans. Chimpanzees and gorillas are indeed more similar to humans than the long-armed orangutan, which also exhibits distinctive and unique features, such as cheek pads in males and large vocal sacs and having a much more specialized arboreal existence. In these respects, orangutans are widely seen to be much more distantly related to humans than African apes.

Morphologically, the African apes would seem to represent a natural group since chimpanzees and gorillas share a suite of uniquely shared features, including their specialized knuckle-walking anatomy. But in the 1960s,

another line of phylogenetic evidence has led to the now almost universal view that chimpanzees are more closely related to humans than gorillas. This evidence was principally in the form of shared similarities in biological molecules, beginning with protein and amino acid similarities supporting an African ape relationship and later DNA sequence similarities that are greatest between chimpanzees and humans. The chimpanzee relationship was at first rejected by primate morphologists but has since become so firmly accepted that it has become a fact of evolution that is beyond question. The only anomaly with this molecular theory is the lack of morphological features uniquely shared between humans and chimpanzees. A few such features have been proposed, but they have proven to be erroneous or lack verification. This lack of uniquely shared morphological similarity would not necessarily represent a problem as it could be attributed to a paucity of such features in the last common ancestor of humans and chimpanzees or a loss of those features subsequent to their respective divergence. This possibility is, however, confounded by the fact that humans do share a large and broad set of unique or specialized features with the orangutan.

The orangutan relationship was first identified by primate systematist Jeffrey Schwartz (2005) who found at least 40 features that were either uniquely shared or nearly so between humans and orangutans including several dental features, such as cusp configuration and thick molar enamel (African apes are like most other primates and mammals in having thin enamel), a single incisive foramen, a foramen lacerum, an anterior-posteriorly short scapula with a vertical vertebral boarder and a relatively small supraspinous fossa, the widest spaced mammary glands, highest estrus production, absence of tumescence of female genitalia during ovulation, greatest degree of cerebral and Sylvian sulcus asymmetry, beard and mustache in the male, forwardly directed cranial hair, receded hairline at birth, and absence of ischial callosities. For any other group, this preponderance of morphological evidence would be widely seen as critical if not conclusive. But this has been precluded by the majority of primate and evolutionary biologists because it conflicts with molecular evidence that has been already declared infallible. The morphological pattern may, however, suggest that in this case at least the pattern of molecular similarity is misleading, perhaps as the result of pervasive and unrecognized primitive retentions in the distribution of base pair sequences.

Molecular grouping of humans and chimpanzees is also problematic because it is incongruent with the hominid fossil record (hominid here referring to any fossil relatives more closely related to humans than the nearest living great ape). The earliest accepted hominids (*Australopithecus*) fail to exhibit uniquely chimpanzee features and instead show the same skeletal features as humans and orangutans. In addition,

they show typically orangutan features, such as large, vertically inclined cheekbones with anterior facing roots, and a posteriorly thickened posterior palate. Analysis of these and other morphological features suggests that australopiths along with humans and orangutans comprise a monophyletic group. This monophyletic group would include the hominids *Orrorin* and *Kenyanthropus* along with the extinct great ape genera *Hispanopithecus*, *Ouranopithecus*, *Ankarapithecus*, *Sivapithecus*, *Gigantopithecus*, *Lufengpithecus*, and *Koratpithecus*, while excluding the purported hominids *Ardipithecus* and *Sahelanthropus*. The taxonomic implications are listed in Table 61.3, although fossil taxa cannot be included in the molecular taxonomy since fossils cannot (with the exception of subfossils) provide evidence of molecular similarity.

Table 61.3 Contrasting Classifications of Apes and Humans Resulting From Morphological and Molecular Techniques

Morphological Taxonomy (Grehan & Schwartz, 2009)	Molecular Taxonomy (Shoshani et al., 1996)
Superfamily Hominoidea	Superfamily Hominoidea
Family Hylobatidae	Family Hylobatidae
Family Panidae	Family Hominidae
<i>Pan</i>	Subfamily Ponginae
<i>Gorilla</i>	<i>Pongo</i>
Family Pongidae	Subfamily Homininae
<i>Pongo</i>	Tribe Gorillini
<i>Ankarapithecus</i> ^a	<i>Gorilla</i>
<i>Gigantopithecus</i> ^a	Tribe Hominini
<i>Hispanopithecus</i> ^a	<i>Pan</i>
<i>Koratpithecus</i> ^a	<i>Homo</i>
<i>Lufengpithecus</i> ^a	
<i>Sivapithecus</i> ^a	
Family Hominidae	
<i>Homo</i>	
<i>Kenyanthropus</i> ^a	
<i>Orrorin</i> ^a	
<i>Australopithecus</i> ^a	

SOURCES: Grehan and Schwartz (2009); Shoshani et al. (1996).

a. fossil taxa.

NOTES: Both approaches recognize the lesser apes (Hylobatidae) as a separate family. The morphological approach places the African apes, orangutans, and humans each in their own family, along with fossil forms where recognized. Humans and orangutans are also recognized as being more closely related to each other, but this is not formalized in the taxonomic arrangement. The molecular approach differs by grouping African apes and humans together in the same subfamily and chimpanzees and humans in the same tribe.

Humans and great apes together comprise the large bodied hominoids. Molecular reconstructions have popularized extending the family Hominidae to include this group, including their fossil relatives. In addition to those fossils listed below, the large bodied hominoids include the fossil genera *Afropithecus*, *Ardipithecus*, *Dryopithecus*, *Nacholapithecus*, *Oreopithecus*, *Otaviopithecus*, *Periopithecus*, *Kenyapithecus*, *Sahelanthropus*, and *Samburupithecus*.

Future Directions: Primate Taxonomy in the 21st Century

It is impossible to accurately predict the course of primate taxonomy and systematics further into the 21st century, but at the beginning of this century, several outstanding problems represent actual or potential challenges for the future.

Diagnostic Characters

Even though cladistic principles are now generally accepted as the current standard of systematic analysis and taxonomic classification, the specification of the unique features that place a fossil within a given taxon are often unclear. Fossil descriptions and analyses are frequently muddled without a focus on primitive states that obscures the presence of derived conditions that would link the fossil with other living or fossil taxa. This is particularly evident where new taxa may be distinguished (particularly in the fossil record) without reference to any uniquely derived features to define the taxon or without reference to synapomorphies that would place it within a higher taxon. A classic example is *Homo floresiensis*, which was first described as a member of the genus *Homo* related to *Homo erectus* without citation of supporting evidence. It was later stated that the generic name was selected as a rhetorical device to prevent the fossil falling into obscurity, and the relationship with *H. erectus* appears to have been determined by default since this was the only other known hominid in the same region at the same time. Subsequent morphological studies have reinforced the status of this fossil as a distinct species (as some argued it was the result of microcephally in a primitive human) while at the same time highlighting features that relate *H. floresiensis* more closely with australopiths or early *Homo*. Publications on new hominid or presumed hominid fossils are particularly prone to this kind of problem when there is a lack of subsequent detailed studies to follow the initial rapid and superficial announcements (although the study of *H. floresiensis* is proving to be a notable exception).

Holotype Access

The scientific foundation of taxonomy biological systematics is the ability to provide empirical verification. This

is the essence of testing in science. Without verification, scientific propositions lose their scientific status and instead become metaphysical abstractions supported entirely by faith. In the study of comparative biology, this pitfall can be avoided only through access to the original material on which theories about identity and relationships are made. In taxonomy and systematics, this is made possible through access to the type material, the specimens to which taxonomic names are attached and from which character similarities are generated. It is the *holotype* in particular that provides the critical verification as it is the reference specimen for each species identity and consequently for relating all additional specimens. For each species, there is only one holotype, and it is essential that there is open access as recognized in the International Rules for Zoological Nomenclature. This requirement by the systematics community is, however, all too often thwarted through the deliberate withholding of access to individual researchers. This practice represents a deviation from the principles of science, and for one primate group in particular—the hominids—it has become a pervasive and persistent problem that continues into the 21st century. Another problem in primate systematics is the use of pseudoholotypes in the form of photographs that cannot be subject to further testing or investigation. This practice reduces primate taxonomy and systematics to the level of stamp collecting as it removes access to the original material and therefore fails the scientific requirement of empirical corroboration.

Molecular Incongruence

This is probably the elephant in the room when it comes to primate taxonomy. There has been an increased focus on molecular similarity as the basis not only for classification but also for delineating the smallest taxonomic units, such as species. Some approaches attempt “total analysis” that treats morphological and molecular similarity as the same kind of data, but this overlooks the inherent problems of homology and similarity that have yet to be adequately addressed in molecular analysis. Emphasis on the same result from different genes or from large data sets may seem to further corroborate the molecular result, but if the molecular comparisons are not actually between homologous derived character states, then the large numbers of similarities may reflect a similar prevalence of primitive retentions in molecular similarity as is often found to be the case in demonstrations of overall morphological similarity. The alternative possibility is that robust morphological relationships may represent a viable falsifier of molecular similarity, particularly when the morphological evidence among living taxa is consistent with hypothesized phylogenetic relationships between fossil and living taxa. One possible resolution of incongruence between morphological and molecular similarity may come when the connection between uniquely shared morphological traits and their molecular position within DNA is understood. The current inclination for primatologists to focus on molecular

similarity to reconstruct primate relationships and delineate taxonomic categories at the expense of morphological incongruence may represent a critical future problem for primate taxonomy and systematics.

Taxonomic Labels

From Linnaeus to the present, primate taxonomy is represented by a hierarchical system of names. At the close of the 20th century, some systematists have argued for a system of names without rank called the *phylocode*. Each node on a *cladogram* could be named, but they would have no corresponding rank. There would also be no species and no binomials. The purpose of the phylocode was to introduce stability into taxonomy—given the constant flux in phylogenetic relationships that currently lead to new taxonomic arrangements. This goal may be problematic since the taxonomic meaning of any one node is still contingent upon its relative position on a phylogenetic tree, and if current Linnean names are incorporated, there is no necessary way to determine how their meaning may have changed. The incorporation of additional taxa within a given clade would also change the meaning of that node, requiring that the definition of the name would have to be changed, or the name would have to be redefined in reference to an entirely different node.

The actual and potential problems for the phylocode system appear, at this time, to present no necessary improvement over the problems confronting Linnean taxonomy against a background of uncertain phylogenetic reconstructions. In systematics, all relationships are relative when the primary question is whether any two taxa are more closely related to each other than either is to a third. In this phylogenetic context, taxonomic categories and classifications are irrelevant and unnecessary other than as convenient labels to designate particular groups of organisms. Whether the 21st century is witness to some other entirely novel solution remains to be seen by those fortunate to be around so long.

Conclusion: The Future Nature of Evidence

It is anticipated that the major contentious questions over evolutionary relationships among the primates will continue to dominate taxonomy and systematics into the 21st century, particularly where different sources of evidence continue to give contradictory or ambivalent results. In addition to those questions of classification within the primates, there will no doubt be further exploration of the interrelationships of modern primates to other mammalian groups.

The future status of morphological systematics represents a major future question. Morphology is problematic when different researchers use different characters, and this identifies a future need for comprehensive and illustrated comparative documentation of features used

to define clades (and in turn the taxonomic groups linked to those nodes). Detailed comparative morphology is probably better known for some obscure insect groups than many primates, especially not (and perhaps most surprising) for the great apes that have been of so much interest for theories of human origin. In some major respects, primate taxonomy and systematics during the last half of the 20th century exemplifies the severe decline in the science of comparative morphology as the inverse mirror image of the rapid expansion of molecular biology. This decline is often evident in the lack of knowledge on comparative primate anatomy and biology, often including some of the most basic elements of biology, such as reproduction. The foundering of comparative morphology may be inconsequential if the promotion of molecular similarity is justified as the final authority on evolutionary relationships. But this status has yet to be seriously evaluated, and it may yet be possible that the 21st century will take a new look at the role and importance of morphology in the reconstruction of primate relationships and classification.

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PRIMATE LOCOMOTION

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The family of primates, ranging from 13 to 16 separate families, includes over 200 individual species. Within these grouped species is our own species, *Homo sapiens*. In terms of *primate locomotion*, expressed forms of locomotion include various forms of quadrupedalism, tripedalism, vertical climbing, leaping, tail swinging, suspensory, and bipedalism, as discussed in John Fleagle's 1998 book *Primate Adaptation and Evolution* (see also Hunt et al., 1996). *Bipedalism* is a remarkable form of locomotion. Though many nonhuman primates occasionally use a form of bipedalism, humans are the only primate species that uses a distinct and obligate form of bipedalism as a primary form of locomotion.

Similarities among nonhuman primates, particularly the great apes and the human primate in terms of morphological, physiological, and social characteristics has confirmed many early naturalists' views of humankind's origin and relationships with extant primates. Such shared characteristics within an evolutionary framework affirmed Charles Darwin's view on humankind's "lowly origin" with his summation that humans differ only in degree but not in kind from the great apes. With the discovery of fossil hominins and hominids, the classically "human" distinguishing features become less pronounced. As more fossil evidence is recovered, the scientific community is faced with questions regarding the emergence of human bipedalism among various forms of primate locomotion within the fossil record. Though the fossil record is incomplete and

recovered fossils have blended ape and human characteristics, bipedalism (at least in some form) is suggested to have existed about 6 million years ago. If these dates and the interpretation of the fossil evidence are correct, a nonhuman form of primate bipedalism and quadrupedalism coexisted farther back than previously estimated. Primate locomotion, similar to morphology, becomes an interesting aspect of our evolutionary descent.

Types of Primate Locomotion

The geographic distribution of primates is limited to the tropical, temperate, subalpine, and alpine biomes of South America, Central America, Africa (including Madagascar), Asia, and the Oceania areas. Nonhuman primates can be found in rainforests, seasonal forests, woodlands, savannas, semideserts, evergreen forests, elfinwoods, and meadows. With the addition of the human species, primates can be found throughout the globe and in every habitat. Considering the totality of the nonhuman primate species, a particular mode of locomotion is not species specific. Rather, activity (e.g., being diurnal or nocturnal) and arboreal stratification and terrestrial territoriality foster evolutionary competition. The habitual modes of locomotion for arboreal primates primarily consist of branch quadrupedalism and/or bipedalism and brachiation. Vertical climbing and leaping are the second and third most common mode

of locomotion, respectively. Suspensory behavior, including arms, feet, and tail, are least common.

Primate locomotion, whether arboreal or terrestrial, is determined on the physical terrain and by the placement of the upper and lower limbs in relation to the adjacent limbs. While in motion, hand and foot configurations can be palmigrade, plantigrade, or digitigrade, and manifest as knuckle-walking, fist-walking, grasp-walking, serpentine grasp-walking, schizodactyl grasp-walking, or clawed quadrupedalism (Hunt et al., 1996; Vilensky & Larson, 1989). Consequently, locomotive gaits among primates could be either symmetrical or asymmetrical, for example, an evenly timed footfall pattern as opposed to an unevenly timed footfall pattern. In addition, gait sequence can be either a diagonal sequence (DS) and diagonal couplet (DSDC) or a lateral sequence (LS) and lateral couplet (LSLC). In a diagonal sequence, the placement of the forefoot is followed by the diagonal hindfoot. The lateral sequence has the forefoot following the ipsilateral hindfoot. It is interesting to note that the human primate develops along similar patterns. During the emerging human locomotive development, both types of gait sequence and variations in locomotive behavior are normally experienced (Higurashi, Hirasaki, & Kumakura, 2009; Shapiro & Raichlen, 2005; Vilensky & Larson, 1989). Although primates use both DS and LS gaits, recent research suggests that DS gaits are preferred over LS gaits. DS gaits are almost exclusively used (Cartmill, Lemelin, & Schmitt, 2007; Stevens, 2008).

The latest accepted theory as to why primates prefer DS gaits is related to an increase in neurological pathways and an increase in neurological motor control in order to have balance control while on branches or terminal supports; however, there is disagreement on the advantage of gait sequence or change of gait on stability (Davis, DeLuca, & Ounpuu, 2003; Higurashi et al., 2009; Stevens, 2008). Although there are disagreements regarding the advantages of gait sequence, branch diameter appears to have an effect on the speed of the gait cycle (Franz, Demes, & Carlson, 2005).

However, it should be noted that the observed type of locomotion and gait sequence can be problematic and can lead to erroneous statistical significance. The problem is method. Although the observations of primates in their natural habitats can be more realistic, controlled experiments that involve modified habitats—the use of re-created “trees” and obstacles, for example—may affect their natural forms of locomotion and gait preference. To this author, variations seen in those “branched trees” that are re-created for experimental purposes may alter natural primate behavior. This alteration may not be in purely psychological terms but rather a biomechanical response to an “unnatural” terrain.

Beyond gait sequence and mode of gait, primate locomotion as defined by this author is best described as that behavior consistent with the biomechanical limitations of the primate skeleton and neurological control within an ecological niche. The diagnostic skeletal features are critical

in both comparing and contrasting primates with the possibility of inferring a mode of locomotion. For example, consider the morphological differences that can be seen between arboreal and terrestrial quadrupeds. As detailed in Fleagle's 1998 book *Primate Adaptation and Evolution*, arboreal quadrupeds have distinct diagnostic features: similar lengths (usually short) of both forelimbs and hindlimbs; elliptically shaped glenoid fossa; a broad humeral head with a moderately robust shaft; medial epicondyle, which are oriented medially; a long olecranon process of the ulna; a broad hamate; a relatively high angled femoral shaft; an asymmetrical size of femoral condyles and articulating surfaces on the tibia; an asymmetrical tibiotalar joint; and a large hallux. Fleagle further reported that differing from their arboreal counterparts, terrestrial quadrupeds have limited anterior-posterior motion of the shoulder (scapula and humeral articulation), an olecranon process extending dorsally, a deep olecranon fossa, a short and posteriorly orientated medial epicondyle, a robust tarsal and robust metatarsals, and short and broad carpal bones.

Differences can also be seen among brachiating and leaping primates, as discussed in Fleagle's 1998 book *Primate Adaptation and Evolution: Leaping primates* have diagnostic features that include a deep femoral condyle, a narrow tibia, a short femoral neck, a slender fibula, a long calcaneus and navicular, and a long ischium. Brachiating and suspensory primates have narrow and dorsally orientated scapulas, a small and round glenoid fossa with a large humeral head, medially orientated medial epicondyle, a short olecranon process, curved phalanges, broad and a shallow femoral condyle, and a shallow patellar groove. Also, the ulna does not articulate with the carpals and the distal and proximal row of carpals via a ball and socket joint contribute to the range of movement.

Given the commonalities and diagnostic features among quadrupeds, brachiators, and leapers, as Esteban E. Sarmiento noted in his 1998 book *Generalized Quadrupeds, Committed Bipedes, and the Shift to Open Habitats: An Evolutionary Model of Hominid Divergence*, there is very little disagreement that the commonalities show a deep common evolutionary ancestry while the diagnostic features show evolutionary adaptation to various ecological niches. Species with overlapping modes of locomotion and morphological similarities have homologous and homoplasy issues regarding morphological traits. This issue can be problematic in determining the origin of human bipedality. Among the various traits attributed to our species (e.g., expansion of the human brain, tool use, and material culture), the emergence of obligate bipedalism preceded all other traits that are considered uniquely human.

Human Bipedal Locomotion

Human bipedalism can be defined as the constant utilization of alternating hindlimbs as a means for movement between

two points, according to Fleagle in his 1998 book *Primate Adaptation and Evolution*. The gait is a cycle (stride) that consists of a stance phase, midstance phase, and swing phase. The moment the heel strikes, the hip becomes flexed, and the knee is extended while the leg is laterally rotated. The adductor muscles then shift the body's weight over the supporting limb (midstance phase), and the opposite hip and knee are extended. During the increase in forward momentum, the ankle dorsiflexes, and the hip and knee pass the supporting leg. After toe-off, the weight passes the toe and hyperextends the hip joint. The swing phase completes the cycle, ending with the leg laterally rotated in preparation for another cycle, as noted by Leslie C. Aiello and Christopher Dean in their 2002 book *An Introduction to Human Evolutionary Anatomy*. This motion makes human bipedality different from the bipedalism of any nonhuman primate. For example, when a chimpanzee uses bipedalism, the cycle differs in its phases due to a lack of full hip and knee extension. In addition, the knee and ankle joints do not pass the hip joint, and the femur does not have a bicondylar angle. Aiello and Dean also noted the absence of abductor muscles and a reverse of the pelvic tilt during the stance phase as additional differences. Altogether, the differences between human bipedality and nonhuman primate bipedality are fourfold in (1) the degree of spinal curvature, (2) pelvic configuration, (3) foot morphology, and (4) biomechanical modifications in related muscles, tendons, and ligaments.

Evolutionary History of Human Primate Bipedality

As many previous primates throughout North America, Europe, and Asia went extinct during the Eocene to the middle Oligocene, the emergence of apes in Africa presented a unique evolutionary adaptation that would eventually be seen within our species in the form of bipedal locomotion. From its evolutionary ancestors, the African Miocene apes *Orrorin tugenensis* and *Sahelanthropus tchadensis* are considered the earliest bipeds. These specimens represent the earliest date for primate bipedalism—far earlier than the later genera of *Australopithecus* and early *Homo*.

Orrorin tugenensis, considered one of the oldest bipedal hominins, dated from 6 to 8.5 million years ago. The diagnostic features, which indicate bipedalism, include an anteriorly convex curvature of the femoral shaft, the blending of the tubercle into the greater trochanter, the presence of an intertrochanteric line (absent in other Miocene apes), a medially salient and well-developed lesser trochanter, elongation of the femoral neck (closer to the Australopithecines and humans), a proximo-distally elongated gluteal tuberosity with a distal leading crest, a marked pectineal line with a spiral line from below and medially orientated to the lesser trochanter and a linea aspera with mild cresting located below the trochanter, a right angled intertrochanteric crest,

an obturator groove originating from the fossa to the inferior margin of the femoral neck (indicating femoral hyperextension), and a developed but shallow hypotrochanteric fossa. *Orrorin*'s femoral neck is antero-posteriorly compressed, along with the presence of an obturator externus groove, which differs from both the Miocene and modern apes (Pickford, 2006; Pickford & Senut, 2001). Similarly, the asymmetrical distribution of the cortex, inferiorly thick and superiorly thin, suggests loading patterns or weight distribution that is indicative of having a degree of bipedalism and being orthograde (Galik et al., 2004).

Another Miocene hominin, *Sahelanthropus tchadensis*, dates back 6 to 7 million years ago. The diagnostic feature indicating bipedality, though controversial, revolves around a cranium (TM 266), which is partial and distorted. Through virtual reconstruction, the cranium depicts an orthognathic face, short premaxilla, a large foramen magnum (greater in length than breadth) that is positioned more anteriorly, and a short basioccipital. The orientation of the foramen magnum suggests bipedality. This is due to the relative angle of the foramen magnum to the orbital plane—103.2 degrees \pm 6.9 degrees for humans and 95 degrees for *Sahelanthropus*, for example, and the orientation of the flat nuchal plane being 36 degrees to the Frankfurt horizontal (Zollikofer et al., 2005). When these morphological features are compared among fossil apes, hominids, modern apes, and humans, *Sahelanthropus* is closer to both *Australopithecus* and modern *Homo*. Displaying morphological synapomorphines with other bipeds, bipedalism becomes the assumed form of locomotion (Guy et al., 2005).

The emergence of hominins in Africa provides the best evidence to date for the appearance of bipedalism. The subfamily Australopithecine consists of three genera: *Ardipithecus*, *Australopithecus*, and *Paranthropus* (previously robust australopithecines). For the *Ardipithecus* genera, *A. ramidus* and *A. kadabba* are suggested to be possibly bipedal and the beginning of the hominin line. This determination is based on the combined features of a short cranial base, an anteriorly positioned foramen magnum, and a strong plantar curvature of the proximal foot phalanx (Harcourt-Smith, 2007). Although *Ardipithecus*, as well as *Orrorin* and *Sahelanthropus*, is controversial regarding its bipedality, that the genus *Australopithecus* was bipedal is accepted with few reservations (e.g., the degree of bipedality Harcourt-Smith, 2007).

There are five species of *Australopithecus* located at sites in the southern, western, and central regions of Africa: *A. anamensis*, *A. afarensis*, *A. africanus*, *A. aethiopicus*, and *A. garhi*. *Australopithecus anamensis* (4.2 million years ago to 3.9 million years ago), though having blended human and ape characteristics, represents a more positive shift in hominin locomotion toward bipedalism. The locomotive indicators are limited. This hominin has a tibia shaft, which is oriented orthogonally to the talar joint surface; the metaphyses are flared both proximally and distally, which is

an indication of bipedal locomotion, as Glenn C. Conroy reported in his 2005 book titled *Reconstructing Human Origins* (see also Ward, 2007).

Australopithecus afarensis (3.6 million years ago to 2.9 million years ago), having similar qualities, presents the greatest blending of primitively derived traits from previous hominids with added humanlike characteristics. The lower limbs are typified by having major features, which include long and curved proximal phalanges with a circumferential trochlea, a navicular with a low dorsoplantar height and a large right-angled cuboid facet, a robust and triangular diaphysis of the first metatarsal, a calcaneus with a horizontal sustentacular shelf, a convergent hallux, a lateral cuneiform with plantar tuberosity, a proximal femur with a short neck relative to femoral length, a high bicondylar angle, an elliptical lateral condyle, a posterior angle of the distal tibia, and a distal fibula with a deep peroneal groove. In addition, the iliac blade faces posteriorly, including robust anterior and posterior superior iliac spines incorporating a sigmoid curve of the iliac crest, a thickened pubic symphysis (dorso-ventrally), and a short ischial shank (McHenry, 1991).

A. afarensis presents an interesting problem in its morphological interpretation. Bipedalism is cited as transpiring due to a lumbar lordosis, a high bicondylar angle, short and wide iliac blades, a prominent anterior inferior iliac spine, mediolateral orientation of the talar surface (distal tibia), a trochlear surface of the talus, and a lateral plantar process of the calcaneus. The dorsal orientation of the proximal articulating facets on the proximal pedal phalanges suggests dorsiflexion (needed during bipedal walking), but it falls outside the human range. Contrary to existing bipedal indicators, certain morphology indicating an arboreal nature and locomotion includes the curved and long proximal phalanges with flexor ridges, a medial cuneiform that is similar to apes (suggesting halluical opposability), a well-developed lateral trochlear crest of the distal humerus (prevents dislocation of the elbow joint during either climbing or suspension), and a cranially oriented glenoid, as discussed in Aiello and Dean's 2002 book *An Introduction to Human Evolutionary Anatomy* (see also Harcourt-Smith, 2007).

Australopithecus africanus (3 million years ago to 2.4 million years ago) shares many affinities with *A. afarensis*. Postcranial elements are fragmentary: capitate, scapula, proximal humerus, distal femora, pelvic blade, adolescent ischium, a fragmented piece of humeral shaft, vertebrae, left and right os coxae, fragmentary sacrum, and a left proximal femur without a head. Generally, *A. africanus* has wide and lateral flaring iliac blades and a small acetabulum and iliosacral joint. The proximal femur has a long neck with a small head. Similar to *A. afarensis*, the bicondylar angle is high (McHenry, 1986; Wood & Lonergan, 2008).

Paranthropus boisei (2.3 million years ago to 1.4 million years ago) and *Paranthropus robustus* (2 million years

ago to 1 million years ago) are suggested to be bipedal. The locomotion of *Paranthropus boisei* is uncertain due to the fragmentary nature of the recovered postcranial elements. Postcranial fragmentary elements attributed to this species include a clavicle, a distal humeral shaft, a proximal radius (left and right fragments), an ulna (proximal and shaft fragments), a distal femur, a tibia (left and fragments of the right), a distal fibula, and the right proximal third metatarsal (Wood & Constantino, 2007). However, the morphological similarities between recovered elements of *Paranthropus* and *Australopithecus*, especially the existence of an obturator externus groove, suggest a degree of bipedalism. *Paranthropus robustus* (2 million years ago to 1 million years ago) has femoral features, though fragmentary, that include the lack in the lateral expansion of the great trochanter, an absence of a trochanteric line and a femoral tubercle, and a deep trochanter fossa with an obturator externus groove (Wood & Richmond, 2000).

Although a degree of bipedality is assigned to *Australopithecus* and *Paranthropus*, the emergence of *Homo* is unequivocally bipedal. Included in the genus *Homo* (starting at 1.9 million years ago) are three early species that exhibit diagnostic features indicative of bipedality. They include *H. habilis*, *H. rudolfensis* (or *H. habilis*), and *H. erectus*. The major indicators include a large tibial tuberosity, an obturator externus groove located on the femoral neck, a bicondylar angle, the position of the foramen magnum, and pelvic and foot morphology. These features are discussed in Aiello and Dean's 2002 book *An Introduction to Human Evolutionary Anatomy* and in Fleagle's 1998 *Primate Adaptation and Evolution* (see also Wood & Richmond, 2000). However, it must be stressed that there remains a degree of morphological variation associated with bipedalism. Today, as in the past, this variation can be found within and among bipedal species.

Today, many researchers conclude that bipedalism could have evolved multiple times in primate history. Given the incompleteness of the fossil record and no definitive relationships among hominin and hominid genera, there is the possibility that multiple lines of bipedal apes could have evolved separately from the direct ancestral descent of the *Homo* line. The committed time to bipedality, even among *Australopithecus* morphology and the associated Laetoli footprints, is unknown and very controversial. This is primarily due to the blended characteristics associated with an arboreal setting. Given that Plesiadapiforms, Adapoidea, and Omomyoidea were arboreal and assumed quadrupeds, the question remains: What eventually prompted the emergence of bipedality as early as the Miocene? Assuming bipedality was established during the Miocene, what major influences would cause the greater diversity of hominins to develop this bipedal characteristic? Finally, what evolutionary pressures between the Miocene and Pliocene could account for the morphological differences seen among bipedal primates? The theoretical answers are far from being conclusive. In terms of evolution, it is very probable

that natural selection is responsible for the divergence from quadrupedalism to a form of bipedality.

Theories on the Origin of Human Bipedalism

The environment, serving as a selective force, may explain the diversity of primates within various biomes and consequently the various modes of locomotion exhibited by primate species, as Alison F. Richard suggested in 1985 in *Primates in Nature*. The role of the environment acting as a selective pressure is widely recognized as a major factor (Kingston, 2007). Based on multiple analyses of marine isotopes, ice cores, sediments, loess sequences, pollen sequences, and stable isotopes, environmental conditions have varied throughout the world, including in Africa. Locations at hominin and hominid sites in Africa indicate a mixture of open woodlands, wooded savannas, grassy plains, and closed vegetation. Fluctuations in aridity and environmental changes during the Miocene to the Pleistocene are caused by various factors. Milankovitch cycling, plate tectonics, glacial and interglacial periods, the Messinian salinity crisis, and Walker circulation patterns reshaped the African coastline and the African Rift Valley. However, re-creation of the hominin and hominid environment is far from complete. Yet interestingly enough, extinct bipedal primates are found in various terrestrial settings and are not limited to one type of environment—the savanna, for example. The importance of the environment on the interpretation of hominin and hominid evolution poses critical questions. If hominids and hominins evolved a form of bipedalism independently from either wooded savannas or closed vegetation, then what was the driving force for the development of bipedalism? And what implications does this have on this “unique” trait that is considered a hallmark of being human? Various hypotheses are proposed to answer such questions.

Scientific consensus on the origin of human bipedalism is not conclusive. However, some theories are more acceptable than others. Some of the more accepted hypotheses include the knuckle-walking hypothesis, the brachiation hypothesis, the climbing hypothesis, the energetic hypothesis, and the thermal regulation hypothesis. The foci of these hypotheses are dependent on models established on extant primate behavior. Two major models include the *hylobatian model* and *trogloidytian model*. In the *hylobatian model*, it is suggested that a small brachiating and tailless gibbonlike primate made the transition to become a terrestrial biped. It is suggested that the bipedal precursor would have entailed a combination of arm hanging and arboreal branch bipedalism. The characteristics included long forelimbs, mobile shoulder and wrist joints, broad and coronally orientated iliac blades, a laterally facing scapula, long and curved fingers, and highly developed thumbs and first toes. Although the

arboreal setting deep within human evolution is widely accepted, the *hylobatian model* and the *brachiation hypothesis* have very little evidence for their support (Crompton, Vereecke, & Thorpe, 2008).

The *trogloidytian model* suggests that knuckle-walking was the precursor to human bipedalism. Proponents for the knuckle-walking theory have a focus on the morphological features of the shoulder, arm (forelimbs), and the wrist and hand in terms of functionality. Functional morphology becomes the critical factor in discriminating between apes in Africa and apes in Asia and hence the locomotive difference that is seen between knuckle-walkers and brachiators (Begun, 2004). The wrist and hand have many shared features between African apes and humans that are indicative of a knuckle-walking origin. The main morphological features include an early fusion of the os centrale, or central portion, to the scaphoid; the size and facet orientation of the scaphoid; a dorsally orientated scaphoid notch; a broad capitate and hamate with dorsal ridges; an enlarged trapezoid; a small triquetrum; and a palmer and proximal pisiform. The articulation of the scaphoid with the lunate, trapezium, trapezoid, and capitates, along with the articulation of the trapezoid with the capitate (which articulates with the second and third metacarpals and the hamate, which articulates with both the fourth and fifth metacarpals) and the second metacarpal, have biomechanical implications for knuckle-walking. During knuckle-walking, compression and shear stress are placed on the hands and wrists. Shear stress is placed on the carpals when the weight is transferred in a rolling manner from the fourth digit to the second digit, although sometimes to the fifth digit during locomotion (Richmond, Begun, & Strait, 2001).

Among these models, the *climbing hypothesis* for the origin of human bipedalism is based on both the morphological features and limb patterns involving muscle movements. The humeral shaft profile, the scapula orientation, and the position of the vertebral column, together with the perspective of the center of gravity, have many similarities with humans. Although human hand and wrist morphology have suggested an affinity with knuckle-walkers, evidence from hominid morphology has implied an “intermediate” form of an arboreal existence with adaptive bipedal traits. The climbing behavior of great apes, as with other primates, closely approximated human bipedalism more than any other mode of locomotion, including nonhuman primate bipedalism. This is based on both kinematic and electromyographic studies of monkeys and apes that showed that limb patterns and muscle movements (*latissimus dorsi*, *caudal serratus anterior*, *deltoid*, *pectoralis major*, and *biceps brachii*) during climbing were similar to human locomotion, as reported by Fleagle in *Primate Adaptation and Evolution* (1998). The climbing hypothesis is recognized as a possibility for the origin of bipedality.

Energy efficiency, or *energetics*, is another theory considered as the origin for human bipedality. When looking at extant primates as possible models, energetics among

primates vary according to species and gait velocity. For example, the amount of energy expenditures of chimpanzees and gorillas are not significant when either walking bipedal or quadrupedal (Okada, 2006). Yet Japanese macaques spend more energy walking bipedal than quadrupedal, and spider monkeys and lorises have lower energy costs for suspended walking than for either brachiation or quadrupedalism (Nakatsukasa, Hirasaki, & Ogihara, 2006). For humans, energy expenditure is greater during running than walking, but walking has slightly greater efficiency than quadrupedalism. Tied in with environmental conditions, it is suggested that this new form of locomotion was necessary for hominins to travel between wooded patches among the savannas, as Conroy explained in 2005 in *Reconstructing Human Origins*.

Associated with energy efficiency, the *thermal regulation hypothesis* states that bipedality is a regulatory process between the environment and the body's thermal regulation. The combination of an upright stance with the reduction of body hair, water retention rate, and energy efficiency, or metabolism, would reduce the amount of heat stress experienced. An increase in diurnal water consumption between a naked biped and a fully haired biped at 30 degrees Celsius with the same metabolic expenditure (2.0 BMR) increases from 0.62 kg/12hr to 0.82 kg/12hr. This water consumption is lower than both a naked and fully haired quadruped at the same temperature and metabolic rate, which is 1.16 kg/12hr and 1.11 kg/12hr, respectively (Amarl, 1996; Wheller, 1991). Even though the evidence on environmental re-creation and the emergence of bipedality can be contradictory, the energetics and thermal regulation remain strong possibilities.

There are several other hypotheses that are known but not widely accepted among members of the scientific community. These hypotheses include migration, food transport, posture, reproduction, birthing, and the aquatic ape. Although these hypotheses do not rely on extensive morphological or primate behavior data, many of the conclusions are based on assumptions and possible scenarios that fit a preconceived conclusion. Nevertheless, each of these hypotheses remains as possible but improbable explanations for the origin of bipedalism.

The *migration hypothesis* suggests that the development of bipedalism occurred during long distance scavenging. Any mutation(s) that furthered the development of bipedality would increase the amount of food found over greater distances. This adaptation would favor bipedalism over quadrupedalism. Furthermore, the freeing of the hands would allow for tool usage designed for the quicker butchering of carcasses (Sinclair, Leakey, & Norton-Griffiths, 1986).

Similar to the migration hypothesis, the *food transport hypothesis* states that erect posture and habitual bipedalism allowed for the freeing of hands in order to carry scavenged food. The combination of body size, distance between food sources, predation, and competition could have favored a

greater degree of bipedality (Hewes, 1961). This view is similar to the tripedal hypotheses where objects are carried either close to the abdomen or slightly behind the back. The key to the transport model is based on the efficiency of the transportation of objects. However, relatively recent research in body proportions and biomechanics, which would include gait, shows an increase in efficiency in carrying goods (while walking) in modern humans as opposed to nonhuman primates with an inference to our hominid ancestors (Wang & Crompton, 2004). Though efficiency in carrying loads among hominids may differ in degree, the morphological changes that result in a greater degree of bipedalism would have a greater biomechanical advantage over less efficient hominids.

Stemming from the migration and food carrying hypotheses, *hominid posture* is considered as another possible explanation for the origin of bipedalism. The upright posture is suggested to allow the ability to evade predators and for displays of aggression. Aggressive displays, along with the ability to exploit new food sources, would have conveyed a greater advantage to a hominid that had both a larger body size and a more erect posture. Research has shown that the stance of *Pan troglodytes* during defensive displays were either primary or secondary (passive and aggressive, respectively). Depending on the circumstance and the presence and distance of predators or competition, the display or postural stance would have changed with every situation. An upright posture would have allowed not only for a greater amount of time for the flight versus fight response and/or cost benefit analysis but also the possibility of intimidation with or without physical contact. In any terms, the speed of a quadrupedal gait versus the benefits of an upright posture was unquestionable during defensive displays. An erect posture would have allowed for a greater line of sight and a greater awareness of the surrounding environment (Walter, 2004).

The *reproductive hypothesis* suggests that human upright posture and bipedal gait are conducive for reproductive efficiency. Unlike the nonhuman primate counterpart, human sexual adaptations for efficiency were seen in a copulation position (ventral-ventral) that would have allowed the female reproductive tract (vaginal angle) to be parallel with gravity, resulting in a greater sperm retention around the cervix. Additional adaptations to increase sperm retention included the sedative effect of an orgasm, females capable of multiple orgasms, the dominance of nocturnal copulation, and a pair-bond sleeping arrangement (Gallup & Suarez, 1983).

As for the final product of copulation, the *birthing hypothesis* suggests that bipedalism transformed the birthing process from an individual experience to a social experience. For example, in the position of the female reproductive tract in a nonhuman primate, an infant emerges from the birth canal facing the female without the necessity of rotating the infant. This differs from the human primate. Due to the human infant head and shoulder dimensions, as

compared to the dimensional opening of the human female birth canal, human infants typically need to be rotated to ensure that they emerge facing away from the female. The vulnerability of females during the birthing process has made assistance a necessity. In terms of hominid evolution, the emergence of complex social systems aided not only in the birthing process, but also provided vigilance against predation during this process (Trevathan, 1996).

The *aquatic ape hypothesis* suggests an aquatic phase during human evolution with implications for bipedalism. This explanation points to humankind's untraditional features, such as the great ability to swim, a reduction of body hair, hair tracking toward the midline of the body, subcutaneous fat, and unspecialized hands. Additional features such as body odor, a voluntary control of respiration, a pronounced bradycardia, salt tears, round female breasts, ventro-ventral mating, and dilute urine are suggested by some researchers as evidence for an aquatic phase in human evolution. It is claimed that our early bipedal ancestors existed in a semiaquatic state within the tropical rainforests. These early ancestors are depicted as "advancing" in a linear progression. At first, these ancestral descendants lived an idyllic life feasting on plants, and then later, they consumed shellfish, and finally, they became terrestrial hunters of game with a spoken language, according to Elaine Morgan in her 1997 book titled *The Aquatic Ape Hypothesis: Most Credible Theory of Human Evolution* (see also Verhaegen, 1985). It may be concluded, based on this theory, that bipedality would have an advantage in the water. However, the efficiency of humans compared to other aquatic mammals within water may suggest otherwise.

Future Areas of Research

While comparing and contrasting the morphology between humans and nonhuman primates can give clues to the relationship among primate taxa, other areas of research are shedding light on the nature of locomotion. The area of biomechanics can aid in the development of new models of origin by understanding the interaction and relationship between bones and muscles. Even the influence of stress and shear on bone morphology can aid in the understanding of locomotive behavior. In addition, contributions made in the area of robotics can also further the understanding of the mind's (computer's) control over multiple mechanical systems. The future development and advancement in understanding locomotion could be within these areas of research and development.

One of the best areas for future research is genetics. Since the developmental basis of vertebral morphology and sequences are the same for all human and nonhuman primates, the differences reflected in both posture and mode of locomotion are suggested to reside in the genetic controls, particularly *homeobox genes*. Homeobox genes (ranging from 100 to 1,000 in number) are a set of DNA

sequences involved in regulating embryonic development (Gehring, 1994). As for humans, there are four Hox gene (39 genes) sequences that control vertebral segmentation: Hox A, Hox B, Hox C, and Hox D. These gene sequences are located in various chromosomes and are expressed in the cells of both the mesoderm and ectoderm (body axis). Research has suggested that changes in the Hox gene code depend on the timed introduction of retinoic acid by means of binding to the transcription regulatory sites and the naturally timed introduction of a teratogen that is controlled by retinoic acid receptor genes. Thus, a change in the timing of the introduction of retinoic acid will change vertebral morphology. For example, inactivation of the RAR- γ changes the anterior formation of the vertebrae and Pax genes (a binding protein) that control sclerotome differentiation (Dietrich & Kessel, 1997).

While humans and pongids differ in their number of chromosomes, 46 and 48 chromosomes respectively, the changes in Hox genes could contribute to the "sudden" emergence and continuing development of the erect posture and bipedal locomotion of hominids. Research has suggested that changes in the distal sequence of the Hox D gene (located on the second chromosome) are responsible for the junction between the lumbar and sacral vertebral region. These changes are suggested to be a product of a mutation, which resulted in the chromosomal fusion of panine chromosomes 12 and 13 into hominine chromosome two. This structural alteration would have changed the rate of protein "evolution" and would have allowed for a high rate of protein change. This change in the rate of protein evolution is suggested to account for the sudden emergence of bipedalism via vertebral morphology. The control of Hox genes on axial morphology and comparative chromosomes among primates are supported by other research (Bowers, 2006; Chimpanzee Sequencing and Analysis Consortium, 2005; Navarro & Barton, 2003). In addition to modifications of the vertebral region, other research determined that Hox b9, Hox c9, and Hox d9 were responsible for limb structure and placement in relation to the axial skeleton during application of fibroblast growth factors (chick embryos). Interestingly, any changes in Hox genes resulted in appendicular skeletal placement with no changes in the axial morphology (Cohn et al., 1997; Muragaki, Mundlos, Upton, & Olsen, 1996).

Conclusion

When evaluating primate locomotion, opinions vary across the scientific community. Nonhuman primates use many forms of locomotion. From quadrupedalism to bipedalism, nonhuman primates exhibit these forms of locomotion depending on the environment (e.g., arboreal or terrestrial) and their biomechanical limitations. The expansion of the neural complexity within primate evolution can explain gait sequence (LS or DS) and limb preference. This is not

to say that the neural complexity is near that of humans; rather, the complexity of the human brain far exceeds the complexity of any nonhuman primate. In terms of locomotion, neural complexity may contribute to limb movement and propulsion, but complexity may not have any influence on posture or preference for a mode of locomotion.

Humans provide an interesting inquiry on the evolution of bipedality. As depicted within the fossil record, forms of bipedalism have evolved multiple times, stretching back to 6 million years ago. Since these hominins and hominids probably did not have the complexity of the modern human brain, what prompted these individuals to stand erect or semierect and walk bipedal is still unknown. However, bipedalism was well established within the Australopithecines. The reason for the emergence of bipedalism from the Miocene apes is still unknown.

Today, hypotheses on the origin of bipedalism and the relationship to the locomotion of extant primates express various opinions. No researcher has complete answers to the many questions posed by human evolution. Morphologically, humans have many shared characteristics with nonhuman primates. However, do these shared evolutionary characteristics show the origin of bipedalism? The presented hypothetical descriptions have attempted to illustrate the deep philosophical problem when attempting to tie shared morphological characteristics with a particular behavior. Experience and probability define the validity in any of these explanations. Through future research, greater light will be shed on the origin of bipedalism, echoing Darwin's words that our species differs in degree and not in kind from the great apes.

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PRIMATE BEHAVIOR STUDIES

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Our species' existence is an enigma that intrigues both scientists and the average human. The reason that we are even able to scratch the surface about this complex question is due to our ability to think critically, maintain culture, and articulate in a manner that has allowed other humans to understand. Humans are able to achieve success based on the ability to express their thoughts in written language, making use of semiotic systems. Scholars for the past 2 centuries have laid the bedrock of knowledge about our close biological and behavioral ties to the primates of this world. This evidence has provided the scientific community and the average human being an understanding of primate behavior as well as the opportunity for future advances. Despite their understanding of the primates, there are many individuals in our world who are still not convinced that humankind spawned from a fossil apelike form. Even so, it is hard to deny organic evolution as a convincing scientific theory. Humans cannot be the only exception to a theory that applies to the emergence of all other species on this planet.

Aristotle was the first of many naturalists to inquire about human existence. For centuries, Aristotle's ideas of a static nature were the doctrine, despite an ever-changing world. Aristotle believed that species are eternally fixed on this planet. This claim rests on his belief that those species that are living on this planet at this moment have always been here and will always be living on earth. Many naturalists attempted to prove that Aristotle's claims were

outdated and dogmatized, but most failed to prove to the masses that the Aristotelian and later Christian view of life was wrong. Charles Darwin, the "father of evolution," is one of the greatest naturalists to have lived. His comprehensive view of organic evolution provided the scientific world with a theory that incorporated not only biology but also geology, paleontology, and anthropology. His empirical arguments challenged old dogmatic ideas that spanned back to the insights of the ancient Greek philosophers.

When Darwin (2007) made his voyage on the HMS *Beagle*, he discovered that organisms that live in different environments acquire certain physical traits and behavioral patterns to adapt and survive. He also came across the idea that if identical species are isolated for long periods from one another, then these identical species will eventually radiate into different varieties and perhaps, given enough time, even into new species. Darwin extended this evolutionary framework to also include our own species, stating that human fossil remains would be found in rock strata and that these specimens would help scientists connect our lineage to the two living pongids on this planet. This idea was known as the pithecometra hypothesis, first presented by Thomas Huxley and Ernst Haeckel. This hypothesis argued the idea that our species is closer to the great apes or pongids (orangutan, gorilla, and chimpanzee) than they are to the lesser apes (gibbon and siamang). While Darwin was correct about the fossil evidence, today we have discovered a total of four living

pongids (which now includes the bonobo), which are all arguably our closest living relatives.

The discovery of the DNA molecule in 1953 by James Watson and Francis Crick helped open the world's eyes to the scientific truth of organic evolution. The molecular evidence that was discovered has shown that humans are biologically closer to the pongids than Huxley of England, Haeckel of Germany, or even Darwin himself could have imagined in the 19th century. These pioneers in human evolution studies had sparked interest around the world, and their influence contributed to the emergence of the discipline of anthropology. The theory that anthropologists follow in their search for knowledge about our past is based on the ideas of evolutionary thought. Many of our speculations may be incorrect, but the truth is that the fossil and artifact evidence found in the rock strata of our planet provides us with the opportunity to pose questions in a logical manner.

Anthropology covers many areas of science such as biology, archaeology, societies and cultures, linguistics, and applied anthropology. The study of primatology, while being a specific focus in biological anthropology, is itself comprehensive in that it attempts to compare and contrast both the similarities and differences in the human species with the other living primates on this planet. In the four pongids (orangutans, gorillas, chimpanzees, and bonobos), we have a window into our past. These complex and self-aware species are the only creatures on this planet, besides humans, which are able to think critically above the rest of the animal kingdom. In our modern world, we have obtained a significant amount of empirical evidence about our biological similarities to the other primates on this earth. These findings have allowed anthropologists to make substantial claims about our behavioral similarities to the other primates.

Studying the behavior of our closest living ancestors is important to advance anthropology because with this information, we can attempt to understand and appreciate how our fossil ancestors developed into the complex human creature of today. Unfortunately, the four pongids and the two hylobates are facing extinction. This is largely due to the environmental changes and human interventions they are trying to endure. At this time, it is crucial for scientists to study these primate species. To truly understand our complex relatives, we must be able to do extensive research on wild apes in their natural habitats. While research in zoos and labs allow scientists to determine these species' intelligence and natural behavior, the only place where we can understand the life processes of these wild organisms in a nonintrusive matter is in their wild habitats.

What is the proof that we actually split from the pongids? While our species did not split from one of the living pongids, it is known that our existence arose from the time period that gave rise to the Dryopithecinae complex of fossil apelike species. During the Miocene epoch, hominids emerged in many different varieties. By the end of the

Pliocene epoch, around 3 million years ago, the environment changed. As a result of this climate change, the tropical jungles of Africa started to vanish causing scattered open woodlands and grassy savannas. This caused a rift in the way fossil apes lived and the way fossil hominids lived. Some species remained arboreal (dryopithecines) while others become terrestrial (kenyapithecines). Fossil evidence demonstrates that the split happened in the Pliocene period, roughly 6 million years ago. Those species that were able to adapt and survive as terrestrial forms (kenyapithecines) evolved to become our more recent ancestors. Bipedality is the trait that first separated the hominid-like hominoids from the pongidlike hominoids. Later developments such as toolmaking, articulate speech, and a complex brain emerged in hominids during the last 3 million years. The living pongids are those great ape species that remained in the rain forests of the Eastern Hemisphere. In this long evolutionary experiment, only those species that were able to adapt to their ever-changing environments survived and reproduced.

Emergence of Primate Behavior Studies

The ability to think critically in terms of science and reason is what separates humans from the rest of the organisms on this planet. Our large cranial capacity and specialized brain have given us the ability to trace our historical lineage. While our species is by far more advanced in many functions of the brain, it is remarkable to see the striking similarities to us that the great apes and hylobates demonstrate. Evidence in behavioral studies clearly shows that we are not the only species to show the ability to think abstractly and articulate our emotions. Scientists accept the fact that we differ only in degree rather than in kind from nonhuman primates. We must not forget to study these species from an objective perspective, not form a bias that humans are far superior to their primate counterparts.

How primate behavior became of interest is a relatively new focus, only originating in the 1960s. This does not mean that there were not studies before this time. Research studies were carried out from 1800 to 1960 and the results analyzed but not with the rigorous discipline that is seen in the 20th and 21st centuries. The study of primates was in many cases secondary to the general mission of these studies. Some early naturalists avoided the behavior studies of wild apes in their natural habitats because these researchers accepted preconceived notions of the large primates, especially ideas about the "violent" gorillas. The fear that these savage creatures would cause harm to individuals set back intensive research studies in Africa.

The first major and groundbreaking study was not in Africa but in the New World, by Raymond Carpenter (1964), who studied the Howler monkeys and later the gibbons in Asia during the 1930s. One may claim this was prior to the 1960s, and they would be correct. But the

progress made by Carpenter would be forgotten until after World War II. Primate field research was not a priority when the world was at war. Carpenter and other rising anthropologists, such as Louis Leakey in the 1950s, paved the way for future researchers and also provided an opportunity for individuals to actually go and study wild primate species in their natural habitats. The passion, which was missing from past studies, was instilled into a new generation of scientists who strove to further our understanding of humans by studying the nonhuman primates of our world. Through extensive investigation and comprehensive research on these close primate relatives, scientists hoped to open doors into our past. The 1970s and 1980s were a period in primate behavioral studies when research was done from a quantitative viewpoint. The goal of these missions was to obtain as much information as possible about the primate species of our planet. However, there has been a shift in emphasis from quantitative to qualitative studies, which forces scientists to refine their research methods. While it is important to learn the scientific specifics about a particular species, we must not forget that comprehensive studies should not be abandoned without constantly revisiting the main facts about a species, lest we dogmatize facts about our closest relatives. The more interpretations we have about a subject, the more valid our generalizations will be. While not intentionally disposing quantitative studies, scientists in many cases have been pressured by both government and private organizations to stray away from large ethological studies because they are not being funded. This can be seen even most recently in the rediscovery of the pygmy tarsier (*Tarsius pumilus*) of Indonesia. This species was believed to be extinct in the 1920s, but scientists fortunately discovered that this species still exists.

My argument is that we cannot allow for the slow removal of large comprehensive studies, especially when we have not truly learned everything there is to know about each species. In the case of the pygmy tarsier, we did not even know that it still existed. The truth is that our closest living species are vanishing before our eyes. If we do not obtain as much information as possible now and take serious steps to save primate species, then they could eventually disappear forever.

Prosimians

To truly understand what are primates, one must understand the criteria that we share with the other species of this planet. The morphological attributes that taxonomists use to determine what is a primate are ones that set it above and beyond other mammals. Species in this group are ones with grasping hands and feet, larger brains, shorter jaws, and a flat face in comparison to other living mammals on earth. The eyes of these organisms are close together and on the front of their faces; these species also have digits with nails rather than claws.

The two subgroups of primates are the Prosimii and Anthropoidea. Prosimian means “premonkey,” and the prosimians of today are believed to be living representations of the early arboreal primates. Prosimians are located in the rain forests of Africa and south Asia.

The earliest and least complex primates are represented several living forms, as the tree shrew, loris, lemur, indri, and tarsier. Tree shrews are found in India, Burma, Sumatra, Java, and the Philippines. The tree shrew is a solitary and asocial creature by nature; the tree shrew will be seen in pairs only in time of mating, but this is the only period where pair-bonding is present. Males are aggressive and will defend their territory. They do so by marking trees with a fluid excreted from the chest.

Prosimians are arboreal and insectivorous, and many taxonomists still classify them with the insectivores. But their complex brain, emphasis on vision rather than smell, and digital flexibility place them in the higher suborder Prosimii. Many believe that the tree shrew is a biological and social link between insectivores and the more evolved prosimians.

Lorisiformes are located in Africa and Asia; they are characterized for their nocturnal lifestyles and for dwelling in trees. Lorisiformes are found normally as individuals or in pairs. Grooming plays a large role in their lives, and it is seen as a form of communication and the creating of relationships between individuals. Lorises feed mostly on insects and supplement their diet with a source of fruits. All members of this subfamily are nocturnal, and they hunt their prey by proceeding quadrupedally through the trees.

The Lemuriformes of Madagascar and the Comoro Islands in the Indian Ocean are composed of lemurs, the aye-aye, and the indri. The species of the Lemuriformes vary in size from the tiny mouse lemur to the largest species, the ring-tailed lemur. Smaller species are nocturnal in behavior, but the larger members of this family are diurnal. These groups, depending on the species, live as individuals or in social groups. These prosimians, especially the lemurs of Madagascar, have prospered on the island due to its being an environment with little to no predators. The only species who threaten this arboreal creature are the hawks, eagles, and humans, who have placed the lemur on the endangered species list because we have infringed on their environment with logging.

Lemurs, due to natural selection, have favored vision over smell and have also created tight social groups to survive against predators. This can be compared to humans in the sense that we adapted to a lifestyle that has been dependent on sight and working together to survive in our ever-changing world. Lemurs are a very social group that play and groom one another; lemurs live in groups of about 24 individuals. They form close relationships with other lemurs due to this nonverbal communication with one another. Like humans, lemurs share a sense of pride in protecting their territory but do so by marking their territory. Lemurs mark their surroundings by urinating or releasing hormones from a gland in the forearm and inner side of

the upper arm; they rub their scents onto trees by scratching. In lemur society, males have a hierarchy that is determined by which males are able to distinguish themselves from the others in the form of vocalization.

Tarsiers are found in Borneo, Sumatra, and parts of the Philippines. They are a small species with very specialized traits. Its large eyes and large ears allow for an ideal adaptation to nocturnal behavior. The Tarsiiformes are usually considered the highest form of Prosimians because of the emphasis on vision, the flexibility in its digits, and also the specialization in the brain found in the tarsiers. Tarsiers are unable to rotate their eyes, but they compensate for this by being able to rotate their head 180 degrees. The species is dependent on being able to leap from tree to tree in search of insects and small vertebrates for its strictly carnivorous diet.

New World Monkeys

The anthropoids of the world consist of monkeys, apes, and humans; this grouping is supported by the close genetic similarities among the anthropoid species, as well as the fossil evidence found in China in the rock strata of the mid-Eocene, which is about 45 million years old. This fossil evidence led people to support the separation of two subgroups of primates, the prosimians and the anthropoids. However, the fossil evidence of some anthropoids is anatomically similar to the modern tarsiers, which allows science to claim that the tarsier is the most related prosimian to the anthropoids of the planet.

The fossil record proves that 40 million years ago, both New World monkeys and Old World monkeys shared a similar genetic relative. By this time, the planet had already shifted into the current geological makeup of our modern world. The science community is still unaware of how the forming of New World monkeys occurred, but it is believed that New World monkeys evolved in the Old World and reached South America via rafting on logs. After this time, the New World monkeys of our planet evolved independently from the Old World monkeys. They now live in the tropical forests of the Western Hemisphere. New World monkeys are known as platyrrhines, a term that comes from the characterization of each species having a broad, flat nose. Due to the geographic isolation of the two groups of monkeys, they diverged in characteristics but in similar ways because of their common evolutionary ancestry.

New World monkeys are found in Central and South America. The species are all classified under the superfamily of Callitrichidae, which is broken up into two subfamilies (Callithricidae and Cebidae). Dependency on the trees as a form of protection, the adaptation of a prehensile tail, and dermal ridges on their tails have allowed these species to live for the most part without fear of predators.

The Callitrichidae includes marmosets and tamarins. Marmosets are found only in southern areas around the

Amazon River. Tamarins are found only in areas north and west of the Amazon River. Marmosets inhabit most types of forests. They feed on insects and fruit. Marmosets move quadrupedally, leaping and climbing from tree to tree. This New World monkey lives in family units consisting of a mother, father, and offspring. The major anatomical differences between the two species (the marmosets and the tamarins) is the structural makeup of the lower jaw. Marmosets have a V-shaped mouth, while tamarins have a U-shaped mouth. Tamarins are dependent on a stable diet of fruit, with insects being a supplement, and like their counterparts live in family groups (mother, father, and offspring) that move together from place to place.

The Cebidae group, the larger of these two families, is a subfamily in which most members are diurnal. This family consists of the capuchins, who live in very social communities of 10 to 30 members. They feed on whatever is available to them such as fruit, flowers, leaves, invertebrates, and birds.

The most extensive study performed to this day was done by C. R. Carpenter (1964), who did field studies on the free-ranging red howler monkey. This isolated primate was ideal for studies because it helped not only the study of this primate but also the study of interactions between other groups, as well as the howler's own ecological territory. His study helped uncover information about the size, movements, age and sex distribution, sexual behavior, and forms of communication. Howlers belong to a subfamily of the Cebidae family called the Alouattinae, which has six species that cover a region from Mexico to Argentina.

Howler monkeys, the largest New World monkey, can reach 6 feet in size from nose to tail. They are entirely arboreal, living in the highest branches of the tallest trees. They travel in small bands of 10 individuals. Howlers have good color vision but a poor sense of smell. They eat leaves, fruits, and flowers. The adult male howlers bellow a roar, which is possible because of the bone at the base of their tongue known as the hyoid bone. This hollow bone allows for a large powerful bellow. Bellowing may be used to express an emotion or defend a territory. Adult males gather for social roaring in the early morning or early evening; their howling carries through the jungle for almost 2 miles.

Sexual dimorphism is very present in all six howler species; females are three quarters the size of males. Howler monkeys are also dichromatic as males and females have different color coats. The howler monkey, in comparison to other New World monkeys, does not venture far from its territory. A howler society consists of a multimale group, which ranges in size from just 3 to 20 members. It covers a small radius of land. The howler diet is primarily of leaves, so the howler is a slow moving monkey.

The spider monkey is a New World monkey. It is part of the Atelidae group and is structurally similar to the howler with a difference only in the size; the howler monkey is significantly larger. The spider monkey is a sexually monomorphic species, which means that males and females

are almost identical in size. The only major difference between the sexes is the length in the canines of the males, which are longer. The long and narrow hands of the spider monkey allow it to move swiftly through the trees; this differs from the slow moving howler monkey. Like the howler monkey, the spider monkey has a long prehensile tail that is used like a fifth appendage. This tail shapes the behavior of the species, as it is used to make the balance and adaptability of an arboreal lifestyle possible.

Females play a dominant role in a spider monkey society. This species lives in groups of 15 to 25 members, making it a very social group. Females decide when the group will move from one place to the next, when they will search for food, and when the group eats. Unlike the howler monkey, who lives primarily on leaves, the spider monkey has a staple diet of fruit. Since ripe fruit is difficult to find, spider monkeys break up into small foraging groups of 2 to 8 individuals to reduce competition among members. The female leaders know where all the great feeding paths are, so they are more likely to receive the ripest fruit. Unlike most primate groups, spider monkeys do not really see a great importance in grooming. However, grooming is usually present in most of the primate species that live in a complex social group.

Old World Monkeys

The Old World monkeys of this planet are found in Africa, Europe, and Asia. These species of monkeys are roughly 30 million years removed from humans and the great apes. The superfamily in which these species are classified is known as the Cercopithecoidea and is divided into the two subfamilies of Colobinae and Cercopithecinae. The Old World monkeys are arboreal and terrestrial species that live off a diet of vegetation or fruits. The communities in which they live vary in size from 8 to 200 members.

The Colobinae are leaf-eating insectivorous monkeys that are represented by the colobus monkeys of Africa or the langurs of Asia. This species, in contrast to the cercopithecinines, are vegetarian. Other factors that distinguish them from the adjacent subfamily are that they lack cheek pouches, and they have a complex digestive system, which divides their stomachs into multiple chambers. Unlike the terrestrial Cercopithecinae species, these species are dependent on living an arboreal lifestyle. They nourish themselves with fruits, leaves, and flowers. To collect food, a group forms a party to forage for these necessities. The group consists of a single dominant male and a number of females and their offspring.

Langurs, unlike the colobus monkeys, live in groups of one or more males with the company of females and their young. They go out and forage in groups to obtain food. The langurs are located in the regions from India to China and Southeast Asia. While the colobus monkey shows a behavior of using semibrachiation, langurs are very

specialized in their hands, which allow them to move from tree to tree with precision. The fingers of the langur are very long, and its thumb is reduced in size to allow for an easy ability to cling to trees.

The Cercopithecinae include the baboons, mandrill, drill, galeda, macaques, and vervets. These species are found throughout Africa and parts of Asia. The species of this sub-group are both arboreal and terrestrial, compared to their counterparts, the arboreal Colobinae Old World monkeys.

Based on their well-adapted life on the grassy savannas, baboons are of special interest to anthropologists. The baboon is the largest of the Old World monkeys. The social behavior and structure of this Old World monkey has become of much interest. The baboons' ability to live in large societies and cooperate to survive in an environment where they are the prey of many larger animals (cheetahs, lions, hyenas, hippos, leopards, water buffalo, and crocodile) is crucial to understanding the evolutionary past of early humans who lived in a similar climate and environment and faced the same obstacles. The recognition that the baboon is an intelligent species, not strictly relying on instinct, dates back to Charles Darwin. In the 18th century, prior to Darwin, it was believed that intelligence rested in the mind of humans who were able to separate their natural instinctive urges and live in a world of strictly rational thought. This was changed with Darwin's claim that humans are like all animals that are able to learn from experiences as well as from instinctive ingrained memory. Darwin believed that instinct is a product of our evolution. Metaphysics is the understanding of existence. To understand how humans evolved into the species it is today, we must uncover fossil evidence to study our closest relatives so that we can envision how we once lived.

While Old World monkeys are roughly 30 million years removed from us, their social network is of major importance because it helps to point out the fact that before tool use and language, social networks must have formed first to promote the survival of species that were limited to smaller cranial capacities. Having large brains has many evolutionary risks. Complex brains need lots of caloric energy to run efficiently. As a result, to reduce the need for larger brains, other animals become specialized in specific skills and in specific brain tissue.

In central East Africa, olive baboons (*Papop anubis*) use their social skills to ban together to avoid becoming killed by other species. While collectively this allows for a better opportunity to survive, it also becomes difficult when resources are limited. The social order of a baboon society revolves around a static matrilineal and an unpredictable male social hierarchy. The dominant male is constantly threatened by new immigrant males and younger males, who challenge the alpha male with their larger and stronger physical makeup. As the alpha male, the leader must make decisions for the entire baboon colony, and he is allowed the first right to impregnate females that are in periods of ovulation. Maintaining a status of alpha male is

difficult due to constant attempts by other males for this position. The average control of this position by one male rarely is longer than 7 to 8 months. To determine one's dominance over another male, males challenge other males by chasing one another. Physical fights are rare to nonexistent. However, if males are unable to determine if one male is stronger than another, they display wahoo calls (loud, low-pitched calls) to indicate who is the strongest. Wahoo calls take a lot of energy, so many males become exhausted after the challenge. While the dominant male is provided the first chance to impregnate the female members of the group, he will not necessarily be successful in the monopolization of all the offspring of all the women. Alpha males achieve success through reproduction and also by the killing of infants that are not their own. Infanticide is not just a process done by baboons; it is performed by many species in the animal kingdom. Infanticide is a way for males to eliminate competition from the gene pool. Since alpha males have a period of only 8 months to monopolize the mating of an entire baboon society, males try to eliminate any infants that are not their offspring. Infanticide is a sexually selected trait that enhances a male's fitness. Infanticide in the animal kingdom happens in primarily polygynous species where competition is intense and females are unable to organize and protect themselves from male attacks. Unlike females, males rarely live past 15 years because they are unable to live longer in such a stressful world. The constant threat of losing one's alpha status is a constant risk as a male becomes older and fears that immigrant males will be able to enter a group and dominate.

Reproductive success and becoming the alpha male are the two most important instinctive goals of all males. While this attitude appears to be selfish, it is one of many variables that disturb the balance of a community. Grooming is another behavior that allows for communication and a sense of security. This practice is not only just a way to relieve stress within a group, but also a practical way to remove salt, dirt, and parasites from the skin of fellow baboons. Grooming is a large part of the social life of this Old World monkey; they spend over 4 hours a day grooming.

The nuclear family is nonexistent in baboon culture. Friendships and alliances between males and females are only for short amounts of time. These truces are a way of handling business. Females appreciate protection from outside immigrant males who may kill their children, and males are willing to protect these infants because they have a vested interest in protecting their offspring. Infants are completely dependent on their mothers for over a year. Female baboons' aspirations are to protect their children and to live a long life. Unlike males, females are seen as a large social unit because females with genetic ties will protect each other. It is common for females to form ties outside of their genetic group; this is established through grooming. Matrilineal society is linear in which one family is dominant over all other natal groups. This hierarchy is

transitive in which natal Group A is dominant over B, and natal Group A is dominant over C. The female hierarchy, unlike in males, is not dependent on being able to physically dominant other members of the society. Rank is determined by age (the youngest sister is the highest ranking of the family members), a baboon's association with natal relatives, and alliances with other females. The female caste system is very rigid. While it is possible that one could fall from status, it is almost impossible to achieve alpha status overnight. Low-ranking females are unable to achieve higher status because the association of lower-ranking kin affects their status. Without the alliances of fellow kin, a female is unable to ever achieve higher status because she is unable to protect herself against other kin groups. A comparison to human social life is the belief that poor people have high stress in their lives because of low income, but the fact is that without a social support system, they are never comfortable because of the lack of control in their lives. When disputes happen between a higher and a lower female baboon, it is engrained in the inferior female that she will have to back down from the dispute. High-ranking females have a regal allure that is unquestioned by lower-ranking females. As a result, when a dispute ends, there is no direct reconciliation. One may ask how society ever functions if there is never a resolution to an argument. The answer is that other family members confront the victim of the aggressor. The reason higher-ranking families stay in power is their ability to remain unified. Unlike males, who are constantly trying to obtain alpha male status, females live a life that is less stressful when social movement is not present. It is equally stressful when they are going up or down on the social spectrum. The only true downside to being a lower-ranking female is the fact that protection of infanticide is lower because high-ranking males see no reason to protect socially weaker females. Protection is vital to a family's ability to live a long life and allow for a safe environment for its offspring.

The reason that baboons are known for having an extensive social network is the fact that all baboons in a society must be able to adapt to ever-changing demographics. As scientists learn more about this species, they realize that baboons live traumatic lives, which have directly resulted in a short life span. With limited cranial capacity, baboons are unable to alter their environment to their needs. This sets humans and baboons apart. It affects not only the immune system of the baboon but also causes major damage to the mind of the baboon. In a life span, an individual must be constantly aware of its surroundings (such as births, deaths, immigrations, emigrations, sexual courtships, and fights). How is this physically possible? For baboons, it is an unconscious function. Baboons are able to determine social relationships and kinship ties based on the ability to recognize individuals in their group through smell and vocalization. While self-recognition is present in baboons and other Old World monkeys, it is difficult for scientists to prove that these species can empathize with other members of their

community. Even though humans are more suited to perform this task, it seems the development of this function in our brains is grounded in symbolic language as articulate speech rather than merely in social observations. The baboons' ability to unconsciously determine the rank of an individual is a skill that must have been favored by natural selection for this species. Baboons that are able to effectively determine their social network are able to live in a large, governed social structure. This allows for baboons to live on the open savannas where they are physically less dominant than other species. The ability to make quick judgments allows for a simplified method for running a social organization. Simplifying social life is a process that is unconscious and can be compared to humans when our species tries to make tasks easier by creating new methods or tools to allow our life to function more efficiently. The evolutionary history of baboons favored the social function, so baboons became more efficient at living in large groups. As stated before, bigger brains result in the need for more energy, and as a result, instead of bigger brains, the social specialization of the baboon species has resulted in a less solitary life, whereas a baboon with an individual lifestyle would be dependent only on its own ability. Having social skills is a trait that allows for baboons to survive not just in their harsh environment but also for being able to observe the unpredictable social world of baboon culture. In comparison to humans, the baboon is a very introverted species. Understanding the internal thoughts of an individual is difficult. Vocalization is limited to grunts that express a very general idea. This struggle to express information highlights the ability to observe the world as a necessity.

The day-to-day ability to plan for future events is not possible for a baboon. The brain of Old World monkeys is not as developed in comparison to the brain of pongids and humans. Baboons live in the moment, unable to sort information to help make their lives easier. Baboons are a diurnal species like humans. A baboon sleeps in the trees at night and hunts by day with an entire group. When traveling through the forest, baboons make loud noises to scare off predators. To achieve success in fighting off large animals like water buffalo, leopards, and hyenas, baboons mob up against the predator. Baboons are vegetarians, so fighting off large animals is only to prevent traumatic attacks.

The other *Papio* species of baboon (*Papio hamadryas*) is found in the deserts of northeastern Africa. Unlike the large groups of eastern Africa, the baboons of the desert are forced to live in small units because of the scarcity of food. Feeding units consist of a single alpha male and 1 to 4 females who also bring along their offspring. This baboon spends the night in large groups of hundreds of individuals on rock strata to protect themselves from larger predators, but during the day, a large group disperses into family units. A group forages with a single adult male accompanied by his females and their offspring. There is significant sexual dimorphism and sexual dichromatism in

the baboons of East Africa. The adult male hamadryas baboon clearly distinguishes itself from its female counterparts. With large canines, caped hair, and a dominating size almost double that of females, males clearly have an upper hand at maintaining control in the baboon world.

Studying the Old World monkeys of Africa and southern Asia has provided a scientific insight on how proto-hominids and early hominids may have existed before the emergence of our own species. The ability of baboons to work with one another in communities led to their success in surviving on the unforgiving savannas.

Hylobates

Gibbons are members of the Hylobatidae family. They are most notably known for their long arms and unique vocalization. Gibbons are very nimble in their arboreal setting, using their long slender fingers as hooks, allowing them to swing from tree branch to tree branch efficiently. The type of locomotion that hylobates perform is known as brachiation. Based on the anatomical ball and socket design, the gibbons' locomotion style is an arm over arm movement. Gibbons are known as lesser apes in comparison to their counterparts, the pongids or great apes. While they share similar characteristics such as an absence of tails, broad chests, and an upright posture, the lesser apes are unlike the great apes due to having a smaller cranial capacity and body size. The Hylobatidae family consists of 11 species that are recognized. These species are divided into four subgenera based on their different characteristics.

Gibbons live in moist rain-forest-like settings, where they spend the majority of their time, living in the high canopy of the forest. This allows for hylobates to look over the entire forest, helping them to avoid conflict with larger predators like leopards and pythons that live less than 10 meters from the ground. This is another behavioral trait that separates hylobates from the great apes, as the great apes are more prone to a terrestrial life. The lesser apes of Southeast Asia are similar to monkeys anatomically in size and their dental makeup. However, they are also similar to the great apes because they do not have tails.

Their diet consists mainly of fruits but also includes leaves, flowers, and small invertebrates, such as bugs. Monogamy is present in gibbon behavior. It is believed to be an ingrained practice, due to the social need and time spent in raising offspring. Forming strong bonds with its mother or father plays a direct role in the health of gibbon offspring. If the male is not present to protect and provide resources for the family, the species would have never survived as long as it has. Around the age of 10 years, an offspring leaves the comfort of its parents and ventures off to find a mate. Vocalization plays a pivotal role in the pair bonding of mates. Duets in the morning and evening between males and females allow for an understanding of the other ape before they meet. This form of communication

is not only important for a baboon in meeting its future mate but also is important in the guarding of its territory. The species is able to perform these melodic sounds due to a throat sac that lies below the chin.

Due to the gibbon's dependence on living in trees, researchers are still attempting to understand this hylobate. Since the species is isolated up in the canopies of the forest, it is difficult to understand the lives of this creature after the sun has set. The gibbon, unlike any other tree-dwelling ape, does not build a nest in the trees. This is due to the adaptation of its callused hindquarters.

The time is now right for scientists to uncover as much information about the gibbon species as possible. As the environment of these species becomes increasingly threatened by humans in the forms of logging and agriculture, the species are more and more at risk of extinction.

Pongids

Orangutans, known as the men of the forest, are seen as the most antisocial of the four pongids. While this species is more introverted, it does not mean that there is not much to learn about this behaviorally and genetically great ape similar to our own species. Researchers such as Birute Galdikas (1996, 2005) and even the pioneer of orangutan studies, the late Alfred Russel Wallace, claimed that this animal in its natural environment of Sumatra and Borneo is not challenged to outwit other animals on these secluded islands. The only true threat to this species is human intervention. Hunters steal infants and sell them on the black market or to zoos. Adult males, in response to these attempts to steal the babies, attack poachers and are killed as a result. Human intervention does not just stop there. Deforestation is also a part of the orangutan's struggle for survival and reproduction. Logging companies use the precious timber of these islands for carpentry and use the leveled land for farming and/or ranching.

As stated before, the orangutan is a very introverted primate. The only ties that are shared between adult males and females are for procreation. Large males attempt to monopolize the gene pool of their area. They perform this by spreading their genes to as many females as physically possible. The reason it is impossible for this feat to occur is due to the size of an adult orangutan. They vary in size from 110 to 198 pounds, which makes it difficult to travel efficiently. While this task may be impossible, it does not stop the males from wanting to achieve this goal. Female orangutans have a slow reproductive cycle; the opportunity to conceive is only every 10 years. The long gestation period has its benefits and its drawbacks, as it gives the females the responsibility to choose the most suitable mate. But the survival rate of the species is dwindling because it takes so much time to conceive only one child.

Compassion is rare; it is displayed only between a mother and her offspring. While genetically 97% similar to

the human species, orangutans are seen as not being our closet living relative. However, there are many who believe that anatomy and social behavior should be enough evidence to outweigh the DNA difference. The argument is somewhat valid due to the genetic difference. However, there are still many examples that show similarities to us such as intelligence. Orangutans understand the importance of protecting themselves from the elements. They do this by building huts for themselves. They create a nestlike structure with a roof to protect them from rain.

The prehistoric human's diet was once similar to the pongid's of our world. But due to environmental pressures, we changed our diet for a better opportunity for survival. An orangutan's diet consists primarily of fruits, leaves, flowers, bark, honey, termites, bird eggs, insects, buds, shoots, and seeds. This diet can make it quite difficult for this pongid to survive because of the unpredictable occurrences that happen to the environment. When their environment is being deforested and the climate causes long spells of drought, hostility reigns over the islands. Since orangutans are anti-social, cooperation is not present. When resources are scarce, males fight over the resources. Orangutans obtain most of their caloric value from fruits, and it takes a lot of fruits to achieve their desired caloric intake.

While scientists believe that humans are not closest to the orangutan, there are alarming characteristics that prove otherwise. Like humans, orangutans are susceptible to human diseases like malaria and the common cold. Other remarkable physical characteristics that single out this great ape from the other pongids are its sexual dimorphism between males and females. Facial hair, cheek pads, long hair, and a throat sac (male traits) show the complexity between the male and female development. Humans show a large spectrum of diversity in their physical characteristics. This difference occasionally results in males and females being unable to show physical differences or result in a human being sterile. Male orangutans have this shared similarity, known as bimaturism. These males are unable to grow long hair and lack cheek pads or a throat sac, but surprisingly they are able to mate. Even though it is difficult for these males to attract the opposite sex, they are still able and willing to mate.

The debate about genetic similarities is always contradicted by unique similarities; scientists can make assumptions about the bonobo and chimpanzee because they are more extroverted pongids than the orangutans and gorillas. The gorilla is seen by scientists as the pongid with untapped potential to be our closest relative. It is hard to judge this large and peaceful species because scientists are still trying to study these primates within their remote locations.

The shy, gentle, curious gorilla is seen as a species that has the most potential for scientists to discover more about ourselves. The gorilla has shown proof of its ability to solve complex problems in tests performed in labs and zoos. However, in the isolated mountains of Rwanda and

northern Congo, it is a different story. Like the orangutans, gorillas do not have predators that challenge their well-being for survival and reproduction. Without any animal forcing them to critically think about how to obtain the resources they need for survival, the gorilla does not show objective signs of great intelligence, and therefore, it is stereotyped as unintelligent. The gorilla is a more social creature in comparison to the orangutan. Gorillas groom and play with other members of their communities. These small societies in which they live are very important for the development of the members of the community. Male gorillas take pride in the protection of their territory from other predators. Mountain gorillas live in small groups of approximately 10 individuals. One silverback male gorilla rules over adult blackback males, adult females, and juveniles.

Males are the dominant figures in a gorilla society. The functions of the entire community revolve around the silverback male. Some extreme cases of inability to accomplish tasks occur when a silverback male dies. The entire group can dissolve because the female's only bonding is between her child and significant other. As a result of this situation, females will leave to join other groups in order to mate. Mature silverbacks can weigh up to 450 pounds; unlike any other pongid, blackback gorilla males must assert themselves into a role in their group. When males reach a certain age, they are forced to decide if they are going to leave the group to start their own clan or remain as a part of their initial clan and hope the adult silverback will share his females. Leaving a group is difficult because it takes a long time to be accepted by another group—males may spend from months to years wandering in hopes of being accepted.

Like humans, gorillas are unique. All individuals have their own personality, distinct nose print, and voice pitch. This shy species, like humans, also appreciates its privacy. In cases of mating, males and females will find hideaways to share time alone. These intelligent creatures show signs of compassion toward one another. Dian Fossey (2000) depicted a moment from her long list of encounters where an elder male tickled a child with a flower and other moments at times when gorillas have encountered the death of loved ones. The first findings of the mountain gorilla, depicted first by George B. Schaller's (1997, 2003) studies, helped eliminate the generalizations about this shy and timid species.

This gorilla was once known as a savage animal, but now we see the mountain gorilla as comparable to cattle. The diet of the gorilla is poor, forcing the species to live a slow, uneventful life. With a diet consisting of insects and grasses, the gorilla has no leisure time because it is constantly foraging for food. This type of diet is unknown to humans, who are primarily omnivorous, which allows us the best chance for survival. Diet is very important to the chimpanzee and is similar to that of humans. Scientists have much knowledge about this extroverted primate, and evidence suggests that this great ape is our closest living relative.

The knowledge that we have obtained about the chimpanzee can be credited primarily to Jane Goodall (1990, 2000). Influenced by the late Louis S. B. Leakey, Goodall has studied chimpanzees in the Gombe area of Africa for over 45 years. The research about the chimpanzee's social interactions with others has shown the intelligence and the shocking acts that make the chimpanzee debatably the pongid most similar to *Homo sapiens sapiens*.

Unlike the gorillas and orangutans, chimpanzees are known for their tool usage and their ability to solve problems. This pongid has shown countless examples of its methods of outwitting its environment. Chimpanzees use twigs to extract termites from logs and pipelike sticks to hunt for fish and to extract honey from hives. Another intriguing behavior is the chimpanzee's ability to use leaves as a sponge to soak up water from streams and puddles. While tool usage varies, there is evidence that proves that this great ape critically thinks to solve problems. These techniques are learned from an individual of the group and learned from others through observation. The most important development in a young infant chimpanzee's life is the time spent with its mother.

Chimpanzees live in groups of 25 to 125 individuals. Chimpanzees in a society like humankind's is very community oriented. Chimpanzees work together because everyone has a vested interest in survival and prosperity. The males of the community share a sense of pride toward their territory. This land has specific boundaries that are constantly being fought over for its resources. The borders are defended by males who fight against neighboring communities. It is important to the success of the chimpanzee groups that males become a cohesive unit "army" because it plays a direct role in the survival of the community. Males never leave their communities, which allows for this cohesive bonding among other male chimps. The males of a society are very social with one another. They spend lots of time grooming, hunting, and protecting their territory.

Females, on the other hand, are by far not as sociable as males. Females spend most of their time raising their offspring, which is their primary goal in life. Outside of taking care of their children, females are solely interested in being around males. The female's menstrual cycle, unlike the orangutan's, is a 37-day cycle that every 9 to 10 days is evident by sexual swelling on the female's hindquarters. This swelling is appealing to males. This pink football sized sac shows the sexual availability of the female. This swelling is believed to be an adaptation to promote reproductive success and also competition among males. The sac is the body's physical reaction to the time when conception is optimum in an adult female. The membrane inflates from an increase in hormones. Scientists believe that females are the key to the success of the chimpanzee population because females hold the key to selecting the most fit among the males. Female chimps, like gorillas, are free to leave societies and join other groups; this is acceptable based on the fact that sexual swelling is a "passport"

into other communities. This is not the case for males, which are tied to their community.

Territory, while not clearly marked, is one of the sole reasons for violence in chimpanzee society. Like humans, chimps are very emotional creatures; Jane Goodall (1990, 2000) has reported cannibalism and murder in chimp behavior. These brutal displays are shown when males stray from their group. As a result, males that stray away from a group are usually killed and eaten. Warfare between groups is never a battle of epic proportions. The only time groups will even attack is when they know they outnumber another group.

Chimpanzees, like humans, understand that territory expansion is important to increase their resources. Males see the importance of reproductive gain in finding new females. By extending their borders, they are able to take resources such as fruit trees, sources of water, and termite hills. Cooperation between chimpanzees is vital to achieve a successful hunt; most nonhuman primates do not eat vertebrates. Only a few higher primates, such as chimpanzees and humans, eat other mammals. Chimps prey on a variety of mammals of at least 35 known species. Of the prey that chimpanzees hunt, 80% is the red colobus monkey. Meat accounts only for 3% of their diet, though. Hunting is primarily a male role in society. Tracking for prey is a bonding experience that promotes cooperation among males. Having a large group improves the chances of success. The reason scientists think that the chimpanzees may be our closest living relative is due to our strikingly similar diets. Their diet is comparable to the diet of past hunters and gatherers.

On the other side of the Congo River, another extroverted species known as the bonobo is a species that is only now being studied. DNA analysis shows that we share over 98% of our genetic matter with both the chimpanzee and bonobo. This arboreal pongid found in central Africa is known for being less aggressive than its strikingly similar counterpart, the chimpanzee. The bonobo (*Pan paniscus*) forms a female-centered egalitarian society. Their social order is run by an adult alpha female. The extroverted bonobo is seen as one of the closer links to our existence. With its ability to use tools, stand erect most of the time, and express a wide range of emotions, this great ape makes a case for being the closest living relative to us. Primarily frugivorous, scientists believe that this harmonious species lives in peace. This is because the species' environment has an abundance of vegetation, allowing them to live in large groups without fear of competition.

The discovery of this species was first documented by Belgian hunters, who brought back to Belgium their carcasses and skeletons from the Congo in the 1920s during the age of colonialism. Bonobos were first claimed to be a subspecies of the chimpanzee up until the 1980s. The distinction was finally made in 1982 by Harold Coolidge, an American anatomist, who claimed that the species was structurally different from the chimpanzee. The major

anatomical differences between chimps and bonobos are that bonobos have a slender frame and bonobo males are only slightly larger than females. Both bonobo and chimpanzee males are more robust than females. From the neck up, bonobos resemble chimpanzees: Males are more robust than females, with larger canine teeth. From the neck down, bonobo males and females are almost identical. Due to isolation, these species eventually specialized to form the modern chimpanzee and bonobo. Chimpanzees, unlike the bonobos, live in an environment that is half savanna and half forest, while bonobos live strictly in a tropical rain forest climate.

Anatomical differences are not the only significant distinction between these two species. The social behavior of these two pongids are polar opposites. The first major study that helped shed light on these behavioral disparities was performed in the 1930s by Eduard Tratz and Heinz Heck at the Hellabrunn Zoo in Munich. Their template provided evidence of the major differences between the two great apes. The eight point behavioral study emphasizes sexual behavior, intensity of aggression, and vocal expression. This study was sadly disrupted when World War II broke out. This setback is just one of many in the search to understand this forgotten ape. The bonobo has been the most difficult ape to study for a multitude of factors—for example, the shy and timid species takes time to open up to humans. The successful studies at the Wamba site were due to the use of sugarcane to entice bonobos to approach and accept humans. The bonobos' environment is another reason why this species is difficult to study. It lives in a thick and isolated rain forest, which covers 80% of the country. The Democratic Republic of the Congo is much larger than a map truly portrays. The Democratic Republic of the Congo's rain forest is the second largest after the Amazon rain forest. To access this remote land, one must hike through the rain forest or paddle along rivers. To add more difficulties to the search for knowledge, the Democratic Republic of Congo since the 1960s has been in political upheaval.

The endangered bonobo species is an important subject to study because it will allow us to come to an understanding of how our species survived and how we developed into the species we are today. The bonobo is an example of a species in which the environment has played a significant role in shaping its social and emotional patterns. In this tranquil land, the female bonobo, unlike in any primate species, creates alliances with other females. This is unique because in other species females migrate to other communities. This static unity among bonobo females allows for unity among the females. With this close social bonding, females are able to control bonobo society through the regulation of food and the protection of infants. Bonobos provide for an alternative view of what is natural in society. This species shows that evolution does not consistently promote the development of a patriarchal society. The common scientific belief has been that polygyny has been the reason

why *Homo sapiens sapiens* survived. This theory was based on the fact that males naturally felt it necessary to protect their offspring to help promote the passing of their genetic traits. As a result of this fear, males would form close ties with their female counterparts. This close tie led to the creation of the nuclear family in which a male, female, and child live as a cohesive unit.

This contradicts the argument that society revolves around the belief in a nuclear family as the ideal way of life. Based on limited information, scientists are unable to prove that there is a social model that demonstrates whether humans are closer to the chimpanzee or the bonobo. The bonobo is a species that allows anthropologists to glimpse another way of living in a society. This difference in perspective prevents humans from making universal assumptions about the past. For humans to truly understand where we have come from, we must be able to learn not only about our evolutionary history, but also a vast amount about the social and evolutionary history of our closest relatives, the chimpanzee and the bonobo. Bonobos are the contradiction to the argument that a formation of a nuclear family was present because their environment does not force them to constantly fight for resources. Another reason why there is more cooperation within their large communities is due to males and females being unable to determine who the genetic father of an offspring is. This allows for a society in which everyone collectively takes care of one another.

Bonobo males, unlike those in the other three great apes, migrate to other bonobo groups after they become old enough to leave their mother's care. Gorillas, orangutans, and chimpanzees all revolve around a patriarchal society. The reason the bonobo species is remarkable is that females—which are 85% anatomically identical to males—are able to run society based on cooperation with other females. Sexual dimorphism is a driving force for why the majority of males in the animal kingdom function as the dominate gender.

While both chimpanzees and bonobos have policies regarding how a society should function, both are dramatically different. Chimpanzees follow a method of knowing what they want, when they will get it, and how they will get it. Bonobos are not less intelligent, but they simply use different methods to obtain what they want. Chimps resort to violence or power to obtain what they want, while bonobos use sex to solve problems. As previously stated, bonobos and chimps are specialized for behaving in different ways. Chimps function with the method of working together to use violence to obtain power. Bonobos are more in touch with placing themselves in the “shoes” of another bonobo's needs and desires. With this awareness, bonobos are able to share an understanding without becoming consumed with their own needs and desires.

Making other individuals in a community comfortable is done by forming close bonds with other members. When competition for resources is at hand, tension is

released through the rubbing of genital areas. With the use of sex as a method to relieve aggression, bonobos are able to be at peace with not just individuals in their community but also with complete strangers. This rubbing is not exclusive to females; both males and females use it as a form of resolving conflict. Bonobos engage in sex with every partner combination: male-male, male-female, female-female, male-juvenile, and female-juvenile. Despite all this sexual activity, the species' rate of reproduction is low (single births in 5-year intervals), and to prevent incest, adult females instinctively leave their communities in search for new mates. This happens when females migrate in their adolescent years, leaving their homes around the age of 7, when they develop the first signs of sexual swelling. In bonobo societies, since adult females retain their sexual swelling when pregnant, it becomes impossible for males to determine whether a child is theirs. This ambiguous pregnancy, while making it difficult for females to find a dependable father figure, allows for the community to remain unified because males are not at constant odds with other males over females or killing infants. To show another behavioral difference from other animals on this planet, bonobos understand the importance of procreation, but like humans, they believe sex is an act of pleasure. Sex, in many cases among humans, is seen to be simply an act of procreation because it forces them to accept the fact that humans are just like every other animal on this planet.

The use of tools has always been an indicator of intelligence. However, there are not many cases in which bonobos have been prone to tool usage. Frans de Waal (1998) argued that this does not prove that bonobos are more or less intelligent than their counterparts, the chimpanzees. He argues that bonobos have provided only a few cases because they are not challenged to think critically to obtain food in their environment. Tool use in most cases is a method used to collect objects that pongids cannot obtain without the advantage of tools. While the bonobo has shown rare cases of tool use in the wild, Kanzi, a bonobo at the San Diego Zoo, was able to create Oldowan tools by cracking stones together to make flakes. The reason Kanzi actually created the flakes was based on her desire to acquire food.

Tool use is not a standard that all individual pongids can achieve: Some individuals are more intelligent than others. It is debated if culture is present in other primates. Culture will never be present if one generation is unable to teach another generation a skill. Humans are able to perform this task through many methods such as literature, oral traditions, and events. But for apes, it varies based on the community's ability to transmit information. While it may seem difficult for people to picture a society such as the bonobos, we can truly learn something about ourselves from watching the social behaviors of this close relative. Roughly around 5 to 6 million years ago, we shared the same common ancestor. Through observations, we are able

to glimpse a picture of this past if bonobos have retained traits similar to those of our ancestors.

Language

Communication is a function that allows all living animals the ability to transmit ideas and feelings to one another. Conversing is what separates the living from the nonliving. Each organism on this planet achieves this process in many different ways. The study of linguistics is a comprehensive field that does not study just language in humans; it also has incorporated an extensive study on animals to determine if language is uniquely human. While studies have varied among different animal species, the main focus has centered around our closest ancestors, the primates, and more specifically the four pongids. From the study of our closest living relatives, the science community hopes to discover the true definition of what language is, and it also hopes to shed light on the evolution of human social and cognitive abilities.

As scientists learn more about the hominoids, they will uncover the properties of acquiring language and also the ability for language comprehension. In the early history of studying our closest relatives, most research was performed in labs to test the limits of the human mind. As time passed, a debate arose over which direction science should turn in decoding the answers to the origins of language. In the natural world, we can truly see these species in an unaltered state. However, many of our closest relatives, the pongids, use only a fraction of their intellect. The reason for this is that their environment does not demand that they develop communication beyond only their need to survive and reproduce.

The great apes in their natural habitat dominate their living space. The only true threat to their existence is human intervention. Without their environment challenging them to alter their lives, there is no need for these species to create stronger social relations with one another. Researchers argue that what truly separates the pongids from other primates is that their cranial capacity has allowed them to think on an individual level. As a result, this has not led to the forming of strong community ties. Sharing information with one another does not need to be as specialized as compared to that among members of the human species. In our recent evolutionary past, selective pressures must have forced humans to work together in a cohesive society in order to adapt, survive, and reproduce.

The specialization as stated previously in nonhuman primates is less sophisticated. Most primates use communication as a method of warning other individuals that there are predators. For example, chimpanzees vocalize in as many as 34 distinct calls. Though these rough grunts form a method of greeting, it can also be a form of expression such as excitement toward food or a feeling of compassion when a mother embraces an infant. Recognizing that these four relatives closest to humans are a key to understanding language,

scientists are in the process of uncovering evidence about these primates and if they are, in fact, deliberately vocalizing to one another. It is important for scientists to know if these species understand the meaning of calls because it would demonstrate the complexity of their minds. This will help scientists understand if these species have the cognitive ability to understand commands given by humans, which will allow us to test their intellect. While pongids are anatomically unable to articulate all the sounds of our universal grammar, it is more important to focus on their ability to understand what we are trying to convey. It is important to figure out if this is possible because it would show the complexity of their brain, which allows them to adapt to the world around them.

A shift is taking place in the way we study primates. Placing them in a world of human interaction will allow scientists to see their ability to adapt to a different social environment. While determining if other species are able to comprehend our communication system, we must keep in mind the fact that while this communication system works for us, it is evident that it does not mean that we are living an ideal way of life.

To understand species such as the chimpanzee, one must be informed about not just the biological and psychological makeup but also about the behavior of our complex relative. The anatomical makeup of our supposedly closest living ancestor, the chimpanzee, shows that the vocal folds in chimps are too fatty and less muscular than those of humans, and therefore, the chimpanzees cannot create sounds necessary for language. The larynx plays a large role in humankind's ability to articulate effectively; in chimpanzees, the epiglottis extends well higher in the throat, lessening the range of sounds it can produce. This evidence proves that our closest ancestors are physically unable to pronounce all the sounds capable of human language. Due to the chimps inability to speak with our capacity, scientists are divided on what research approach should be followed to test chimpanzees potential limits. The major division in the science community is between two methods: the use of pictograms, which allows primates to create simple symbolic syntax, or the use of ASL (American Sign Language).

The history of using ASL as a form of communication was first studied in 1965 by Allen and Beatrice Gardener. In their experiment, which lasted from 1965 to 1972, they raised a chimp as if it were a human child. Washoe, the chimp, was able to form simple syntax through the use of sign language in an intelligent and creative matter. Within 3 years, Washoe was able to learn 130 signs. This experiment was the first of many experiments that shed light on the capabilities of chimpanzees and led to the pursuit of studying other primates.

Modern studies pertaining to our closest living relatives have revolved around the alteration of an environment. One variable is selected in which the pongid studied is forced to think critically, forcing it to test its social limits. In 1999, the University of Georgia conducted an experiment that entrenched two apes in a human atmosphere. Panzee, a

chimpanzee (*Pan troglodytes*), and Panbanisha, a bonobo (*Pan piniscus*), were raised from 6 weeks of age and fixed in human society. The study's focus was to see the capacity of these species through the use of lexigrams and to see if these pongids could comprehend human speech.

Experiments that proved the complexity of the two pongids were performed by forcing the apes to use their social skills to get what they wanted. The most well-known and successful study was a double study in which a scientist would place a fruit outside of Panzee's reach. Another scientist would go near Panzee, and she would make the scientist aware of the location of the fruit. The forms of communication that Panzee used were initially displaying her hindquarters as a greeting, and after this greeting, pointing to a picture on a computer screen that displayed the item hidden. After she received the attention of the scientist, she would go outside in her play area and attempt to direct the researcher to the location. This test did not involve just a unique event; this study was practiced multiple times with the use of different locations and items. Usually, Panzee would inform someone of the fruit or image within a 24-hour time span, and in rare cases, within a few days. Behaviorally, the primates do not have the same complexity as humans do in speech, complex learning, or invention, but these behaviors are present to some degree. How will scientists uncover the mysteries of our closest relatives? The truth is that we can truly understand by simply forming a relationship with them, as well as observing them.

Every unexplainable event causes humans to consider the possibility that we are not the only species to actually have a complex brain. The social phenomenon of this world has played a direct role in the shift in our mentality and our understanding of behavior. The consensus since the late 20th century has been the belief that all animals were simple, walking biological machines having no feelings or compassion toward other organisms. Even the father of evolution, Charles Darwin, believed that all organisms follow the practice of survival of the fittest in which all animals are completely fueled by their primordial nonrational instincts, which drive them with any means possible to survive. Each species on this planet is unique and diverse, but this does not mean that we are not all connected through organic evolution. We all experience and react to stimuli to survive. Behavioral science is still flourishing because there is still much to learn about the primates of this world. Understanding and observing the day-to-day experiences of these species will allow us to see how their brain functions and also how our early hominid ancestors once lived.

Future of Primate Behavior Studies

Primate behavior has endless possibilities and many directions in which the field can go; but we must not forget our history and also allow for no "stone to be unturned." In order for primatology to achieve its goal in the understanding

of nonhuman primates, we must exhaust all options in all fields. While research has been seen as a highly competitive and an individualistic practice, it seems all the more logical for anthropologists and other scientists to band together to accomplish our goals. The reason we are motivated to study primate behavior is to learn more about ourselves and the other primates. To allow for the discipline to flourish, we must spark interest not only in our community of researchers but also in the general population. By providing information for people to learn, we allow individuals the opportunity to understand anthropology by creating the means to understand. We are providing readers with the sources, which will hopefully enlighten those who have questions.

Technology has affected all aspects of our lives. This is not contrary to the field of anthropology and the study of primate behavior. The ability to test the genome of individual primates is one of many fields that allow researchers the opportunity to become more attuned with evolutionary research. Knowing which offspring is whose is especially important in bonobos; this allows scientists the ability to create elaborate data, such as the family trees of individual groups. Other studies that have allowed scientists a greater insight into the understanding of our primate relatives are the testing of hormonal levels within species. This has given researchers the ability to gain insight into the reproductive cycles, ovulation cycles, male testosterone levels, and stress levels of the species studied. This is especially important in the study of baboons, which was addressed in *Baboon Metaphysics* by Dorothy L. Cheney (2008). While new advances in technology are costly, especially for large studies, their availability furthers the understanding of primates. As time progresses and technology becomes more efficient, these products will become obtainable to all.

Technology allows primatologists to obtain information on a more consistent and less invasive basis. In particular, by using radio collars to track species, scientists will not have to be constantly on the move for fear of losing the group being studied. The great benefit of these forms of monitoring groups is that scientists can watch over multiple colonies, which allows for cross-cultural studies. While advances in technology allow humans to study our closest ancestors with more efficiency, we must not forget that even though technology has allowed humans to achieve many goals, we have also caused great harm to our world. We must remember that humans have been in interaction with other nonhuman primates for millions of years, and for us to keep this possible in the future, we must be responsible and environmentally friendly.

While the scientific community knows there is evidence to prove this fact, the difficulty of trying to get into the minds of our closest living relatives remains. Do the great apes and the lesser apes have the rational faculty to understand the reasoning behind their actions, or is it simply that they are performing a task through mimicking? Are primates able to

create and maintain culture, and are primates restricted to only nonsymbolic language? Can these animals understand abstract thought by referring to symbols that are not physically present? In many cases, these questions cannot be addressed in the natural environments of these species because their environments do not demand that they use their complex brains in this fashion. This is why it is important to not only study primates in their natural environments but also to incorporate these animals into human social contexts.

Conclusion

The future of primatology has endless possibilities. What makes primatology such a unique focus is its ability to cover many areas of specialization. A comprehensive study has foundations in genetics, zoology, anatomy, veterinary medicine, behavioral ecology, anthropology, sociology, psychology, and linguistics. Since the 1950s, people have been curious to not only learn about our closest living relatives but also through learning about these species to learn something about ourselves and where we have come from. The major reason why primatology has been able to make the progress it has made is because in the science community, people treat the field and subject with utmost respect and have decided they will devote their lives to this field. Without scientists who truly love what they are doing, primatology would never achieve its goal in understanding the nonhuman primates of the world. As in any subject, the only way for us to continuously expand our knowledge is to establish the general descriptions of the subject in order to create a meaningful framework. The focus of broad general and quantitative studies during the 1970s and 1980s allowed for future studies to achieve the success we have today. In our focus to find the specifics of our study, we must not forget our history and how to perform broad studies. Every day, we are uncovering new species, and while it is necessary to obtain more and more information about primates, we know we must also create a comprehensive view of the new species in the taxonomic kingdom. As species are being discovered, we must remember that as more and more human contact takes place among the primates, the more likely that our chances to study these species will begin to dwindle. As much as we as humans have created and discovered remarkable things, we intentionally and unintentionally have the ability to alter not only our own lives but also the lives of other organisms around us. To discover the information we need, primatologists must work together in the effort to enlighten not just the science community but also the human world.

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PRIMATE EXTINCTION AND CONSERVATION

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Nonhuman primates offer tremendous value for many different reasons. Being humankind's closest living relatives, they can teach us a great deal about ourselves in terms of understanding our own cognitive abilities including behavior, health, language and development, and, importantly, evolution. They also play a significant role in habitat biodiversity, which is of tremendous importance to overall health of the world's fragile ecosystem. In terms of biological diversity, primates are both seed dispersers and seed predators, occupying specific niches throughout tropical rain forests. Some of the world's richest and most diverse ecosystems also have the largest and most diverse primate populations.

The Issue

Many primates live in tropical, developing countries and compete with humans for valuable resources, such as food and habitat. In various parts of the world, they are exploited for consumption either directly as food or indirectly for medicinal value and also commercial trade. Primates that raid crops, like other animals around the world, are sometimes shot as pests or poisoned. Their forest habitat is being logged and cleared at an alarming rate by commercial loggers and subsistence farmers for land use, such as plantations for cash crops and even firewood. Finally, since endangered primates live in primary rain forests, which

often have the most valuable wood, their conservation is directly tied to the protection of their habitats.

Background

Within the animal kingdom is the order of primates, a group comprising more than 230 different genera. Groupings within the order are either classified into prosimians (smaller bodied and often nocturnal insectivores, with claws instead of nails) and anthropoids (larger bodied, diurnal, often frugivorous, with female reproductive cycles similar to that found in humans) or strepsirrhines or haplorrhines. For example, lorises and lemurs are considered prosimians and strepsirrhines, whereas all monkeys and apes are anthropoids and haplorrhines. Perhaps the most unique primate is the only one that shares characteristics with prosimians and anthropoids and maintains characteristics unique to itself—the tarsier. It has been the subject of controversy for some time and because of its unique combination of traits looks to remain that way.

Nearly each species found within this distinct order possesses physical qualities that separate them from other mammals and other animals. Primates, including humans, share a variety of characteristics not necessarily unique in and of themselves. However, it is the combination of these traits that make them unique. Some of the specific traits

that certain primates have include a complex stomach (sometimes sacculated in colobines species), flexible shoulder girdle (to allow for the greatest range in motion between arms and shoulders), toilet claw (used for extraction of food), dental comb (to scrape bark and gum off trees), prehensile tail with a skinlike undersurface (often used as another limb as well as for balance), postorbital bar (how the eyes are situated in the skull), ischial callosities (sitting pads found on monkeys but greatly reduced in gibbons and siamangs), and cheek pads (food storage).

General traits include lengthy gestation, grasping hands and feet with an opposable thumb, a generalized skeleton, stereoscopic and binocular vision, and a large brain. In particular, the lengthy gestation makes primates particularly vulnerable to extinction. Apes on average reproduce only every 5 to 9 years in the wild (depending on the species). The grasping hand and opposable thumb allow for dexterity and manipulation of objects other animals are not capable of. The thumb has been perhaps one of our greatest evolutionary biological developments, as it allows for a specialized manipulation of objects and tools, which ultimately aids in our survival. Of all of our fingers (and toes), it is the thumb that allows for the greatest range of object manipulation. A generalized skeleton allows the primate to move through its environment in a variety of ways while also allowing an existence in a variety of habitats. Rather than only flying through the air to get from one point to another or slithering from Point A to Point B, a primate can walk, run, jump, climb, swing, brachiate, hop, leap—to move from place to place. Binocular and stereoscopic vision give the primate an ability to have overlapping fields of sight which provide a three-dimensional “(3-D)” view as a result of the eyes being on the front of the face rather than at the sides of the head. This allows for a depth in vision not all animals are afforded. The shape (and relative size) of the brain is similar between humans and non-human primates. The great apes have the most similar brain in structure and size compared to humans, with lesser apes closely behind. Monkeys have a similar brain structure but notably smaller.

Finally, the brain, nature’s most dangerous product (as some would say) happens to be relatively large in all primates. Big brainedness has many benefits not the least of which is an increased cognitive ability often associated with survival.

Intelligence and Cognition

Primate intelligence is a much studied area. Primates are able to demonstrate intelligence in numerous ways including via language, culture, tool use and innovation, and, perhaps most important, survival.

For example, each great ape species has several members that live in captivity and are capable of language in various capacities. Kanzi, a bonobo, uses a symbolic communication

board called the lexigram and is capable of understanding spoken language. Koko (perhaps the most famous signing gorilla) has a vocabulary of over 1,000 signs, and she understands approximately 2,000 words of spoken English. There are also examples from the orangutan and chimpanzee families.

Another example of primate intelligence is found in cultural behavior. Jane Goodall’s (1990) long-term field research has revealed that chimpanzees not only use tools but also make them. Chimpanzee tool use occurs for a variety of reasons including extraction of ants and termites, extraction of certain nuts with anvil and hammer types of tools, and even for symbolic gestures, such as bluff charges to intimidate rivals.

Primate self-medication is another area demonstrating cognitive abilities among primates. Many use plants to treat a variety of parasitic infections. Chimpanzee expert Toshisada Nishida’s studies have shown that out of nearly 200 native plant species eaten by Mahale Mountain chimpanzees, one fourth are used by natives to treat gastrointestinal disorders or parasite disease. In addition, monkeys and prosimians have been seen using millipede and ants as appropriate material for an anointment as protection from insects.

Social Structure/Food/Locomotion

Primate behavior is centered around group living in most cases. In fact, all but one species of Primates is considered social. The orangutan is semisolitary. This is believed to be because their primary food source, fruit, is only found sporadically; therefore, orangutans cannot afford to be social. While many primates eat fruit, the orangutan is a super-specialist of fruit and relies on it for over 90% of its diet.

Most primates live in groups from just several members (as in the case of monogamous species, such as gibbons) to large groups, numbering into the hundreds—hamadryas baboons live in groups as large as 700, for example; that, however, is extremely rare. Most primates live in smaller groups of less than 100 members. They are most often classified as diurnal (day living) or nocturnal, though some forms of lemurs are more crepuscular.

Nonhuman primates like their human relatives are heavily dependent on learned behavior. They learn what they need for survival from their mothers and also other group members. Alloparenting (care of infant by a group member not necessarily related to the individual but often is) is an important part of primate living, and thereby, only primates living in groups benefit from this behavior while raising their offspring. This has serious implications for long-term survival and conservation for different species of primates.

Many perform a variety of locomotion (with their generalized skeletons) and can brachiate through trees as well as walk quadrupedally on the ground and in the branches. Some

even walk bipedally (though rare). The bonobo is our most adapted primate for this type of specialized locomotion.

Primates eat an array of food especially fruit, leaves, other plant material, insects, and even meat. Some are highly specialized, such as the orangutan and gorilla, while others such as certain types of baboons are considered more omnivorous (like humans). Perhaps one of the most “vegetarian” species, the mountain gorilla has an herbaceous diet, with very little fruit and no meat other than insects. Proboscis and other colobus monkeys have sacculated stomachs (chambered) to aid in digestion of (often bitter) plant material, such as leaves.

In a general sense, most primates are found in tropical areas, with just a few genera found in more temperate climates. In fact, the generalized primate (one who can live in numerous ecological niches and eat a more general omnivorous diet) is rare. This includes some macaques, baboons, and of course humans. Thus, unsurprisingly, change in climate reasonably explains the extinction of numerous species of primates.

Wild primate populations are currently found in fairly specific regions and climates in almost 100 different countries throughout the world. They are found throughout Africa and Asia (Old World) and in both Central and South America (New World). Most primates live on or near the equator in tropical areas or rain forests. In fact, more than 90% of all primate species today live in tropical areas, and their fate is directly linked to the places in which they call home, forests. One species in particular, however, does live in northern Japan (Japanese macaques). There is only one species of primate found in Europe—the Barbary ape. The name is somewhat of a misnomer because the Barbary ape is actually a monkey but has no tail, and that may be the reason it was given the name.

Around the time dinosaurs went extinct, the fossil record reveals the first true primates. These ancestors of modern primates were small in size, active at night (nocturnal), and moved through their environments on all four limbs, quadrupedally. They were mainly in the form of lemur and lorislke creatures, smaller forms dating back to older epochs. The earliest known primate (ancestor) was around in the Paleocene or Cretaceous period. It was a tiny, insect-eating fossil mammal not unlike a tree shrew called *Purgatorius*. Then the rise and increase in numbers and diversity of primates was seen in the Miocene epoch. Around 30 million years ago (mya), monkey and apelike primates surfaced. Approximately 4 mya, hominids began to appear, and with this new species of primate came the adaptation to ground living and walking, or bipedalism. The Pleistocene is the epoch in which we currently find 234 (plus or minus) different types of primates. As each radiation of different primates occurs with each epoch, we also see the extinction of particular species.

Human evolution and adaptation expert John Fleagle (1988) stated, “The extinction of plesiadapiforms, for example, coincides roughly with the radiation of both

rodents and early prosimians, and the decline of proconsulids in the middle and late Miocene of Africa is associated with an increased abundance of cercopithecoid monkeys” (p. 460).

The record indicates that first rodents extinguished smaller forms of primates, and then later, larger forms of primates extinguished smaller forms of primates. This demonstrates a pattern of one animal form eradicating another. Humans, being one of the larger forms of primate species and undoubtedly the most prolific, also apparently display the same tendency.

Predation is one explanation for the disappearance of large numbers of primates (and other animals). It is known that humans have been hunting primates into endangerment and even extinction for hundreds of thousands of years. It is thought that during the Pleistocene in East Africa human predation was also responsible for annihilation of many large monkeys. Some 2,000 years ago (indicated by fossil data) with the arrival of *Homo sapiens* to Madagascar, we see numerous primate species driven into extinction. *Archaeoindri*, a gorilla sized lemur became extinct at this point. Today, many of the remaining species of lemurs found on Madagascar are also considered highly endangered—the main reason, human.

Extinction

As nature specialist David Quammen (1998) stated, “The concept of mass extinction implies a biological crisis that spanned large parts of the planet and, in a relatively short time, eradicated a sizable number of species from a variety of groups” (p. 58). Once this point is reached, viable populations no longer exist and so vanishes the goal of each biological organism perpetuation of self into the next generation. Specifically, Quammen (1996) added,

The crux of the matter of extinction . . . is not who or what kills the last individual. The final death reflects only a proximate cause. The ultimate cause or causes, may be quite different. By the time the death of its last individual becomes imminent, a species has already lost too many battles in the war for survival. . . . Its evolutionary adaptability is largely gone. Ecologically, it has become moribund. (p. 77)

It is well-known that human activity is changing weather patterns and ultimately the climate. In addition, competition from other primates (humans) coupled with destruction of natural habitats now accounts for the largest extinction seen in history. Comparatively, recent historical times have shown extinction on a small scale. As Quammen (1998) told it, “Between 1600 and 1900, by his tally, it is believed that humans caused the extinction of about 75 known species, almost all of them mammals and birds. Between 1900 and 1979, humans had extinguished about another 75 known species” (p. 59). Obviously, unrecorded and unknown extinctions are not factored into

these numbers. This rate is well above rates of known loss during the Cretaceous extinction (the most recent and perhaps most famous of all extinctions, extinction of dinosaurs). Mathematical calculations can be done estimating current rates of destruction and the number of species that will therefore become extinct. As an example, it has been estimated by W. V. Reid of the World Resources Institute that before 2040 up to one third of tropical forest species will either be extinct or doomed to extinction unless drastic change occurs. This has grave implications for a slow-reproducing, long-living animal, such as a primate.

Some argue that extinctions (in mass scale) are natural—having occurred at least 5 other times in history. The difference this time is what makes the current situation most alarming, the rapid degree at which it is occurring, as well as the cause. Smaller extinctions were thought to take only one species per major group per million years according to experts such as Quammen. It is believed that this background rate was counterbalanced by the evolution of new species. Mass extinction tells a different story.

Endangerment

Primates are vulnerable to extinction for several reasons. Lengthy interbirth intervals coupled with long lives are characteristics often associated with primates. With that, comes grave conservation implications for both individuals as well as species, not to mention overall ecological diversity.

In a general sense, primates are considered slow breeders compared to other animals. While some are capable of producing offspring up to twice a year, that is rare. As an example, for each of the ape species, the time between births (interbirth interval) varies from up to 2 years in gibbons to up to 9 years for orangutans. Chimpanzees, bonobos, and gorillas all have approximately 4 to 6 years between births. For a species that only gives birth normally once every 9 years, vulnerability to extinction looms closely.

However, there are additional reasons, which make the issue more complex. Proboscis monkeys are currently found in the wild only in Borneo and are at great risk. Their numbers are estimated at less than 10,000. They have very specialized diets, including certain leaves, which require the unique digestion that only a sacculated stomach can provide, and do not do well in captivity. Proboscis monkeys seem to have a rather calm and sensitive temperament in contrast to, say, a macaque or baboon. It is for these reasons that these culturally distinct monkeys are some of our most vulnerable to extinction.

Another example provided, this time on the African continent, is found only in the Democratic Republic of Congo—the bonobo. These great apes are genetically 98.5% plus similar to humans and considered to be temperamentally sensitive and also culturally unique. According to bonobo and chimpanzee expert Frans B. M. de Waal, during

World War II bombings near the Hellabrunn zoo, captive bonobos died of fright in zoos, while their chimpanzee cousins remained seemingly “unaffected.” Bonobos have proven to be one of the most intelligent (in human measured terms) species ever documented, with capabilities for language, tool use and innovation, and other various attributes. Thus far, bonobos are the only known species to use sex for more than pleasure and reproduction. It has been widely researched that they rely on sex to diffuse aggression.

Both bonobos and proboscis monkeys are two diverse species found within this particular order in the animal kingdom. Yet sadly, we as humans risk their very existence at the hands of our own ignorance and greed.

Human overpopulation is one reason for endangerment of other species. Even though a few countries and states have declining population growth, overall world population continues to grow at an alarming rate. This compounds an already bad situation by putting enormous pressure on available land (and therefore biodiversity).

Destruction of habitat comes in a variety of packages, most often for the reason of land conversion for resource exploitation. For example, in Indonesian rain forests (home to many different species of plant and animal) wood is harvested for several reasons. These include use for plywood, furniture, homes, fuel, knickknacks, and even toothpicks. As Franke Wilmer (1993) articulated in *In the Indigenous Voice in World Politics Since Time Immemorial*, “The international demand for hardwood between 1950 and 1985 increased from four to seventy million cubic meters. Japan and the United States are the primary consumers. The Philippines, Malaysia, and Indonesia are the primary suppliers” (p. 17). It seems our insatiable desire for wood may doom our closest living relatives.

Land conversion (for profit) is another reason why primate habitat is disappearing. This includes logging, overgrazing cattle for human consumption, and converting natural, undisturbed areas to cash-bearing profit crops (such as rain forest to palm plantation or small-scale forest to tourist destination). Plantations for coconut, palm, rubber, sugar, and so on are also devastating the natural environment including many forested regions in tropical places, such as Asia and Africa. Palm oil is the chosen oil used in almost every household throughout Southeast Asia. Indonesia, home to the endangered orangutan, is the largest producer of the plant. It is used locally, as well as exported to countries throughout the world. It is found in numerous consumable products sold in the United States, including cakes, cookies, candy, crackers, soap, and so on. In fact, some believe that palm plantations have replaced the frenzied logging industry because the rate of destruction is even greater for this type of land conversion than simply taking product out of the forest.

Another threat to primates is the transmission of disease between animal and human (zoonosis). Numerous viruses and parasites can pass between humans and nonhuman primates. These include the common cold viruses, malaria,

tuberculosis (TB), herpes, scabies, Ebola, HIV (which in primates is a form called SIV), and so on. Because of the genetic similarity between primates and humans (up to 98.5% between chimpanzees, bonobos, and humans) justification for medical testing on primates is not uncommon. Ironically, however, often the disease affects the given primate differently than it does in the human counterpart. It is believed that HIV originated from the blood and butchering of a chimpanzee in Africa in the 1950s; however, HIV is not fatal to chimpanzees. Unfortunately, medical testing and the infection of HIV in chimpanzees has resulted in a captive ape population, which is now lethally dangerous to humans but didn't further knowledge and understanding of the disease in humans. The care for infected individuals (that often live lengthy lives and cannot be afforded exposure to others of its kind) is yet another ethical (and financial) concern born of this type of situation.

Primates are also poached out of the wild to be used for medical research testing. Yerkes Regional Primate Research Center regularly imports primates to be used in medical experiments. At one time, the center had one of the largest populations of captive orangutans originally intended for biological warfare experimentation. Currently, macaques seem to have been deemed to be experimented on for diseases ranging from TB to HIV (or SIV in the primate form). In addition, international demands for biomedical testing on primates have had serious effects on certain populations such as rhesus macaques. In India, they nearly became extinct from "overharvesting." Until recently, conservational status has rarely been a concern. There are numerous considerations to this issue, in particular the ethics of capturing and holding primates for human experimentation is of grave ethical concern.

Nearly universally, primates are soft, cuddly, charming, and intelligent, exuding great appeal to humans. Therefore, capturing primates to be used as pets is another factor affecting their conservational status. People see them used for entertainment on TV or in movies, performing at circuses and at zoos, and people think they might make good pets. Primates are often willful and, particularly great apes, are at least 5 times stronger than most humans. They also bite and can carry diseases.

And while difficult to obtain a primate for a pet in the United States, that's not always the case with other countries. For example, in Taiwan until it became a member of Convention on International Trade in Endangered Species (CITES) (in 1990), it was considered fairly easy to obtain a primate such as an orangutan for private homes. C. Martin and E. Martin stated,

In the period 1987–1990 the demand was so great that more than a thousand (and possibly as many as two thousand) orangutan youngsters were smuggled out of Indonesia to supply a private market which was reportedly prepared to pay anything between US\$ 11,000 and 20,000 for an individual ape. While to some it may seem a high financial price to bear for humans, for primates, the cost is far greater. (cited in Rijkse and Meijaard, 1999, p. 121).

Capture for any animal is disruptive to say the least and traumatizing, often fatally so. There is no way to obtain an infant primate in the wild without killing its mother and often the entire family unit. There are numerous estimates on how taking one primate member out of its natural group in the wild negatively affects not just the individual but also its entire family and sometimes community. For example, experts such as Dian Fossey (1983), Geza Teleki (chimpanzee expert), and Herman Rijkse (1982; orangutan expert) approximate that for every infant ape captured at least 5 adults were killed; in another estimation, only 1 in 5 captives may survive long enough to reach its destination.

Primates are very dependent on their mothers for information critical to survival in the wild. Therefore, it is biological instinct for a mother to protect her infant at any cost. Further, in the case of mountain gorillas, the silverback will protect any member of his group and fight to his own death in the effort to protect them from humans or other dangers. Since gorilla groups can be as large as 20 members, this can mean a severe depletion in population when people hunt primates for pets or entertainment.

Hunting primates for food is another threat to them. Some local human populations throughout Africa have hunted animals in the forest for hundreds of years. Prior to the globalization of forest products, such as mahogany wood used for furniture, remote hunting was much more difficult. In more recent times, infrastructure provided by logging companies now contributes to access of previously restricted areas. The logger then subsidizes the hunter by providing weapons and guns and also provides free transportation into the forest, home to so many different species of primates. As authors Dale Peterson and Karl Ammann (2003) depicted, "It is possible to imagine that the loggers and the hunters and the meat traders are working side by side in a single coordinated and continuous activity: the industrialized extraction of valuable resources from a great forest" (p. 116). Companies bring in large numbers of nonnatives (and their families) and thereby stimulate the bushmeat business by supplying new consumers. It is said that typically these workers can afford more meat than people living locally. The authors also talk about studies in which wood workers were consuming bushmeat 2 to 3 times as often as natives in nearby villages. Employment for hunters is also provided by logging companies that may depend on them to eat. So here lies the connection between demand for wood, habitat destruction, bushmeat, and the endangerment of primates.

Unlike more natural causes for extinctions (such as effects from weather or other natural catastrophe), hunting has a greater influence on overall species numbers. In nature, the weaker, smaller, or diseased members are usually most affected. Hunters, on the other hand, will look for the largest animals available, females with dependent offspring (in the case of hunting for the pet trade), or even hunt indiscriminately. Chronic pressure

on primate populations by hunters is a further effect negatively affecting conservational status. The extinction (or near extinction) of certain monkeys is believed to be a direct result of bushmeat. It's difficult to know for certain because one of the ways in which conservationists know a primate female has been killed is in encountering her infant in captivity. For the hunted male, no such immediate record exists, though his body parts may wind up in commercial trade as relics intended for selling to tourists. For example, decorated, adult male orangutan skulls or even gorilla hands used for ashtrays are sometimes found intended for sale. Obviously, losing reproductive age females has significant implications in the overall conservation of the species.

Further compounding the issue is the fact that certain consumers have developed a cultural preference for bushmeat, such as gorilla. Primatologist Craig Stanford (2001) described it this way:

At an open air market in Yaounde, capital of Cameroon, a brand-new sports utility vehicle sweeps past a row of rusting tin-roofed shacks, stops in a cloud of dust, and disgorges a pair of Cameroonian yuppies in white tennis whites. They bargain briefly with a vendor seated behind wicker baskets piled with slabs of smoked meats and climb back into the SUV with the hand of a gorilla, the leg of a chimpanzee. Two hundred miles away, a logging truck rumbles along a rutted dirt road cut through the forest the previous year. Tethered to various parts of the truck are more animal parts, mainly duiker antelope but also gorilla. The meat, the surplus of what the logging crews have for their table, is being shipped via the forest road out to the towns for commercial sale. Along the way the truckers stop at settlements where more parcels of bushmeat are loaded on. The logging truck works for more than the loggers; it is the flagship of the ape bushmeat industry. The logging crew employs hunters at its camp to supplement the starchy diet the company provides. The company, a French-based conglomerate, knows this; in fact they have supplied the logging crew with big-barreled guns, intended to kill anything from gorilla size on down. (pp. 192–193)

Also, the role the government plays in this economic and global issue must be examined. It has been said that some officials not only condone consumption of bushmeat but will also serve and eat it themselves. In some central African countries, gorilla meat has been served at state dinners as well as found in metropolitan cities, such as Paris and London. This implies some sort of preference for bushmeat by the cultural elite. In addition, it has been found in areas where there are migrant populations of central Africans. Each species of great ape (as well as many monkey species) is potentially affected by this. The International Primate Protection League (2008) reported infant victims of the bushmeat trade ending up at a bonobo sanctuary in the Democratic Republic of Congo. These infants' mothers have been killed by hunters and poachers. Primates including chimpanzees, gorillas, and even slow lorises are also hunted for medicinal use.

Orangutans are not exempt from this threat either. Though shocking to learn, orangutan meat is said to be available for sale in local markets in Indonesia. According to orangutan experts Rijksen and Meijaard (1999), it is believed that at least two restaurants in Jakarta and even perhaps in other Southeast Asian cities orangutan and gibbon organs and meat are available at extraordinarily high prices, subject to availability. In addition, it's rumored that wealthy, east Asian customers place advance orders and on special occasion indulge in "primitive substitution cannibalism." It is this idea that then begs the question—though bushmeat hunting has gone on for generations—is the degree to which we currently see it occur sustainable, ethical, or even necessary.

Over on the Asian continent, primates are also hunted for consumption by humans but on a smaller and less direct scale. For example, orangutans, which have been hunted by local populations of Dayaks for centuries, are also at great risk but not due to overhunting and bushmeat, as seen in Africa. It is anticipated that the overall population in Indonesia will surpass 250 million people by the year 2020. The consequences of this growth will be perhaps most felt by biological organisms such as the slow-breeding orangutan. The ever-growing, insatiable quest for commodities by humans will present a sobering picture: the pushing of our primate cousin toward the edge of extinction.

Orangutans are therefore moving rapidly toward the edge of extinction. They are suffering mostly due to habitat loss as their forest homes turn into palm plantations for human consumption. So while they aren't directly hunted as often as African primates, they are as vulnerable due to the same global forces that are driving our African relatives into extinction.

Primates, especially the charismatic apes, are also exploited for entertainment in the media. Again according to experts Rijksen and Meijaard (1999), a Taiwanese television sequel (also featuring an adolescent male orangutan) called "The Naughty Family" ignited a "booming demand" for pet orangutans. It continues here in the United States as well. 1996 brought another star to American film: *Dunston Checks in Again* features another male orangutan, igniting an inappropriate interest in keeping primates as pets.

The American film *Any Which Way You Can*, starring Clint Eastwood and a subadult male orangutan, ignited an interest in keeping apes for pets. Most people don't realize that training an animal up to 8 times as strong as an adult human male, with keen cognitive abilities, often requires brute force. Many viewers may also be unaware that according to Peterson and Goodall (2000), authors of *Visions of Caliban*, the original orangutan "Clyde" was trained with a

can of mace and a pipe wrapped in newspaper. He was viciously beaten the day before filming started to make him more docile. Near the end of filming the sequel *Any Which Way You Can*, the orangutan was caught stealing doughnuts on the set, brought back to the training facility and beaten for 20 minutes with a

3 1/2-foot ax handle. He died sometime soon after of a cerebral hemorrhage” (pp. 145–146).

Future Directions: Conservation

The goal of conservation in general is to limit loss wherever possible. In the words of conservationist Russell Mittermeier (1996), a broad approach includes the following:

- (1) protecting areas for particularly endangered and vulnerable species; (2) creating large national parks and reserves in areas of high primate diversity or abundance; (3) maintaining parks and reserves that already exist and enforcing protective legislature in them; (4) creating public awareness of the need for primate conservation and the importance of primates as both a national heritage and a resource; . . . (5) determining ways in which people and other primates can coexist in multiple-use areas. (p. 1)

These efforts will help ensure that future generations understand and appreciate what has taken 65 million years in evolution and adaptation to create.

CITES (initiated in the 1970s) has helped the conservation of plants and animals by ranking just how threatened, endangered, and vulnerable each is to extinction. With more than 160 participating countries, laws have become more strictly enforced in hopes of saving and preserving the biodiversity still found in today’s modern world.

The idea of sustainable development is often used in association with conservation and globalization today. It looks at efficient management of resources and production levels, which increase or maintain productivity while causing minimum (or preferably no) damage to the environment. Specifically, too, sustainable development must be economically viable, ecologically sound, and culturally acceptable. It’s often a high order for a sometimes theoretic idea.

Protection plays a significant role in the conservation of primates. It is necessary that this occurs on several levels. Individual primates, entire species, as well as their habitat must all be protected. The rain forest is a biological system, which produces valuable product. When trees are cut unsustainably, precious nutrients are depleted, exacerbated by processes such as farming and cultivation. People must understand this connection between rain forest products and balance within a natural system. It requires awareness and recognition of the value of living primates. This occurs through education of not just values but also important factors, such as evolution, disease transmission, primate cognition, and general biodiversity. Primates must then be protected by laws, and those must be enforced rather than risk more theoretic conservation and less applied protection of them.

Establishing wildlife or habitat corridors has the potential to also aid greatly in the conservation of many different

primate species. This enables animals to move safely from one area to another, allowing important processes to occur, such as seed dispersal and gene flow. Seed dispersal contributes to overall biodiversity of all life. Evolutionarily speaking, gene flow is critical for reducing risk of inbreeding for smaller populations of primates.

Captive breeding and reintroduction plans offer some hope toward the preservation of certain primate species. The species most often highlighted as successful is the golden lion tamarin. It is an example of a species successfully brought back from the brink of extinction. Native to Brazil, these tiny primates had become incredibly endangered. Golden lion tamarin experts D. G. Kleiman and A. B. Rylands stated,

By 1975, fewer than 200 golden lion tamarins were estimated to survive in just a few small patches of Atlantic Forest in the state of Rio de Janeiro; but by 2000, their numbers in the wild were estimated at about 1000, with another 500 or so housed in zoos. (Campbell, Fuentes, MacKinnon, Panger, & Bearder, 2007, p. 505)

Also, incredibly, as many as 40% of golden lion tamarins found in the wild today were either born in captivity and reintroduced into the wild or are descendants of these captive born animals. Part of the success of the golden lion tamarin conservation program is attributed to small size and high reproductive rates of these monkeys (weighing approximately only 4–5 ounces and reproducing up to every 160 days or so). Also, protected habitats still available contribute greatly to the conservation success seen with golden lion tamarins.

Well-regulated ecotourism is another avenue that can lead toward the conservation of primates. As an example, both orangutans and mountain gorillas are species that interact with ecotourists. Through education and awareness to the public, the plight of the given species becomes more real to the visitor through a hands-on rather than theoretic understanding of issues these primates are facing today. Ideally, this can lead to behavior that is more globally responsible in educating the consumer on how consumptive choices may or may not affect a given species. It also brings employment and money into local populations who then take part in the caring for the apes or the parks in which they are found.

Another avenue of conservation in effort toward overall protection and prevention of extinction is rehabilitation. Dr. Carey Yeager (1996) defined rehabilitation in this way: “Rehabilitation implies a process in which animals in captivity are given medical treatment, protective care, and experience or training necessary for successful life in the wild” (p. 10). In addition, skills such as foraging, finding appropriate food sources, climbing, nest building, and even social interaction between conspecifics are developed and nurtured.

It is a difficult and time-consuming process, further complicated by financial challenges. Most agree that this wildlife management tool should be used only as, in the

words of orangutan experts H. D. Rijksen and E. Meijaard (1999), a “temporary measure to remedy a weakness in the legal framework concerning the conservation of protected species” (p. 154), as opposed to using it as an end all solution toward combating global issues surrounding endangerment. In other words, if the legal framework were enough, rehabilitation would be unnecessary. The goal of returning to a life in the wild though sometimes lofty is critical to those providing rehabilitative care for endangered primates. There are numerous rehabilitation projects located throughout the world. In particular, the island of Borneo, home to most of the remaining world population of orangutans, has several orangutan rehabilitation projects. Examples include Sepilok, located in Malaysian Borneo, which is known for its educational center and strict adherence to quarantine procedures. Semengok is also located in Malaysian Borneo and is locally known as an orangutan rehabilitation center. Wanariset (Indonesian Borneo) adheres to strict quarantine and release procedures for animals entering into the center. Nyaru Menting is the newest orangutan rehabilitation center and has been featured on Animal Planet’s “Orangutan Island” series. It is fastidiously run, and care for individual orangutans, as well as the overall species, is quite apparent. Camp Leakey, now a destination for tourists, is home to ex-captive orangutans, as well as wild ones. These are just some examples of orangutan rehabilitation in one geographic area of the world. When done well, it can serve as a model for other species in other parts of the world, facing similar challenges.

Additional efforts focus on providing sanctuary for endangered primates. Different than rehabilitation, a sanctuary does not have the goal of returning the individual to the wild. A prime example located within the United States is a sanctuary for lesser apes located in South Carolina. The International Primate Protection League (or IPPL) cares for 30 some gibbons rescued from biomedical labs, zoos, and even the homes of people who once had them as pets.

Many Western-living people have first come to know primates in zoos. Historically, however, most animals came from the wild, and those that survived often ended up in zoos. In *Our Vanishing Relative*, authors Rijksen and Meijaard (1999) depicted a Dutch animal collector named van Goens who was rumored to specialize in hunting adult orangutans rather than juveniles, arriving in Amsterdam with a reported 25 (sold for 25,000 German marks per pair). Then, for the Ringling Brothers Circus, he imported 33 more orangutans. Not one year later, the Dutchman returned to Amsterdam with another 44 orangutans, all from Sumatra. Based on records from zoos, at least 218 orangutans were exported from Indonesia between 1924 and 1943.

Modern-day zoos house many animals who have been born in captivity (to parents and grandparents caught in the wild). They are now considered another vehicle used in the

conservation of those very species. Within some zoos and aquariums, the Species Survival Program was developed in an effort to help certain species deemed most endangered. Its focus is on select animals that are in danger of becoming extinct in the wild. The program was developed with the idea that zoos and other captive breeding programs may be these species best chance to survive. By maintaining a healthy and genetically diverse population, these management programs offer some hope as more and more habitat is destroyed, fragmenting larger populations of animals, which large-bodied, slow-breeding primates are especially vulnerable to. Ideally, those rescued from poachers and pet traffickers should be the only members held captive and on display, in hopes of furthering education about the plight so many primates face today. As ambassadors for their species, these individuals carry significant educational and awareness messages for their closest living relatives to those who have put them in the greatest danger of potential extinction.

Conservational efforts focus on megafauna or flagship species (charismatic animals attracting attention to the plight of the given species). Primates, especially the great apes, certainly hold such appeal. For example, the Great Ape Project founded in 1993 by Paola Cavalieri and Peter Singer (1993) is an international organization of experts from a range of fields including primatologists, psychologists, and ethicists. The UN declaration of the Rights of Great Apes would confer basic legal rights on nonhuman great apes: chimpanzees, bonobos, orangutans, and gorillas. Specifically, of the rights suggested, the first is the right to life. Individuals are to be protected and not killed, except in self-defense. Protection of individual liberty, essentially the right to not be imprisoned or held captive is the second right. The right to be free from infliction of pain (torture) either wantonly or for alleged benefit of others is considered basic. This has obvious positive conservation implications for at least these four species.

All hope is not lost. At the turn of this century, estimates for lowland gorilla populations were around 100,000. In July 2008, a population was discovered in the Democratic Republic of Congo at 125,000—upping the overall total to more than 200,000 gorillas today. Also, since Dian Fossey’s time (late 1960s through mid 1980s), mountain gorilla populations have tripled, though with still just over 700, they are still considered critically endangered.

Another hopeful example as of late 2008 was reported on the Tonkin snub-nosed monkey. A small population of this extremely rare monkey, with its distinctive upturned nose, has recently been discovered in a remote forest in northern Vietnam.

As reported in *Science Daily* in late 2008, the monkeys were believed to be extinct until the late 1980s, with only approximately 200 Tonkin monkeys remaining in the wild. In April of 2008, biologists managed to observe 15 to 20 individuals (including 3 infants). This exciting discovery offers hope for the snub-nosed monkey’s future.

The past includes very little known information on primates in general. The last 30 to 40 years have brought a wealth of information about primate behavior to the forefront, crucial to understanding conservation issues. Presently, we are at what many experts consider to be the “11th Hour” in terms of understanding enough of the complexities involved in primate conservation and endangerment to prevent extinction. The future, while bleak in some ways, also offers increasing hope. As the human population expands so does our understanding of our kin. We have been endowed with tremendous cognitive abilities, and it is my hope that we will put those abilities toward great use in the preservation of our closest living relatives—the primates.

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PART XI

CULTURE STUDIES

AMAZONIA

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The Amazon is the second-largest river in the world, with a basin that encompasses nine countries and is known as *Amazonia*. Amazonia, or Amazon rain forest, is one of the largest remaining forests of the world. It is home to indigenous peoples, both noncontacted and settled, mestizos, and European immigrants' descendants. A home to megabiodiversity, Amazonia contains plenty of natural resources—not only land but also timber, gold, oil, and gas. Amazonia is largely a remote rural area with people living in subsistence economies, but it is also a network of vibrant and chaotic urban centers and towns that have been supplying natural resources to the world market since as early as the 16th century. The export of mahogany, rubber, quinine, fauna, and many other products has always influenced the region's economy with a boom and bust cycle. The trail of natural products leaving the region serves as a channel through the subsistence economy, the mercantilist economy, and the free market economy. The fate of the forest is very much related to the demands of the world market and the unwillingness of national governments to invest government resources in an area already ruled by local economies supplying the world market through the export network.

The Amazon rain forest is divided into upper and lower sections of the Amazon River basin. The first one lies between 800 and 3,400 meters above sea level while the second area lies at an altitude below 800 meters. As many other tropical rain forests, Amazonia hosts a trilogy of

human and natural resources that constitutes not only its main value but also the fate of its destruction, indigenous peoples, biodiversity, and natural resources, such as gold and oil. Wood, medicinal plants, food, and firewood are some of the direct uses of forests. These forests provide for the survival of a number of rural populations, including indigenous peoples and resource-poor farmers. The standard of living of these populations depends largely on maintaining rain forest vitality, diversity, and coverage. The extraction of oil and mineral resources has fueled only economies foreign to the Amazon, which usually invest little in the areas where they mine or extract oil.

Settled Indigenous Peoples

The early works of Meggers and Evans (1957, p. 598) suggested that the first Amazonian settlers initiated a slow process of “filtration” through the main course of the Amazon River and its tributaries. Other works (Roosevelt, 1991) showed that the area in the Island of Marajo and in the main stream of the Amazon River hosted large, sedentary societies capable of military chiefdoms. The presence of these societies forced less complex societies to leave the *terra firme* and move to the 5,000 smaller Amazon tributaries and its headwaters. At the time of the European contact around 1542, when Orellana descended through the Napo River into the Amazon, some 5 to 6 million

Amerindian peoples lived in Amazonia (Denevan, 1976, 2003; Newson, 1996). Since early contact with the Europeans, the indigenous peoples' population rapidly decreased by epidemics and forced labor.

The Web page of the Red Amazónica De Información Socioambiental Georreferenciada (<http://www.raisg.socioambiental.org/node/106>) gives an overall estimate of more than 370 Amazonian indigenous peoples with a total population of 1.6 million people living in 2,200 territories. Additional to this population are the urban indigenous peoples and the noncontacted indigenous peoples. Bearing in mind that all estimates are gross, we can say that Bolivia has 31 indigenous peoples with 172,000 individuals, Brazil has 200 indigenous peoples with 213,000 individuals, Colombia has 52 indigenous peoples with 70,000 individuals, Ecuador has 6 indigenous peoples with 95,000 individuals, Guyana has 9 indigenous peoples with 40,000 individuals, Peru has 60 indigenous peoples with 400,000 individuals, Surinam has 5 indigenous peoples with 7,000 individuals, and Venezuela has 16 indigenous peoples with 39,000 individuals. Our comparison of these estimates with others cited below suggests a margin of error between 10% and 15%. Now, probably around 1.6 million indigenous peoples live in Amazonia.

Brazil's almost 200 indigenous peoples involve the Apalaí, Apinayé, Apurinã, Arára do Pará, Asurini do Tocantins, Asurini do Xingu, Atroari, Banawá, Bororo, Caiuá, Canela, Cinta-Larga, Deni, Fulniô, Guajajara, Guarani Mbyá, Hixkaryana, Hupda, Ikpeng, Jamamadi, Jarawara, Juma, Kaapor, Kadiwéu, Kaingáng, Kamayurá, Karajá, Karipuna do Amapá, Karitiana, Kaxarari, Kayabi, Kayapó, Krahô, Kuikuro, Kurá-Bakairi, Mamaindé, Maxakalí, Mundurukú, Nadëb, Nambikuára, Palikúr, Parakanã, Paresi, Paumari, Pirahã, Rikbaktsa, Sateré-Mawé, Suruí do Pará, Suruí de Rondônia, Suyá, Tenharim, Terena, Waiãpi, Waurá, Xavante, Xokleng, Yanomámi Waicá Central, and Yuhup, among others.

The large extension of the Brazilian Amazonia and different stages of development among these areas has meant diverse organizational processes for Brazil's Amazonian indigenous peoples. Since the arrival of Europeans to Brazil, the indigenous population that inhabited the main river areas was the first to succumb to the European expansion and to move westward. During the first centuries of contact, the indigenous peoples' population dropped nearly to extinction. The manhunt was carried out by means of the sword or the crucifix. Many early attempts at evangelization were resisted by indigenous warfare; however, evangelization gave way to settlements where indigenous peoples were forced to live and work. The benefits of evangelization are still being debated with the evidence provided by the cases of various indigenous peoples in initial contact. By the beginning of the 20th century, the ongoing manhunting for indigenous peoples was continuing in the hands of the "professional killers" (*bugreiros* in Portuguese) that cleared the land. At the

same time, the evangelization of indigenous peoples had not achieved full results. In the early 20th century, there were indigenous uprisings outside of Amazonia in Sao Paulo state, Espirito Santo, Minas Gerais, Santa Catarina, and Parana that brought the issue of manhunts to national attention through the media. Internationally, the 1908 16th International Congress of Americanists held in Vienna, Austria, received complaints that Brazil was enforcing a national policy of eliminating indigenous peoples. This bad reputation forced the Brazilian government to act in order to protect indigenous peoples through the 1910 creation of the state agency Service to Protect Indigenous Peoples (SPI by its acronym in Portuguese). The man picked as chief of the organization was Candido Mariano Da Silva, who later changed his surname to Rondon. He was a descendant of Terena, Bororo, and Guana indigenous peoples. From 1889, he helped set up thousands of kilometers of telegraphic lines—peacefully—in indigenous peoples' lands; that service led the government to nominate him as the first director of the SPI.

In the 1940s, the Ronçador-Xingu Expedition was in charge of pacifying indigenous peoples, opening roads, and setting up emergency camps. The brothers Orlando, Claudio, and Leonardo Villas Boas took part in this expedition. In 1944, the expedition was successful in pacifying the Xavante and 2 years later, 14 other indigenous peoples of the Xingu. It was not until 1961 that the Xingu Indigenous Peoples National Park was set up in support of these 15 indigenous peoples.

The agency decayed by the 1950s and was finally closed and replaced by a new National Foundation for Indigenous Peoples (FUNAI by its acronym in Portuguese) in 1967. This has meant a different organizational process from those experienced by their Andean Amazonian neighbors.

In Ecuador, the Amazonian rural population outnumbered the urban population. The Amazonian rural population has been growing since 1950 when it represented only 1.68% of the national rural population (Ecuador's National Institute For Statistics and Census [INEC], 1951). In 1990, it was 285,728 and represented 6.35% of the national rural population (INEC, 1991). In 1990, the Amazonian urban population was 102,215 people and represented 1.86% of the national urban population (INEC, 1991). In 2001, the Amazonian urban population was 129,861 people while the rural population had reached 233,379 people, for a total Ecuadorian-Amazonian population of 363,240, representing 2.98% of the national population. This was the result of both migration and colonization.

According to the Confederation of Indigenous Peoples Nationalities of Ecuador (Confederación de Nacionalidades Indígenas del Ecuador [CONAIE], 1989), the region was inhabited by several indigenous groups: 60,000 Amazonian Quichuas in the provinces of Pastaza, Napo, and part of Sucumbios; around 600 Sionas Secoyas; 700 Cofan; 600 Huaoranis; 40,000 Shuars in the provinces of Morona Santiago, Zamora Chinchipe, and part of Pastaza; and

2,400 Achuars for a total of 104,060 people (CONAIE, 1989; Hicks, 1990, p. 6; Ruiz, 1993, p. 641).

Until 1974, Ecuadorian-Amazonian indigenous peoples represented 40% of the Amazonian population, but by 1990, they represented only 28% of the regional population (INEC, 1975, 1991). The process of colonization of the Amazon region pushed indigenous populations toward more remote areas. The indigenous population had to confront integration or resort to isolation in the forests. Migration to the Amazonian region grew steadily, threatening indigenous survival. The use of indigenous peoples as a labor force also affected their pattern of settlement and their cultural survival. Since the 1960s, the indigenous population has initiated a process of organization and has demanded land rights. Until 1979, indigenous peoples did not vote in Ecuador. It was only then that the literacy test was cancelled and indigenous peoples were eligible to vote and to be elected (Mumme & Korzetz, 1997, p. 49). Mumme and Korzetz point out that Ecuador's indigenous peoples have defended their environmental interests through the representation offered by CONAIE rather than through "electorally based representation" (p. 49). The organizational process gradually expanded throughout the Amazonian region. In 1992, 2,000 Amazonian Indians marched to Quito and demanded land rights; as a result, outgoing President Rodrigo Borja (1988–1992) awarded land rights to an extent that surpassed the land titles given by all previous governments together (Rainforest Action Network, 1997; Sawyer, 1997). These Ecuadorian-Amazonian indigenous peoples' organizations were part of the social movements' uprisings that removed Presidents Bucaram, Mahuad, and Gutierrez.

In Peru, there is a broad estimate of around 48 to 65 ethnic groups belonging to 12 to 14 indigenous language groups, with an estimated population of approximately 300,000 inhabitants in the Amazon region (Comisión Amazónica de Medio Ambiente y Desarrollo [CAMAD], 1992, p. 34; Dandler et al., 1998, p. 9; Instituto Nacional de Recursos Naturales [INRENA], 1999, p. 3); Yañez, Noewjovich, & Tobin, 1998, p. 40). The Instituto del Bien Común, a non-profit organization that has mapped 80% of Peruvian indigenous lands, registers in its Amazonian Indigenous Communities Information System 59 ethnic groups belonging to 15 indigenous language groups. In 2008, this population was still grossly estimated around 300,000 people who in fact could be probably closer to 400,000.

In 1969, three indigenous peoples' organizations were born in the Peruvian Amazon. After 3 years of intense efforts, the Amuesha people from the central Peruvian Amazon created the Congress of Amuesha Communities (Brysk, 1996, p. 40). In the northern Peruvian Amazon, two indigenous peoples' organizations were created by the Aguaruna people from the Potro and Manseriche rivers and by the Achuar people from the Huitoyacu, Manchari, and Shintusi rivers (Dandler et al., 1998, p. 12). Since then, a large number of indigenous peoples' organizations have been created.

Ten years later, the first regional and interethnic indigenous peoples' organization was born: the Aguaruna and Huambisa Council. That same year, the first national organization was born with the creation of the Coordinator of the Native Communities of the Peruvian Jungle, which in 1980 changed its name to Interethnic Association for the Development of the Peruvian Jungle (AIDSESEP). In 1984, AIDSESEP led the process of creating the only pan-Amazon organization representing the eight countries of the basin, the Coordinator of Indigenous Peoples Organizations of the Amazon Basin (COICA). In 1987, a second national organization was born with the creation of the Confederation of Amazonian Nationalities of Peru (CONAP). AIDSESEP has been active in defending the land, opposing mining and oil prospecting in their territories and in protected areas, and organizing the grassroots to plan and implement education, health, and production projects (Varese, 1996). CONAP, which initially had the same view, at some point changed and decided to sign a deal with Perupetro in 2007, but this stance has a longer history and has marked the division between the indigenous peoples' organizations, their nongovernmental organizations (NGOs) of support, and is influencing many of the organizations of the Peruvian environmental movement.

Perupetro (Petróleos del Perú), Peru's state corporation in charge of managing oil concessions, differs from Petroperu, Peru's first state oil company and manager of oil resources, which is currently only in charge of commercializing some oil products in Peru.

The recognition of indigenous peoples' lands has had diverse historical processes, legislation, and institutions involved. In Brazil, after initial eviction and relocation, larger territories were awarded to indigenous peoples as in the case of the Yanomami. In Ecuador, government had granted small concessions until the government of Rodrigo Borja when the government granted an amount of land similar to all that had been granted before in all republican history and introduced the legal concept of "indigenous peoples' territory." In Peru, small land holdings have been granted for approximately 1,500 native communities totaling over 12 million hectares of forests. Only the Matses and a few other peoples have been able to secure larger territories while most have been titled and surrounded with colonists who are mainly from the Andean highlands and fewer from the coast.

During the 1990s, the United States Agency for International Development (USAID) promoted Latin America land liberalization under the principles of promoting democratic values and free market principles and thereby created a land market. Thus, counterreform in México, Perú, and Honduras, for example, proposed to generate employment, promote environmentally and socially sound economic growth, and political freedom and governance. Land liberalization involved changing the legal framework to support private sector access to the land market. These reforms affected the most vulnerable, who

had previously benefited by the agrarian reform (Van Dam, 1999, p. 16). During 2008, the Garcia government (2006–2011) in Peru was aiming to promote investment in Amazonian lands for biofuels, soy, and timber. These intentions caused major concern among the indigenous peoples and nonindigenous peoples of the Peruvian-Amazonian region who went on strike demanding the nullification of this legislation. After many days of revolt, the Garcia government overruled two decrees modifying access to indigenous peoples' lands by third parties. Similar protests had been occurring in Colombia in 2008 where the indigenous peoples went on a national march to the national capital, Bogota, to press the government for land rights and to denounce violence.

All Amazonian national governments declare respect for indigenous peoples' rights and the commitments of international legislation protecting their rights, while regional and local authorities want to prevent the enforcement of these rights. World Bank-funded programs have favored individual land titling for colonists over communal land titling for indigenous peoples. But now with the impulse of a second wave of privatization, governments of Colombia and Peru are calling for the small land holders to leave the land. In the case of Colombia, the rural populations are in the midst of the violence that has long affected this country. Indigenous peoples are easy targets for any of the contending forces involved. The governments of Ecuador and Bolivia may be more open to listening to the demand for land rights. The former has been increasing protection to noncontacted indigenous peoples, while the latter has offered to continue land titling. However, the same offer has been made to colonists by Evo Morales, who emerged from the Bolivian electorate. Both governments have indigenous peoples as public officials and involve the participation of indigenous peoples' political organizations among other social sectors.

The Noncontacted Indigenous Peoples

Of the world's 100 noncontacted indigenous peoples, some 85 of these remain noncontacted in the Amazonian countries. There are 67 noncontacted indigenous peoples in Brazil, 14 of them in Peru, and at least one each of them in Bolivia, Colombia, and Ecuador.

The noncontacted indigenous peoples inhabit headwaters, ranges, and other higher ground available to them. Many remain in cloud forests where fauna is more abundant. They live off hunting, fishing, gathering, and incipient agriculture. Reports coincide on their seasonal migration along riverbanks to gather turtle eggs on which occasions they move in family groups of around 25 people, usually with some domesticated huanganas that they breed as dogs, and set camp every 5 kilometers after a 1-day walking journey. In these cases, they have been spotted from air while reports by park guards along riverbanks

show huts made of palm leaves, some of them big enough to provide cover for 5 to 6 people.

The noncontacted indigenous peoples bravely enforce, with spears and arrows, their right to remain without contact. When their possibilities of avoiding contact are reduced by external actors, their alternative is to move to remote areas where this is possible. Their decision to remain noncontacted is evidence of their strong pursuit of their right to be protected from development ensuring their hunter-gatherer lifestyle. In fact, these people try to avoid contact, but when possible and necessary, they aim to scare us out of their land to protect it. They are no more nomadic than many other populations that seasonally adapt to climate change and availability of resources.

The existence of the last remaining indigenous peoples is denied by those interested in their lands, namely loggers, cattle ranchers, and oil companies. Those denying the existence of these peoples usually argue their "absence" in the literature, the fact that the area has been intervened in the last decades, and the fact that there are no scientific reports stating so. Those affirming the existence of these peoples rely on local informants, artifacts found in the field such as stone axes, pottery, wooden containers, bags, or signs or marks on trees, as well as trails and stories of encounters and sightings, human calls in the night imitating animals, and some spearheaded animals appearing at their campsites. Thus, the matter of probing the existence of these peoples in a given area is a much debated issue.

Activities by loggers, cattle ranchers, and oil companies can affect the forest where the noncontacted indigenous peoples live through deforestation and clear-cutting, forest fragmentation and biodiversity loss, negative effects on the wildlife and protected areas, and ecosystem fragmentation. The presence of teams of workers, equipment, and tools will produce solid and liquid waste that will be eliminated in the forests without any more treatment than burying solid waste in the ground. These activities usually include the arrival of airplanes and helicopters flying over the area. In the case of oil, seismic lines will cut usually a few 100 kilometers through the forests. These risks altogether represent a serious threat to the health and wealth of these populations by affecting their integrity, their access to food, and by their lethal exposure to disease.

Over the last decades, Brazil has developed a policy on demarcating and protecting noncontacted indigenous peoples' territories. Although not all efforts were successful, they did contribute to the process of understanding the need to not contact these peoples and respect their right to their land. Since the creation of FUNAI, 13 million hectares of land have been set aside as protected areas for noncontacted indigenous peoples. Protecting their land is a first priority and should be done taking into account the need to contain human pressure and to provide buffer zones to avoid destruction and disappearance of these peoples. Since 1987, FUNAI has focused its work on noncontacted indigenous peoples through seven teams operating

in the states of Amazonas, Pará, Acre, Mato Grosso, Rondônia, and Goiás. In Acre, there are 10 indigenous lands, 5 of which belong to noncontacted indigenous peoples. In Brazil, there is an estimate of around 40 noncontacted indigenous peoples that have been verified and another 27 nonverified, which accounts for a total of 67 noncontacted indigenous peoples.

In the case of Peru, five territorial reserves have been created over 2,812,000 hectares. These are the Murunahua Territorial Reserve and the Mashco Piro Territorial Reserve in the Ucayali Region (1997), the Isconahua Territorial Reserve in the Ucayali Region (1998), the Madre de Dios Territorial Reserve for the Mashco Piro peoples in Madre de Dios (2002), and the Kugapakori Nahua Nanti Territorial Reserve in the Ucayali and Cuzco Regions (2003). However, another five proposed territorial reserves have been awaiting government approval, some of them since 1999. These are the Yavari Tapiche, Yavari Mirim, the Napo Tigre Curaray in Loreto, the Kapanawa in Loreto and Ucayali, and the Cacataibo in Loreto and Ucayali. In Peru, the government department responsible for noncontacted indigenous peoples and the territorial reserves is the National Institute for Andean, Amazonian and Afro-Peruvian Peoples (Instituto Nacional de Pueblos Andinos, Amazonicos y Afroperuanos [INDEPA]). The executive had reorganized and reassigned INDEPA between different ministries during 2006 and 2008 until Congress passed a law restoring the institution's autonomy. However, it still lacks financial and technical resources to carry its duties adequately.

In Bolivia in 2006, the government set up the Intangible Zone for Integral Protection and Absolute Reserve of the Toromona peoples in the Madidi National Park, which is also inhabited by the Ese Ejja and the Kapuibo peoples. The Sinabo, who live between the lower Beni and Yata rivers, are also considered to be in a situation of noncontact; however, another indigenous peoples, the Warasug'we, live in the Noel Kempff National Park in a situation of initial contact. In both cases, these indigenous peoples inhabit a national park, a strict protection area with a ban on resource use.

In Ecuador, although there is no general legislation covering this matter, in 1999, the Ecuadorian government passed an Executive decree (a Presidential decree) creating the Tagaeri Taromenani Intangible Zone. Since then, the Ecuadorean government has failed to delimit the boundaries of the area. After some Ecuadorean campaigners lodged a request for precautionary measures to protect the Tagaeri Taromenani, the Inter American Commission on Human Rights requested the Ecuadorean government "to protect the life and integrity of the Tagaeri Taromenani, adopting the necessary measure to protect the territory that they inhabit, including measures to prevent access" particularly from illegal loggers (see Oilwatch report at http://www.oilwatch.org/reparacion/index.php?option=com_content&task=view&id=62&Itemid=56). The delimitation of the Tagaeri Taromenani Intangible Zone is still pending. Instead, the Correa government proposed in

October 2008 a code of conduct to be followed by the oil companies operating in the area.

In 2002, the Colombian government set up the 999.880 hectares of the Pure River Natural National Park to protect the Aroje, Yuri, and Caraballo peoples, respecting their right to remain noncontacted and allowing them to settle in the future and turn the national park into a communally titled, indigenous-peoples' land. The National Park has among its usual conservation objectives a first and primary goal to protect the territory of the noncontacted, ensuring their survival and their decision not to be contacted.

Migrants

Migration is always in vogue in Amazonia. It was so in the 1950s when Brazil aimed to relocate landless people from outside the Amazon, and it is so today when Andean populations are still moving every day to live in the Amazonian lowlands. These Andean indigenous peoples move to live in Amazonia to practice agriculture, cattle ranching, and commerce. These people usually overvalue their own culture in comparison with that of the Amazonian indigenous peoples.' The more commercially oriented Andean peoples are usually non-Catholic Christians, whereas the Catholic are less organized and lack the organizational skills and group support of non-Catholic Christians. Other migrants include coastal and European settlers.

It usually takes 30 years for many newcomers to understand that agricultural production in tropical lands is quite different from irrigated-land agriculture. In some cases, the migrant population of a rural area has been there for enough time to have integrated traditional knowledge with the exploitation of the Amazonian environment. After one or more generations, this mixture has produced a Creole-Amazonian culture of extractive and "riparian peoples" (*riberenos* in Spanish, *ribeirinhos* in Portuguese)—descendants of migrants who over generations had adapted to indigenous peoples' use of resources—who are partly a mixture of beliefs involving traditional knowledge on how to harvest the environment. While Brazil has granted land rights to these populations, other countries such as Peru have not recognized land rights for these "migrant" peoples and their descendants, despite the fact that many of them live on the forest and feed on it.

Forced labor is still a common situation in Bolivia and Peru both in artisan gold mining and in forest extraction. Andean laborers are hired in their towns and sent to the lower Amazonian forests and rivers to extract resources with a mixture of 15th-century labor conditions and 15th-century cheap, Chinese equipment to dig for oil in Amazonian riverbeds. A small investor usually holds a mining permit that is not supervised on-site. This means miners usually forcefully enforce their limits with their neighbors, feeding conflict with agriculturalists and other resource users. A laborer is hired for a 2-year period to

work 6 days a week, with no holidays and a credit account that can extend its contract.

Urban Centers and Towns

Amazonian societies at some point generated larger sedentary societies along the main Amazon River and its main tributaries, such as in Marajo Island. Many other smaller, nonmilitary chiefdom societies also coexisted in the smaller tributaries and biggest cities. The arrival of missionaries, soldiers, and all sorts of fortune seekers changed the Amazonian landscape. Since then, the region has been exporting natural resources to the world market. The boom and bust cycle has characterized the export of Amazonian products, such as timber, gold, leather, pets, and all sorts of products from biodiversity. All those resource cycles developed a network of rural towns, small cities, and large capitals, such as Manaus and Iquitos. The rubber boom cycle was the most important of these boom cycles. Between 1865 and 1920, Manaus was Brazil's most developed city with electric lighting, piped water, and opera theaters.

Since then, a lot has changed in Amazonia and its cities. Some approximate numbers for current urban Amazonian populations are as follows: Bolivia (Trinidad 89,613; Cobija 32,200), Brazil (Belén 1,912,600; Manaus 1,524,600; Boa Vista 300,000), Colombia (Florencia 150,000; Mocoa 31,000; Leticia 29,666), Ecuador (Lago Agrio 81,918; Puyo 24,881), Peru (Iquitos 396,615; Pucallpa 204,772; Yurimaguas 41,827; Oxapampa 7,743), and Venezuela (Puerto Ayacucho 52,526). These urban centers supply smaller towns that are at the forefront of frontier expansion. They serve as networks for the natural resources flowing to the regional, national, and international markets. Thus, large catfish from Peru goes to the Colombian market, while Brazil nuts and some Amazonian leathers are commercialized in the world market.

Outside most of these Amazonian cities and towns remains the rural landscape, more so up the tributaries. Grasslands and pastures dominate many eastern Amazonian river areas, while in the Brazilian Amazon, the expansion of a network of roads initiated in the 1950s has given space to modern soy crops that dominate the landscape. In the Peruvian Central Amazon, for instance, an area colonized 150 years ago, the descendants of European settlers have forced the Yaneshá indigenous peoples to the fringes of the valleys now occupied by pastures, grasslands, and European-looking urban settlements. Similar phenomena have occurred with other European settlers in different areas of the Amazon. Beyond these areas, the subsistence economies of small colonists and indigenous peoples occupy the smaller tributaries with their family settlements. In the upper section of some of the less occupied headwaters, some noncontacted indigenous peoples still remain. That is the case of the Peruvian–Brazilian border where the national societies stopped their search for rubber at the edge of the rubber forests leaving the hills untouched by the rubber trade. In the

western Amazon, many indigenous peoples living in the upper section of tributaries retain their traditional costumes, language, and organization, while those indigenous peoples of the lower lands are commercial, riparian societies open to commerce and trade since very early times. Traditional Amazonian trade involves coca, salt, stones for knives and axes, cotton, and fauna among other products.

The Effect of the Timber Trade

In the last two decades, efforts to produce a tropical forest reform sprouted in the Amazonian countries. Bolivia, Brazil, and Peru passed new legislation to move away from the mismanagement and forest mining into sustainable forest management. Forest certification schemes and the support of USAID helped Bolivia experiment with forest reform in the 1990s. Peru took until 2002 to start granting forest concessions. However, corruption, mismanagement, and short-term policies favored reform that did not change the relevance and priority of illegal logging, which feeds the national and international markets.

In Peru, between 2002 and 2004, approximately 7.8 million hectares of forests were granted in forest concessions that struggled to comply with the prices offered in the auction and the poorly enforced management plans. Although forest concessions are the official main source for timber production, permissions to agricultural producers for habitat conversion also allow them to sell timber, while another 12 million hectares of forestlands are in the hands of indigenous peoples and sought by loggers aiming to set up contracts with these communities to access the timber. Protected areas are an important source of illegal timber as much as they are territorial reserves for noncontacted indigenous peoples.

Indigenous peoples are the most deeply affected by the timber trade that drains their forests and many times their organizations and trust, too. Indigenous peoples are affected by the forest reform through the overlapping of forest concessions with indigenous lands, particularly, land that is not yet registered; the lack of an adequate process of consultation prior to the awarding of all forest management categories; the invasion of communal land and territorial reserves for noncontacted indigenous peoples; and the government's failure to meet its offers of technical advice in support of communal forest management. At the same time, these indigenous peoples can be affected by corruption from the illegal logging market.

Recent progress in decentralization does not offer much hope for the forests. Regional and national politicians in Madre de Dios, Loreto, and other Amazonian regions are proud representatives of illegal timber interests. The regional president of Loreto announced in 2008 at an international conference attended by the minister of the environment of Brazil that Loreto will not grant 1 square meter to protected areas or indigenous lands, in accordance with the demands of loggers and other extractive industries.

Regional political leadership is very much influenced by the regional economic forces, which in many cases are also strong, local political actors.

To strengthen compliance with forestry legislation, a possible innovation could be the requirement to use the global positioning system (GPS) to link a forest production area with a log going to the market. This would trace the route of a legally harvested log instead of supporting a timber market characterized by wood coming from illegal logging. These actions coupled with a sound database that discounts the timber harvested can be a useful tool for tracing the origin of legally harvested timber.

Megadevelopments

The asymmetry between the actors involved in land use and extractive industries is a central issue in socioenvironmental conflicts occurring in the region. The opening of roads and the paving of the already existing ones will foster the arrival of new populations demanding land and resources and expelling the old population without land titles or capital to new deforestation areas. When looking at socioenvironmental conflict around natural resource policies, we find a divorce between the discourse of the legislation and of the public officials and the implementation at all levels. The assumptions of the legal framework have very little relevance to resource users making decisions in the forests about how to manage resources, how to solve conflicts, and how to compensate for damages. Under these circumstances, the opening of new areas by the South American Regional Integration initiative (IIRSA by its Spanish acronym) suggests the intensification of conflicts affecting indigenous peoples, colonists, peasants, and riparian populations due to the increase in the demand for land, forests, minerals, oil and gas, and illicit crops.

Until the financial crisis of October 2008, a wealth of financial resources from the international financial institutions set up the conditions to carry out large-scale projects, such as IIRSA. IIRSA aims to develop road and communications infrastructure to favor trade and economic development. Geopolitically, it is the affirmation of the continental role of the Brazilian State in the South American region. IIRSA is a proposal to build not only roads coming out of Brazil to connect with its neighbors but also roads among Brazil's neighbors, as well as ports in the Amazon and in both oceans and communications networks.

The Inter-American Development Bank (IADB), whose social and environmental policies are below the standards of the World Bank, plays an important role in the region financing corporations, governments, and megaprojects, such as the components of IIRSA. Another important player is Brazil's National Development Bank that will invest \$220,000 million as part of a plan to accelerate growth (PAC by its acronym in Portuguese) by developing infrastructure, telecommunications, and

energy lines between 2007 and 2010. IIRSA is one of the projects funded by PAC.

Many Amazonian countries lack adequate environmental and social management of infrastructure development. Some of the international financial institutions that are financing these projects also lack these adequate standards. Some governments see these standards as a hindrance to development preferring, though, to avoid the introduction of necessary reforms or proposing to weaken the mechanisms already in place.

In Peru, IIRSA is building the Northern (Paita-Yurimaguas-Huallaga-Amazon River) and Southern (Ilo-Cusco/Puno-Madre de Dios-Assis) Interoceanic Highways while a Central Interoceanic Highway from Pucallpa to Cruzeiro do Sul with connection to Lima has been proposed. In addition, at least two proposals have been mentioned in regard to trains. The social and environmental effects of this expansion to the last frontier in South America will disproportionately affect the most vulnerable populations in these areas, the indigenous populations, both noncontacted and settled and other rural populations. For instance, the current proposed design for the Pucallpa to Cruzeiro do Sul highway aims to cross over a proposed Sierra Del Divisor National Park and over the Isonahua Territorial Reserve in Peru for noncontacted indigenous peoples. The reserve is set up for the noncontacted indigenous peoples, and the crossover is going to negatively affect them by providing open access to the area.

The implementation of IIRSA will only contribute to accelerating the processes already affecting Amazonian peoples and their forests. Protected areas and forest production areas will be crossed by new lines of flow of mahogany and other forest products. At the same time, the national government transfers few responsibilities to regional and local governments, mainly responsibilities in areas in which the national government finds no profit such as artisan gold mining, whereas the profitable concessions of gas, oil, and timber remain in the hands of the national government.

Brazil's Amazonia can be seen as a showcase of the risks posed by current development as usual to the region's rich biological and social diversity. In the 1950s, Brazil decided to open two main roads into the Amazon (one south to north, and another east to west). Along with the road came the settlers into the newly opened areas. Since then, deforestation has had a significant effect in modeling future climate change in the region with an expected increase between 2.3 °C and 5.5 °C for the next 100 years. Similarly, other models predict a rainfall reduction around 20% for the same period. This reality is particularly harsh when we look at the development of urban centers and towns in the Amazon. A study by the Brazilian-based Instituto Socioambiental of seven Amazonian tributaries (Jurua, Purus Madeira, Tapajos, Xingu, Araguaia, and Tocantins) showed that unplanned settlement is creating a network of deforested urban centers that lack recreational

areas and tend to elevate temperatures at the local level thus building islands of deforestation in the Amazonian forest with a tendency to more deforestation.

Oil and Gas

In 1867, only 4 years after the first pioneer oil well was drilled in Titusville, Pennsylvania, a well was drilled in Zorritos on the northwest Peruvian Pacific coast. Peru started production in La Brea and Pariñas oil fields in 1905 (PetroPeru, 1995, p. 5). The first exploration for oil in the Peruvian Amazon occurred in 1911 on Ashaninka land in the central Peruvian Amazon (Dandler et al., 1998, p. 32).

In 1962, Peru started to import oil (PetroPeru, 1995, p. 5). The military junta led by General Juan Velasco Alvarado (1969–1974), following the nationalistic trend of developing countries at the time, decided to expropriate International Petroleum Company, a subsidiary of Standard Oil of New Jersey, ESSO. As a result of this, the government created the Peruvian state oil corporation (PetroPeru) on July 24, 1969 (PetroPeru, 1995, p. 12). The aim was to develop a national state-oil-corporation able to explore and produce oil. The junta also decided to build an 854 km-long pipeline from the Marañon river town of San Jose de Saramuro to the port of Bayovar on the Peruvian north coast. This pipeline has a capacity of 200,000 barrels per day (bbl/d), but it carried only 75,000 bbl/d of crude oil during the 1990s (Ministerio de Energia y Minas, 1999, p. 50).

In the 1960s, Ecuador and Peru initiated the development of oil resources with the collaboration of foreign corporations; however, these countries had no environmental regulations or any concern for environmental matters. By the end of the millennium, both countries had started to develop environmental regulations and set up standards to manage the social and environmental effect of oil activities. However, the transition from discourse into action was and still is slow. This was a particularly difficult issue for Amazonian populations, particularly indigenous peoples.

During the 1980s and early 1990s, Peru's oil production had a downward trend. In 1985, PetroPeru produced 188.5 bbl/d, and in 1992, oil production was 115.6 bbl/d (PetroPeru, 1993, p. 7). From 1990 to 1992, the oil sector was affected by the economic and political crisis left by the Garcia administration (1985–1990). The Fujimori government (1990–2001) was confronted by lack of investment because the country had been declared ineligible by many international financial organizations. Economically, the country was hit by unusually high rates of inflation and devaluation, while politically, drug traffickers and two terrorist organizations were in control of some areas of the country. This economic and political environment had an effect on an already declining trend in foreign investment in the oil sector. In this context, in 1989, PetroPeru shared the market with one operation of Oxi-Bridas (joint oil venture) in oil block 11 in the northwest and an operation

of Occidental Oil Company in block 1-AB (Ministerio de Energia y Minas, 1999, p. 49).

In the case of the environmental and social effects of energy development, the case studies from my dissertation looking into the 1990s showed how the process of development of the legal framework evidenced some tension between the text of the law and enforcement of the social fact (Habermas, 1997, pp. 1–9). On one hand, there is the normative text, the letter of the law, expressing the results of the political debate, and parallel to it runs the social interpretation of the facts, the interpretation done by politicians, the private sector, NGOs, and the general public. In the Ecuadorian case, there was tension between the legislation that forbade oil pollution in protected areas and the final interpretation made by President Durán Ballén (1992–1996) allowing oil activities in the Cuyabeno Wildlife Production Reserve. In the middle, lay a number of diverse interpretations of the law made by oil companies operating in the Ecuadorian Amazon. In the Peruvian case, this tension resulted in the modification and overruling of one third of the environmental code in order to favor foreign investment at the beginning of the 1990s. However, in early 1999, the Peruvian government approved the National Strategy for Natural Protected Areas by Supreme Decree 10–99-AG. This decree stated that non-renewable resources could be exploited only in protected areas where direct use of resources is allowed, a policy still in force today.

Since 2004, a second oil and gas boom fed by the growing economies of the United States, Europe, China, and India and a price hike that reached \$140 per barrel in 2008 expanded oil activities in Peru from 13% of the Peruvian Amazon to 75% of this region. This occurred amidst poor enforcement in environmental management and lack of resources to operate at an adequate level while maintaining very low legal standards. Political pressure on technical officers caused the Camisea pipeline to fail so bad that it broke down five times in its inaugural year—amid claims of human rights violations over the lack of adequate compensation to local peoples and over its effect on noncontacted indigenous peoples and indigenous peoples in initial contact. The Peruvian ombudsman's office produced a report in 2005 based on citizens' complaints citing environmental impact assessment infractions. Political pressure came directly from President Alejandro Toledo who stated that the gas had to arrive in Lima at the city gate on August 9, 2004. The Ministry of Environment was created in 2008 by the Garcia administration only as a requisite for a free trade agreement with the United States and also by the pressure of the IADB involved in financing a second Camisea gas pipeline. This new ministry does not oversee oil, gas, electricity, or piped water. Today, oil activities affect two territorial reserves for noncontacted indigenous peoples and many reserves. A second pipeline adjacent to Camisea, which has changed 50% of its original route, is being built with plans to build a third one. Despite 500 years

of European activity and despite current disturbing and threatening oil exploration, noncontacted indigenous peoples still remain in the forests in three other proposed territorial reserves.

In Brazil, oil activities occurred mainly on the coast. In the 1990s, an oil spill in Rio de Janeiro forced a change in support of the environmental policies of Petrobras, Brazil's state-owned oil corporation. Later on, when Petrobras went into the Urucu oil fields, it had already improved its environmental and social standards; however, the local populations near the pipeline to Manaus still had to make demands to obtain gas and other benefits with a \$20 million environmental management plan and a \$20 million social management plan package. Petrobras is now expanding activities in Peru in areas involving noncontacted indigenous peoples while some Brazilian politicians are aiming to mirror such policies in their own side of Amazonia.

Future Directions

The expansion of extractive industries and the development of road and energy infrastructure are the main threats to the health of the Amazonian rainforests and ecosystems and its inhabitants. Particularly, the very vulnerable noncontacted indigenous peoples in Ecuador and Peru are facing the pressure of oil activities and loggers, while cattle ranchers are the main threat on the Brazilian's side of the Amazon. This is an example of a human rights catastrophe that goes unaccounted by regional politicians interested in accessing natural resources not only at the cost of lives but also at aiming to end a lifestyle that has kept a healthy forest and ecosystems. Development at the hands of individual interests fails to address the broader issues of resilience, sustainability, and governance. These latter issues are central considerations in the planning of a sustainable future for Amazonia. Some Amazonian regional and local governments, civil society, and social movements are demanding accountability in the land-use allocation process; the overlapping of multiple uses has long been a tradition in the Amazonian rainforests. However, when one of these uses forbids the possibility of the other uses—as in the case of extractive industries—the recipe for social conflict is ready, as the processes of social unrest show in Colombia, Ecuador, and Peru. In the short term, the need for prior informed consent by indigenous peoples appears to be the key to finally developing indigenous peoples' public policies. In the long term, the process of urbanization and its rate of growth suggest that unplanned development will continue to deplete the forest, affecting the water rainfall and the climate.

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AUSTRALIAN ABORIGINES

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The native people of Australia are commonly called *Aborigines*, a much discussed term that comes from the Latin expression *ab origine* whose meaning is “from the beginning.” Even though nowadays this definition is mostly accepted, many members of the local populations dislike it as they perceive it as synonymous with oppression and as a stereotyped and discriminating way of distinguishing them from others. For this reason, they usually prefer to call each other by using hundreds of local expressions, such as *alaua*, *nmattjera*, or *tagoman*, which are some of the names used in the Northern Territory, or *gingai*, *gringai*, *wiljagali*, or *illawarra* used in the New South Wales state. These terms generally mean “person.”

Controversial Definition

In the linguistic anthropology field, the identification issue is a very important aspect as it conveys a meaningful message: the fact that their wise ancient culture conceives all the people to be the same, without any classification—simply anyone belonging to the human species. In order to respect their culture and their point of view, the adjective *Aboriginal* and the noun *Aborigine* will be used in this chapter simply as conventional.

Past and Present

Torres Strait islanders also belong to the indigenous population of Australia, but due to the peculiar features of their culture, which include some Papuan and Austronesian elements, they are generally referred to separately from the populations living on the continent.

The precise timing of the beginning of the human occupation on the mainland is still a controversial topic. Aborigines immigrated to the land we now call Australia from Southeast Asia between 70,000 and 40,000 years ago. Relative to the results of thermoluminescence dating, most archaeologists agree with the hypothesis of Aborigine arrival as 50,000 years ago, while radiocarbon testing places that epoch as 40,000 years ago.

An extraordinary discovery in 2003 has brought to light more than 400 Pleistocene-era human footprints together with some animal imprints (those of a kangaroo, an emu, and a big bird) in a desert area of southeastern Australia near the World Heritage Site of the Willandra Lakes Region. The researchers think that those prints can be dated to 20,000 years ago and describe the movement of women, men, and children through a humid area that could have provided them with food. Nowadays, Australian Aborigines embody the most ancient living culture in the world even though colonialism inflicted severe pain on them, bringing drastic changes to their lifestyle. Before colonialism's

beginning in the 18th century, Aborigines numbered much higher than today, but their numbers decreased enormously due to the killings the foreign settlers carried out against them, to scarcity of food and water caused by land deprivation, and last but not least to new illnesses (such as influenza, measles, smallpox, and venereal diseases) brought by the European conquerors for which Aborigines did not have any immune defense. Most of the local populations used to live near the coastline where they could fish and gather crustaceans while others obtained sustenance from the bush where they could find fruits, leaves, berries, and roots, or they could hunt in the desert areas. Nowadays, some communities that are still independent live especially in certain areas of Arnhem Land and in the dry regions of central and west Australia, but most of the natives live in the metropolis suburbs, generally in conditions of poverty and homelessness and often victims of alcoholism and social prejudices. That has caused the extinction of many traditional groups. Their life expectancy is 15 or 20 years lower in comparison with that of the white Australian population, and the infant mortality rate is nearly triple. As far as job opportunities are concerned, their unemployment rate is high, while salaries are definitely low.

Aboriginal ethnicities are estimated to be around 2% of the total population of the continent, which amounts to 22,156,867 inhabitants in early 2010 (Australian Bureau of Statistics, <http://www.abs.gov.au/>). They live both on the mainland and on many islands such as Groote Eylandt, Mornington Island, Palm Island, Fraser Island, and Tasmania and are organized as more than 500 tribal groups.

The Effects of Colonialism

As underlined before, life for the Aborigines became extremely difficult and troublesome when the first European settlers arrived in Australia claiming to have “discovered” a new continent and considering its inhabitants to be simply cumbersome objects to get rid of: The serious consequences of those treatments of the native people’s life cannot be ignored or denied as they are historically documented.

The fact that the indigenous people did not consider the territory as property and that they did not use to mark out the lands made it possible for the foreigners to claim that the wide Australian continent belonged to no one. Consequently, the rights that the Aborigines had had on their land for 1,000s of years were ignored, whereas the *terra nullius* (“land belonging to no one,” or “empty land”) principle was applied by the English who could take possession of the Australian regions in the name of the British Crown.

Even though the indigenous people often behaved defenseless in the face of the invasion, their attempts at rebellion caused the colonial government to reach the decision to use extreme clamping down to suppress rioting. In an instrumental way, massacres and individual killings

perpetrated against Aborigines were made and believed to be supported by Charles Darwin’s theory of natural selection, that is, that some races (such as Aborigines, who were considered to be inferior in comparison with the other ethnic groups) are destined for extinction. Therefore, the colonizers tried to pretend that Aborigines’ deaths were natural events. The government also tried to denigrate their adversaries by describing them as drones and inclined to alcoholism.

Notwithstanding, protests against violence arose and public opinion started to acknowledge how atrocious and unequal was the attitude of the members of the political power toward the natives.

For these reasons, the British chiefs felt compelled to change their strategy and to adopt an only apparently different approach to the Aborigines. The real aim of what was officially presented as “protection policy” was to “hide” native people through severe racial segregations and keep control over them. Indigenous communities were controlled by Western religious missions and forced to follow new cultural models.

However, the Aborigines were still a problem for the white Australians who decided then to start a new form of dominance by “assimilating” the native peoples into the European civilization and trying to make their 1,000-year culture disappear. Their traditional social structure was dismantled, and people were forced to follow the Western model of life. Moreover, since the second half of the 19th century and for 100 years, a new plan was undertaken by the political institutions: Thousands of children (above all, those who had a white parent and who are now known as the *stolen generation*) were systematically removed from their families and constrained to live in religious structures or orphanages or with white families where they were educated according to European principles so that they would pursue the ideal of totally transforming their population and purifying their race through eugenics. Those practices are now considered to have been real cultural genocide.

The shocking results of that policy are still visible today as many Aborigines now live excluded from both societies: oblivious of their traditional culture and languages and marginalized by the well-off Australians whose system they are dependent on. Real integration seems to be still a mirage.

In February 2008, the Prime Minister of Australia Kevin Rudd offered in parliament what many observers have defined as “historical” apologies for “the laws and policies that have inflicted profound grief, suffering and loss” (British Broadcasting Corporation [BBC] News, February 13, 2008).

Social Structure

In Aboriginal culture, social organization is very complex as group life is considered to be more important than individuality.

The language groups (i.e., the various groups that differentiate themselves from the others as far as their spoken idiom is concerned) are based on several clans, which have their links with the territories they live in and with certain animals or plants or other natural elements venerated as totems. Each clan is divided into 2, 4, or even 8 “skin groups” (also called *moiety*s).

The kinship system is a fundamental concept. It establishes the roles, the duties, and the display of manners of every member as it regulates every kind of relationship. According to its laws, for instance, members belonging to the same clan are forbidden to marry one another.

The way people address the other members is also extremely interesting but really very difficult to be understood by an outsider’s point of view. *Mother* and *father*, for example, are names that also refer to aunts and uncles, while *aunt* and *uncle* are terms used for older people; *sister* and *brother* are used not only for someone with whom a person shares his or her own biological parents but also for close relatives of the same generation. These examples make clear the meaning of *family* in Aboriginal culture, that is, a group that configures itself as “extended.”

If a person lives in harmony with an Aboriginal clan for a relatively long period, he or she is adopted by the group in the sense that he or she receives a kin name and, consequently, becomes aware of his or her particular role in that society.

On the other hand, strict social rules regarding external interactions are in force within each clan. Some individuals cannot, for instance, attend certain meetings or communicate with certain clan members. In such cases, communication may take place through the mediation of a third person or by using nonverbal means, such as signs and gestures.

The status of children and aged people is peculiar. As told before, from the end of the 19th century until the second half of the 20th century, Aboriginal children suffered psychological violence when fiercely taken away from their families by the government. They grew up without knowing anything about their origins or their family background, forgetting their names, and being taught to disregard the culture of their ancestors. Young boys were made to work for many hours every day, especially as farmhands, and they were often beaten if they did not obey the orders; in contrast, girls were indoctrinated to become docile wives for white men and to pursue through interethnic marriages the aim to make the white race prevail on the others.

Within indigenous societies, on the contrary, children are taken care of not only by their own parents but also by everyone within the group. The education they get causes them to approach the beauties of nature. Through storytelling, they learn how to go hunting, how to find fruits in the forest, and how to discern good food from dangerous ones or, more generally, they learn how to correctly behave toward the other members of the group; some knowledge is not revealed until the child has reached a suitable level of understanding.

When boys and girls are considered ready to become real men and women, their initiation takes place. Those rites will symbolize the death of their childhood and their passage into the world of adulthood. This can usually happen when the child is between 10 and 16 years old.

Non-Aboriginal people are forbidden to attend those ceremonies; the indigenous people describe these initiation ceremonies as particularly intense. The young protagonists wear ornaments or have their bodies painted and also have to endure painful experiences, such as having cuts made on their skin or having their noses and ears pierced; the teachings they receive will be precious in their lives.

Contemporary elders are highly respected for their wisdom and their role as moral guides, for they pass on their knowledge and experiences: The elders are, in fact, extremely important figures in the cultural Aboriginal panorama as they represent a symbolic link between the past and the future.

A central role in the community is assumed by shamans, too; their importance within the society will be described on the following pages.

Languages

Many years of colonial dominion have also caused severe loss as far as the cultural, Aboriginal heritage is concerned, considering, for instance, that more than 300 local idioms have disappeared since its beginning. Nowadays, 200 original “dialects” remain: *Aranda*, *Wati*, *Walmatjari*, and *Tiwi* are some of the most well known.

Aboriginal culture has essentially been spread orally, and only in recent times the languages of central Australia have started to be written down. The overall linguistic panorama is much diversified in northern Australia, while it is more homogeneous in other areas of the country.

Many pidgins (also called Aboriginal English) have developed from the contact between English and the huge variety of local dialects. They are a sort of English whose structure and vocabulary have been changed by the influence of local idioms: Some of them are very close to Standard English and are spoken in nearby cities, whereas others are more different from it and are mainly used in isolated regions. They are very important in communication between indigenous groups who did not share a common language and whose peculiar mother tongues could otherwise be an obstacle for relationship with each other. White Australians, however, generally still ignore both the traditional languages and the modern forms of pidgins, but in some schools of the continent, bilingual education is now an opportunity for Aboriginal students.

Australian native languages can be divided into two main families: the Pama-Nyungan and the Gunwinyguan languages. The first group is the more diffused one. Its name derives from the Pama idioms spoken in the northeast and the Nyungan, which are from the southwest; the

Gunwinyguan languages, on the contrary, are spoken in the northeastern area of the Northern Territory.

Apart from these two principal linguistic families, there are many other languages and also isolated idioms. Generally, most Australian languages share several phonological or lexical elements. Different speech styles are interesting aspects of their features. For instance, avoidance speech, also called by the colorful expression “mother-in-law language,” is a particular type of speaking that involves the use of synonyms when some relatives are present and everyday words that could be perceived as taboos. In some cases, certain words are even replaced by signs. This happens, above all, in some central and southern desert areas or near the Gulf of Carpentaria. In Aboriginal culture, silence is also an important strategy of communication.

Some languages, then, have unique characteristics, such as the use of certain words only by men or only by women; on the other hand, lexicon can also differ if the language is spoken on the mainland or on islands.

In contrast with the commonly accepted theory that native idioms derive from an older language that spread through Australia 5,000 or 6,000 years ago, the linguistic anthropologist Mark Clendon has recently hypothesized that current Aboriginal languages might have more ancient origins as they could have come from the period of the last Ice Age (approximately 13,000 years ago) when a narrow strip of land united Australia to New Guinea in an area that was as densely populated as the eastern coastline of what is now the Australian continent (American Broadcasting Company [ABC] Science Online, December 13, 2006).

The Dreaming

At the end of the 19th century, the British-Australian anthropologist Sir Walter Baldwin Spencer (1860–1929), who was also one of the earliest filmmakers in the history of anthropology, and his Australian colleague, the anthropologist and ethnologist Francis Gillen (1855–1912), used for the very first time the word *Dreamtime*, referring to one of the essential beliefs in indigenous culture. They spent several months working and studying together, participating in expeditions, and trying to understand the Aboriginal way of thinking. The results of their research were collected in books such as *Native Tribes of Central Australia*, which appeared in 1899, *The Northern Tribes of Central Australia*, published 5 years later, and *The Arunta: A Study of a Stone Age People*, which appeared in 1927 (Spencer & Gillen, 1966, 1969, 2000).

Some years later, the Australian anthropologist William Edward Hanley Stanner (1905–1981) was listening to a native who was speaking about Dreamtime and who explained to him that the white man does not know the real meaning of *Dreaming*. Stanner (1972) preferred this last

word for referring to what the Aborigines believe to have been the “time of the creation”: A gerund verbal form could, in fact, better give the idea of the continuous presence of the time of the creation in the present moment. According to Aboriginal philosophy, Dreamtime, or Dreaming, is a timeless dimension that is not relegated to the past; on the contrary, it is a concept that is actual in every epoch, just as creation is an uninterrupted process.

Sometime later, Stanner (1972) also coined the expression *everywhen* thinking that this term could be more appropriate to define the concept of Dreaming that was so distant from the Western way of thinking.

On the other hand, Theodor George Henry Strehlow (1908–1978), an Australian anthropologist who dedicated himself to studying the Aranda group in particular, defined this idea by the terms *uncreated* and *eternal*, underlying in this way the fact that the Dreaming does not know any human-limited temporal dimension in its essence.

However, the most meaningful definition of this concept is the one that comes directly from the voice of the natives: It is *all-at-once* and underlines the particular role that time and no-time play in their cosmogony.

The indigenous people believe that when the *primordial beings*—that are now considered to be their “totemic ancestors”—came out from earth, time started to exist on our planet, which was featureless, bare, and dipped in silence and in darkness. The ancestors emerged from the crust and began to travel: They made the humans and the animals as well as the sun, the moon, and the planets, and they woke up the various forms of living beings that were asleep, hidden under the surface of the land. Ancestral Spirits deposited the seed of life and shaped the world through their actions (Dreamings), their will, and their imagination by following the Dream of the creation. They also created the *unchangeable law* (i.e., the “lifestyle and rules” every native Australian should follow even today) that also encompasses every legend and every ceremony. Several interesting tales are related to Aboriginal cosmogony: Some of them such as the one about “Rainbow Serpent” (also named “Rainbow Snake”) will be reported in the following pages.

The Dreamtime beliefs were much more vivid before the arrival of the first colonizers: Europeans found the Aboriginal beliefs very complex at first but later simplistic. At that point, to the European mentality, the natives were often considered to be similar to children who live in the Dreaming world created by their imagination. Past anthropological studies implied, in this sense, that the wisdom of an ancient culture was instead rather childish.

At the beginning of the 20th century, the French anthropologist and ethnologist Lucien Lévy-Bruhl (1857–1939) in his studies on the mental processes of Aboriginal populations theorized that they owned a “primitive” sort of mind as they were unable to use logic and that they experienced a sort of mystical involvement in the reality shown by the myths.

The Rainbow Serpent

The so-called Rainbow Serpent (or Rainbow Snake) is one of the greatest and most important Aboriginal spiritual symbols.

The legend of this mythical creature probably originated in northern Australia near the area where nowadays the Kakadu National Park is located. However, due to its unlimited value, it is obviously known everywhere on the continent where it is also called by other names depending on different tribes: *Ungur*, *Taipan*, *Yero*, *Ngalyod*, *Wonambi*, *Langal*, *Almudj*, *Borlung*, *Wonungur*, *Yurlunggur*, *Galeru*, *Wollunqua*, *Muit*, and others.

The Rainbow essence of this mythical creature is energy and light. Its dualistic nature allows it to not only create life but also to destroy it: It represents both creation and destruction, good and evil, masculine and feminine powers. Generally, it is believed to be a female being. Like women, she is related to natural cycles: She generated life on our planet, gave nourishment, took care of all creatures, and represents the feminine power on earth. Women belong to this mythical creature, and when women pass away, they return to her cycle of life-death-rebirthing. She regulates fertility, menstrual cycles, and blood circulation as well as the rhythm of the seasons and of other natural elements, such as tidal phenomena and wind flow. Her relation to weather phenomena is especially believed in Australia's monsoon area. Rainbow Serpent is also associated with the sun that gives us warmth and nutrition but can also make hot and sultry weather that causes the scarce and precious water resources of the desert to evaporate: In this case, its noxious and destructive energy is associated with male nature.

There are various stories related to this mythic being. One of the most famous legends tells us that the Rainbow Serpent came from the deepness of the earth when the world was still in a state of sleep, and it felt lonely. It started its journey on the ground and it created mountains, plains, gorges, hills, and all landscapes while crawling and slithering on the soil. Through its interaction with sunlight and wind, it provoked rain that created lakes and rivers. Even today, rainmakers and healers ask for its help through giving gifts of shells and quartz crystals. When Rainbow Serpent wanted to rest, it coiled up and slept without turning into any other element of the landscape or modifying its original nature. Australian Aborigines believe that it still hides in water holes or in a canyon formed by erosion near a waterfall in central Australia (but according to Gagudju people, it precisely lives in a place called Djuwarr) and that it does not allow people to disturb its quiet.

Male adolescents are said to risk being kidnapped by Rainbow Serpent—who would eat them and vomit them—to let them enter the adult age, while pregnant women are forbidden to touch the water it drinks. Legends said that the Serpent swallowed two young boys and transformed them into two iridescent parrots as colorful as the rainbow. That mythical event was a rite of passage that allowed them

to obtain awareness and power. Nowadays, during ceremonies, people still primp with multicolored feathers to look like the Snake. Women, on the contrary, do not need such rites to get its power: They already own it, and they become adults with the onset of menarche.

People cannot see the Serpent except when it rises, arches its huge body, and shows itself in the semblance of a rainbow in the sky.

The intelligence of the Serpent is said to give to shamans the powers of healing and of traveling beneath the earth, flying through the air, and breathing underwater.

The Land

The bond between Aborigines and their land has always been very strong. In fact, land is an important element both as a fundamental source of sustenance and as a deep spiritual significance.

The indigenous people are very respectful toward the environment and know how to use its resources without damaging it. They do not overexploit it but try to maintain its delicate equilibrium and do not compromise its natural cycles that balance and regulate it. Taking care of it is a preeminent moral duty for them. For this reason above all in the past, people did not live at the same place too long and were careful not to hunt or fish too intensively in order to preserve different species and their reproductive rhythms so that the people could have enough food for themselves in the following seasons.

It is clear how the contemporary biodiversity loss caused by pollution and excessive use of natural resources could have a devastating affect on their lives and menace their own survival.

Their wisdom has allowed them to live in harmony with nature since the oldest time up to now. This symbiotic relationship derives from their animistic perspective that makes them feel devotion and respect toward all the elements. In this sense, land holds particular religious significance.

Moreover, according to their moral principles, land cannot be owned or traded: Those actions would be sacrilegious toward their ancestors who are believed to have roamed through the continent giving shape to it.

The native people do not fence in the land, and the concept of *border* is very different from that of the Western culture in the sense that it does not imply the concept of private ownership.

In the 1970s, Aboriginal human rights movements started as demonstrations to obtain justice against unequal laws and to claim rights to lands founded on the Aboriginal's 1,000-year occupation. Since the beginning of the colonial dominion, in fact, local populations had been deprived of their richest soil and had not been able to gain any economic benefits from the natural resources that had been found in their territories. One of the most important results in the fight for equal rights was obtained in 1994 when the

High Court of Australia declared that the concept of terra nullius, or land belonging to no one—that the English had applied to take possession of land—should be considered illegal and that the presence of the Aboriginal populations on the Australian continent before the arrival of the first settlers should be admitted.

Magical Elements

The land and its beauties (shells, minerals, and precious stones) represent a world of magic power. *Jakuli* or *riji*, for example, are traditional male ornaments (pubic covers or necklaces) typical of the northern area of the continent that are worn by men who have reached the main level as far as initiation degree is concerned. Those pearl shells are decorated with tribal motifs and are believed to be linked to the spiritual energies of water that let shamans own the power of healing people. On the other hand, the mother-of-pearl glow reminds us of the Rainbow Serpent descriptions that are deeply connected to water power as underlined before.

As far as Queensland's local culture is concerned, opals (Australia owns very important quantities of this mineral) also own their beautiful, iridescent colors because of the fact that they had been touched by the Snake; on the contrary, according to some tribes living in New South Wales, opals originated in water that a pelican was carrying in its beak.

Mabain (or maban) is a material associated with quartz crystals and other elements such as mother-of-pearl, iron, and desert rose, or ochre, and it is considered to give magic powers. It is used during ceremonies and rites of passage when parts of it are inserted into the initiate's body to symbolize the link between the human status and the spiritual one: the bond between the present time and the eternal time of the Dreaming. Also, red ochre has intense significance in Aboriginal rites; related to the color of blood, it is used as a pigment for decorations and rubbed over naked bodies.

As it has been shown, the land and its elements transcend their material concreteness to reach deeper meanings. In local languages, shamans, who are the ones who succeed in completing all initiation levels, are called by terms that mean "clever men" or "powerful men." The first anthropologists who visited Aboriginal tribes described them as people with extraordinary powers, such as clairvoyance or telepathy. Among them are the so-called medicine men, that is, men who are able to heal people by using natural remedies and giving energy. They are said to get this power from the cosmic harmony that created everything; this happens through symbolic death and rebirth. The ancestral spirits, in fact, are believed to come and bring the new shaman to the netherworld where they introduce magic shining quartz into his body. After acquiring its vital energy (as light possesses healing and regenerating virtues), the shaman can reach the world of the Spirits and meet his totemic guide. According to the tradition, those

powerful stones could also come from water holes where the Rainbow Serpent lived.

There are also women who become shamans: Their secrets can be known only by other women or by men of high degrees.

Mythical Geography

Australian natives are bound to their land above all through a deep feeling of affection and filial love: Earth is like a mother, and they feel part of her. Damaging her means making unacceptable violence, and depriving them of her causes them to lose their own identity. As the anthropologist Theodor Strehlow (1947) underlined, the territory is like a giant *genealogical tree* as past and present are written on it.

The term *songlines* refers to a series of songs related to those trails that describe the mythical journey of the sacred Spirits of the Dreaming throughout the continent. In fact, as told before, the ancestors are believed to have awoken the different forms of life and shaped the countryside by distributing plants and animals, by making rivers and streams flow, or by relating one place to another. While doing that, they left their marks such as footprints or incisions on the land giving in this way significance to every natural element; according to the Aboriginal animistic view, whatever exists (rocks, plants, stars, water, etc.) has its own soul. The mythical trails of their passage trace a sort of labyrinth all over Australia and are said to be still visible as impressed upon its landscape features. Because of them, many places acquire a fundamental spiritual value and become a source of "law"; in this sense, Aborigines prefer to call the songlines by the phrase "way of the ancestral law." These sites are considered to be sacred, and the natives keep them secret. The sites are said to own particular energy that lets people reconnect with the Dreaming dimension. Only a few people are allowed to visit them, and tourists or companies involved in economic businesses that do not respect this moral prohibition outrage the Aboriginal people and offend their sensitivity.

Aborigines, who identify their origins with a particular Ancestral Spirit, keep an extraordinary relationship to the characteristics of the landscape that are associated with it: In this sense, we can refer to the Aboriginal spatial view as a totemic one.

We can consider the concept of songlines as a principle of mythical geography, giving symbolic interpretation to some particular sites that are perceived as backgrounds to mythical events. In fact, this complex system of songs gives significance to the geographical features of the landscape and suggests mythical explanations of those natural phenomena that can infuse the territory with special value.

The Rainbow Serpent is considered to have created a song describing its own actions on the land surface. Aboriginal people still sing it, particularly when they have to travel from one place to another: It can help them to face

difficulties in daily life as it offers indications of how to get understanding of the secrets of the territory. In arid desert areas, for instance, its spirit can guide them to find precious fresh water to drink.

Uluru

Mount Uluru (called Ayers Rock by the white explorers at the end of the 19th century in honor of Sir Henry Ayers, who was premier of South Australia) is a huge rock formation set in central Australia and also one of the most famous sacred sites in Aboriginal mythology that is considered to be still inhabited by many Ancestral Spirits. According to the Australian ethnologist Cyril Havecker (1988), it is one of the symbols of the Rainbow Snake, which originated life. Aborigines consider it an emblem of fertility.

There are so many legends related to it. One of them tells that Tatji, the small red lizard, lived on the plains near Uluru and came to the rock where it threw and lost its curved stick (a sort of boomerang). Trying to find it, Tatji started to dig the soil and scar the rock causing those cracks and hollows that are still visible today. Another story tells that the Bell-Bird (typical Australian birds belonging to the sparrow family) brothers were hunting an emu, which ran away toward the big rock. Two fantastic creatures, the Blue-Tongued Lizard men, caught it and killed it. When the Bell-Birds arrived, the lizards had already eaten the emu, so the birds took their revenge by burning the lizard men's shelter. The lizards tried to escape the flames by climbing the rock, but they fell and burned. Gray lichens on the surface of the rock still remind us of the smoke of that fire, and two boulders are seen as the two dead lizard men.

These examples show us how in Aboriginal culture mythological tales are useful to explain natural phenomena, such as erosion or the presence of a certain type of flora and fauna.

Even more significant is the legend that tells us about the origins of Uluru. At the "out-of-time epoch" of creation, two local ancestral tribes did not participate in a feast as they stayed gazing at the wonderful Sleepy Lizard women. The hosts got so furious because of the attitude of the tribes that in order to kill the leaders of both groups, they gave life to a mud sculpture that became a dingo. Earth was so desperate because of that tragic event that it rose up and originated Uluru, whose splendid tones remind us of red blood.

Many examples of cave art, illustrating both mythological scenes and daily life events, are there to remind us of the richness of this culture that has never broken its deep bond to the past.

There are still many secrets concerning the magic charm of Uluru, which are inaccessible to non-Aboriginal people. Visitors are strongly asked to not damage the rock or climb over it as a sign of respect for its sacred value. Unluckily,

too often this request goes unheard. The mount is still an attraction for thousands of tourists who visit it every year.

Art and Musical Traditions

Art is a really important way of expression in Aboriginal culture as it is bound to nature, mythology, and rituals. As far as painting is concerned, many different types of surfaces are used to decorate (rock, barks, objects such as boomerangs, etc.), and there are also various styles to realize it, in particular, the so-called X-ray art (in which people and animals are portrayed and their skeletons and organs can be seen), the "stencil art" made by using, for example, leaves or hands as templates, and the "dot painting" originally made with sand, stones, seed, or other natural elements and nowadays by using dots of color. Drawings were originally realized through natural pigments, such as ochre and crushed rocks mixed with water or spittle. Those colors were also used for body painting on particular occasions such as initiation ceremonies, funerals, and ritual dances, whose decorations own a social and spiritual meaning.

Recently, thousands of extraordinary pictographs and petroglyphs (that date from 15,000 years ago to the middle of last century) have been found in Arnhem Land, northern Australia, arousing enthusiasm in the archaeologists for the exceptionally long period of time they cover.

Also, the role of music and of sounding expression in Australian traditional culture is highly significant. Dreaming Spirits are said to have created everything by "singing" life into the world, and even nowadays, during ceremonies (called by the indigenous *caribberie* but known by the English as *corroborees*), people chant the ancient songs of their mythical origins. Some of the songs are widespread, but many others are kept secret to preserve their evocative and magic power from corruption.

According to Aboriginal philosophy, whatever exists needs a name in order to be identified through a series of letters that can be pronounced: That allows the primordial energy of creation, which is the essence of every being, to materialize in tangible forms of life. Through the cultural concept of the songlines, music joins the surrounding environment and generates the peculiar, mythical meaning of geography that has been previously illustrated.

There are various sorts of instruments played during ceremonies. One of the most famous is what non-Aboriginal people know as *didgeridoo*, which is called in local languages by many different names such as *ganbag*, *yirdaki*, *maluk*, and *yigi yigi*. It is a natural musical instrument made not by humans but created by termites that feed on wood and consequently create hollows in tree trunks.

Its employment is very ancient, and it is traditionally known as a *eucalyptus trunk* or *bamboo* that Aborigines decorate with totemic drawings. Two ancient legends explain its accidental discovery by human beings.

According to the Northern Queensland's tribal culture, it once happened that some women went to get firewood, and

while going back to their villages, they heard an unknown but enchanting sort of deep sound coming from one of the trunks they were carrying. The wind blowing into it was letting them discover what can be considered one of the most fascinating types of natural music in worldwide cultures. On the contrary, as far as the traditions of the North Territory are concerned, not women but men were involved in the discovery of didgeridoo. They were roaming through the woods to find some food when they noticed that animals used to find their hiding places in excavated trunks. When one of those hunters tried to blow into one of the trees, it unexpectedly uttered a sound. Since that day, those trunks have been used to create music.

Conclusion

The description of the Aboriginal world that has been presented in this chapter has essentially aimed to be an invitation for the reader to reflect on the importance that indigenous cultures still have in the contemporary world.

History teaches us that too many arbitrary clichés and subtle interests have tried to persuade us that many local and often marginalized populations live in a sort of “prehistorical era.” The indisputable fact is, however, that they actually live in the same time as we do.

The different sectors in which anthropology structures itself can offer a valuable contribution: to make evident that there is not a unique way but different ways to live in the present. For this reason, the approach to the Australian indigenous people that has been illustrated could have important applications in future research. Their ancestral and modern holistic view of the world—instead of appearing as separated from the current temporal context—may offer a chance to rethink our own present. The richness of their culture and their unconditional respect for nature can help us to think over an idea of progress that should not imply indiscriminate growth to the detriment of emarginated populations. In the intercultural dialogue that should animate the contemporary globalized world, the deep study of their artistic richness, of their sensitiveness as far as ecological lifestyles are concerned, and of their precious, orally transmitted knowledge heritage could contribute to letting us better know our own identity. Thinking of ourselves as members of the great *natural family*, rediscovering sounds and silences, and considering the immense value of biodiversity and not running the risk of losing it forever can give us the force of constantly creating and improving our world in a modern Dreaming.

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INUIT

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Bands of Paleo-Eskimos migrated into the New World near the conclusion of the Beringia, or Land Bridge era; it is inconclusive, though, whether they traveled by land or water. Initial theories of origin suggested derivation from areas such as Mongolia, Japan, and Korea to circumscribe on a more generic area of Asia. The evolution from “Paleo-Eskimo” into *Inuit* occurred after arriving at the tip of the northeastern Siberian area around 8000 BCE. It was once believed that the Inuit migration initiated from the west end of the volcanic Aleutian Islands, progressed eastward toward the Alaska mainland, and then continued northerly; fieldwork reveals that the ancient encampments appear increasingly antiquated on the islands closest to the Alaska mainland and less aged on each successive island. Therefore, it is the nomadic and seasonal journeys of certain bands that initiated relocations farther south (after departing Siberia) to the Aleutian Archipelago, or “the birthplace of the winds,” as it is called by its inhabitants. These journeys resulted in the continuous occupancy at Nikolski Bay, which was established around 6700 BCE. From approximately 4000 to 1000 BCE, these Aleutian Island dwellers evolved into the *Unangan* people (more popularly known as “Aleut”). That the Unangan are related to the Inuit will be recognized in this chapter.

The *Tuniiit*, a name derived from the Canadian Inuit oral history, made an epic eastward migration into Canada; by 2500 BCE to 800 BCE, Inuit settlements were maintained

in Greenland (the ancestors of the modern Greenland Inuit arrived around CE 1250). A division of the Eastern Inuit returned to the northern area of Alaska. Similarities have been noted in the stone-wall habitations found in two opposite locations of the North American continent: on the Diomed Islands in the Bering Sea and in Greenland.

Inuit Seasons

The Inuit’s hunting/fishing/gathering economy transpired in an apparent two-season (summer and winter) location, although the Canadian Inuit observe six seasons:

- Upingaassak—the material for spring (early spring)
- Upingaak—spring
- Aujak—summer
- Ukiassak—the material for a small winter (early fall)
- Ukiak—small winter (fall)
- Ukiuk—winter

These isolated Inuit communities, which resided on the continuous terrain of permafrost, cultivated a distinctive society that is congruous with their environment and effectually capable of thriving in the Far North. An example of evolutionary adaptation is the Inuit’s physical structure, which reduces heat loss with a shorter, stockier body, as opposed to a taller, more slender body that would dissipate heat faster. The Inuit’s survival-appropriate technology

meant that hunting provided material for their primary source of provisions as there was relatively little waste, for example, material for clothing such as the waterproof coats fashioned from mammal intestines (e.g., from walrus, seal, sea lion, and bear) and whalebone for housing support and various hunting and fishing implements (e.g., hooks and spears). Marine mammals and fish were subsistence staples, although from Alaska to Greenland caribou and other land mammals were also hunted, while in Siberia the reindeer was important. For the most part, the meat of fish and mammals was consumed raw. In this land that lacks vegetation (save for the summer), the nutrition that was needed to avoid scurvy was provided within the uncooked meat. Clothing such as pants could be worn with the fur on the outside, or “inside out,” with the fur next to the skin. The severe winters required two layers of clothing to be worn with the inner layer designed with the fur side facing the skin for increased insulation. The Inuit mode of land transportation consisted of dogsleds or sledges. On water, the Inuit and Unangan are experts in maneuvering their kayaks (the Unangan name for kayak is *iqax*); these slender and complex vessels were originally fashioned from driftwood, bone, and mammal skin, with Inuit blood for glue (some kayaks even had joints of bone or stone).

The traditional kayak is a single-person closed vessel. Russian Orthodox priest Ioann Veniaminov (Durham, 1960) noted how a cord secured within the hem of the hatch and tied around the body and under the armpits prohibited water from entering the kayak. Captain Cook (Durham, 1960) documented his ship’s sailing speed at approximately 7 to 10 miles per hour as the kayaks (or *bidarka*) held their pace with his ship. The Umiak (also *baidar*) is a wide and spacious



Traditional Inuit kayaks were constructed from bone, driftwood, and skins. This modern version is constructed from a design similar to the traditional one, but it is made with new wood and canvas.

SOURCE: Photo by Pamela Rae Huteson, with permission from The Center for Wooden Boats, Seattle, WA.

vessel (more similar to a rowboat) that transported groups of people and cargo.

The continuity of the Inuit family was fortified through the belief in reincarnation. For example, after a death in the camp, the first child born is bestowed with the deceased’s name (from either gender). Moreover, the child is then entitled to the respect due to the former person (e.g., a child named after a mother may be endeared as “little mother”). The Inuit’s oral history occurred throughout the child’s life, with family stories and the reenactment of the family’s songs and dances. The Inuit believed in spirit entities that held power over their world. Inuit mythology reveals the entity Sedna (a half-human, half-creature being) who is credited with creating sea mammals (Paskievich, Van Raalte, Pratt, Pitsiulak, & Zemma Pictures, 1992), as well as controlling the harvest (bestowing the harvest only on those truly worthy). Consequently, the Inuit observed a myriad of rules and taboos and the belief in amulet charms. Amulets have been worn by both the hunters and their kayakers (a kayak was considered a living vessel and therefore required the protection of amulet charms). Because of the conviction that charms increase in power with each passing year, a female child would be adorned with the amulets intended for her future sons. Animal life was respected, too; when a seal was taken, freshwater was poured into its mouth so that it would let the other seals know how well it was treated. The shaman was relied on to heal the sick and to contact the esoteric world concerning issues pertaining to societal matters, hunting, and weather predictions. A majority of the seasons (from spring to fall) were spent in hunting, fishing, and harvesting in order to store for the winter. The winter was a time of festivals, drumming, singing, dancing, wearing masks, storytelling, giving gifts, and having feasts.

First Contacts

The expansive, primal attributes of the Arctic are experienced as a territory of harsh and unmitigated challenges for those unaccustomed to this harsh environment. This region has also inspired presentiment tales of early explorer adventurers who “expanded the frontier” and documented a people from a primitive social structure living within the Arctic Circle:

- 14th century: The Norse Vikings became the first European contact and bestowed on the Inuit the nomenclature of *skraelings*, or screamers (Fitzhugh, Ward, & National Museum of Natural History, 2000). Their depictions of *skraelings* resembled dwarfs.
- Mid-1500s: The Basque from Spain arrived with fishing and hunting parties, establishing a camp at Labrador that resulted in the first illustration of an Inuit camp (Proulx & Canadian Parks Service, 1993).

- 1570s: The British aspiration for a Northwest Passage brought the first voyage with Martin Frobisher, in 1576, to Baffin Island and returned with documentation of the Inuit peoples (Williams, 2003). Inuit were also brought back to England in some of the British voyages.
- 1648: The Russian explorer Semyon Dezhnev documented the people he called *Chukchi* at the Diomed Islands between Russia and Alaska (Berg, 1949).
- 1741: Dane navigator Vitus Jonassen Bering, employed by the Russian Navy, arrived at the Aleutian Archipelagos (Miller & Urness, 1986). The Unangan population drastically declined during Russian occupancy.
- 1700s: Moravian missionaries began evangelical work in Greenland and Labrador (Nowak, 1999).
- 1800s: European and American whalers occupied both the Atlantic and Pacific sides of the Arctic until 1918 (Spence, 1980).
- 1825: The first English explorer in Alaska, Sir John Franklin, documented a trading system between the Inuit and the “Indians” (Simmonds, 2005).

Methods

Adaptation to Inuit Technology

The risk of early scientific expeditions lay in the paucity of available knowledge concerning preparations for an Arctic expedition, such as the inadequacy of European clothing to buffer the frigid Arctic conditions, overland travel that entailed human power to haul barges across the terrain of ice and snow, and so on. In the 19th century, Arctic explorers broke from convention. They marked the inaugural adaptation of integrating Inuit apparel and transportation into their expeditions, initiating with Charles Francis Hall (Hall, Davis, & U.S. Navy Department, 1876) in his 1860 to 1862 exploration to search for the lost Franklin expedition. Those who followed suit were Robert E. Peary, Knud Rasmussen, and Vilhjalmur Stefansson (while a minority, they also assimilated Inuit victuals into their provisions, e.g., raw meat).

Fieldwork

Early fieldwork preparations relied on procuring a local guide, usually Inuit, for equipping an entourage for a successful Arctic journey. Charles Brower (Brower, Farrelly, & Anson, 1942), whaler/trader/census taker/postman/novice archaeologist of Barrow, was indispensable for equipping explorers such as Diamond Jenness, Rasmussen, and Stefansson for an Alaskan Arctic exploration. Between the field expeditions, Brower also coordinated with the explorers and museums in order to supply them with shipments of artifacts, which he received from the local Inupiaqs.

Rasmussen’s amulet-artifact gathering once developed into creative negotiations. He declared that the protection

constituent of the amulets—for the original owners—would hold steadfast (as Rasmussen was not from that region, he therefore should be denied benefit from an amulet’s influence). Trading resumed as a consequence of his hypothesis, although with a stipulation insisted on by the Inuit that locks of Rasmussen’s hair be a necessary condition of the trade to ensure the extension of the amulets’ charms.

Language

The acquisition and mastery of the Inuit language, standardizing a writing system for the “Eskimo-Aleut” (also known as *Eskaleut*, *Eskimoan*) linguistic stock, aided essential cultural decoding and the comprehension of the embedded histories, belief systems, and allegories within the Inuit traditions. Rasmussen (1999) held an advantageous position over his colleagues because he was part Greenland Inuit and spoke Kalaallisut (Greenlandic Inuit language) fluently.

Major Dialects Within Each Region

- Siberia: Yup’ik
- Alaska: Inupiat, Yup’ik, Alutiiq, Unangam Tunuu (Aleut)
- Canada: Inuktitut
- Greenland: Kalaallisut (Greenlander)

Notably commented on are the Alaskan dialects, for although in relative proximity, they are virtually different languages. Comparably, the Alaskan northern Inupiat dialect (i.e., the Point Barrow area) resembles that of the Greenland Kalaallisut dialect. It was initially observed by Rasmussen during the Danish Fifth Thule expedition that the Greenland Inuit accompanying him were able to comprehend the American Inuit, from the Naujat (Repulse Bay) to the Netsilik Inuit (Rasmussen, 1927) to the Point Barrow Inupiaq (Brower, Farrelly, & Anson, 1942). Concerning the retention of the native languages, the Inuit, due to their locale, have retained their language, although in Siberia, the Sirenik dialect from the Chukotka Peninsula is extinct. Also, the Inuit who have relocated to metropolitan areas are witnessing the disintegration of their language in younger generations.

Inuit oration contains valuable information concerning their cultures and traditions and represents insights into the Inuit psyche. In her research, Margaret Lantis (1952, 1953) ascertained that the Inuit mythology includes clues into the Inuit cognitive processes (e.g., fear, coping strategies, behaviors, etc.). Within Inuit oral history, early European contact has also been discovered (Seidelman & Turner, 1994). Rasmussen documented Inuit stories of the lost Franklin expedition, which occurred nearly 75 years prior, as well as the John Ross expedition of approximately 90 years prior. Archibald Fleming documented Inuit oral history concerning the winter encampment of the

Martin Frobisher's expedition at Baffin Island, which occurred nearly 350 years prior to documentation.

Cartography on Baffin Island

The 1883 to 1884 groundbreaking research and cultural interaction by "the father of North American anthropology" Franz Boas for his publication *The Central Eskimo* originated as a by-product of his unique cartographic project on Baffin Island. Boas maintained the significance of recording Inuit place names (as opposed to affixing early explorers' names to that region). He also launched an unprecedented collaboration with the Inuit by respecting the distinction of their geographical wisdom and by encouraging both genders to illustrate maps and identify the areas. Boas therefore illustrated not only the Inuit's technical skills and ability in creating accurate maps but also the Inuit's personal relationship with their land as well.

Art Comparison in Origin Theory

Prior Inuit origin theories once focused on the Paleo-Eskimo emergence from Europe as claimed by British archaeologist Sir W. Boyd Dawkins (1886), who asserted that the Inuit descended from the Magdalenian/reindeer hunters of Western Europe. This theory originated from prevalent parallelisms in lifestyles of the Inuit and Magdalenian population. The theory of the Paleo-Eskimo's originating in Europe appeared to coordinate with the "follow-the-reindeer" theory, that is, the reindeer hunters who followed their game northeasterly as the weather warmed. This concept attained popularity in 1899 when Frenchman L. Testut (Bandi, 1969) interpreted the Magdalenian skeletons from the Chancelade area to have an Eskimoid resemblance. However, in the early 1930s, Frederica de Laguna (Bandi, 1969) challenged this speculation in her article "A Comparison of Eskimo and Palaeolithic Art," which indicated that when juxtaposed, there was an absence in the accordance of artistic expressions concerning the two cultures, albeit with similarities in the materials used (i.e., ivory, bone, etc.).

Acculturation in the Arctic

The intervals of benign and incursive contact from the Euro-American cultures established a governmental authority on the indigenous people who were unfamiliar with a conspicuous, consumptive culture. Sociologist Peter Usher (Creery, 1983) revealed that the usurpations from traditional hunting lifestyle to a trapping economy at the Arctic Hudson Bay post in 1901 was effectively realized in approximately a decade. In addition, the conventional demarcation of the Arctic region, with the consequential aggression of division and relocations of

the Inuit families into countries and settlements, contributed to impairing the Inuit social organizations. The Russian and Alaskan Inuit families (e.g., the families between the Diomed Islands) though only 20 miles apart were not allowed to visit. Also, the Pribilof Islands in Alaska were inhabited by the Unangan who were subjects of Russia for the seal trade. When the Americans "took over" Alaska, the Pribilof Unangans became American wards (as opposed to the Unangans who lived on the Aleutian Islands who were not wards). The Pribilof Unangans/Aleuts did not obtain emancipation until after World War II. Meanwhile, in Canada, the separation of young Inuit couples and their children from their immediate families took place as they were shipped to mining camps. And in Russia in the 1920s, the communist Soviet Union relocated the Siberian Yup'iks from their ancestral lands and assigned them to units known as collectives for laboring at manufacturing.

In the early 20th century, the accession of ramifications concerning this unprecedented acculturation event within the Arctic imposed insurmountable digressions within the Inuit communities. The sovereign and independent Inuit had become reliant on the Euro-American cultures that projected their standpoints as benefactors, "improving" the Inuit's circumstances. These "improvements" facilitated a cultural genocide and social alienation (i.e., the interference with the Inuit by separating them from their traditional culture that through centuries of vicissitudinous change had adapted them to their Arctic environment).

The periodic establishments of the new lifestyles became noticeably evident at the earlier stages of Euro-American contact; the Inuit felt that they had lived a healthier lifestyle prior to the "modern" standard of living conversions. Those who still lived off the land commented on how the village dwellers had lacked color and vigor.

Sample Chain Effect in the Arctic

What follows is a small sampling of certain Canadian villages that experienced a drastic change in their way of life, which started with the removal or tying of their dogs, and the progression of "civilization" (Huteson, 2007b):

- Some "civilized" villages required that dogs be restrained to their owners' property in lieu of the freedom the dogs once enjoyed (in certain villages, the slaughtering of dogs immobilized the Inuit families and prohibited seasonal movements). The restraint of dogs resulted in the consequential incapacity of their canines to pull their sleds for an extended traditional hunting trip (due to lack of adequate exercise).
- The Inuit were then unable to hunt for their families or travel (this impediment produced hardships).
- The inability to hunt forced a need to purchase food, thereby establishing the necessity for employment and solidifying dietary changes (e.g., sugars, flour, fatty acids, etc.).

- The endorsement of gas-powered snow sleds replaced the custom of dog sledges. These modern sleds were prone to breaking down, thereby facilitating the Inuit's mechanical knowledge (a marketable skill for employment).
- Therefore, the Inuit, who from time immemorial had maintained a self-sufficient and active life (i.e., running alongside the dogsleds and subsistence hunting and gathering), transitioned toward a sedentary lifestyle of riding "skidoos" and retaining steady employment to purchase hunting gear and provisions.
- And finally, the reliance on Western medicine counteracted the emergence of physiological issues (i.e., excess weight gain, diabetes, heart disease, cancer, etc.).

Alcohol has brought devastating consequences on the indigenous peoples. In Alaska, for instance, it interrupted the food gathering activities of the Inupiaq villages, which brought starvation in numerous camps. Violence increased within the villages, and camps of these Arctic peoples, who were attempting to adapt to their new way of life, spent monies acquired through fur trade on inebriations. In the early 1900s, George Gordon (1906) witnessed the deterioration in the Arctic due to Euro-American contact—the amalgamation of rampant diseases, the Inuit's traditional food sources substantially hunted out by nonnatives, coupled with a drastic dietary change—which prompted Gordon to warn of the impending extinction of the Inuit.

Additional preeminent advocacies of lifestyle conversions came from churches and schools; both disrupted the Inuit's hunting and gathering practices. The church forbade hunting on Sundays, while stipulating a necessitation to attend various worship practices throughout the week. In addition, the traditional Inuit ceremonies were forbidden; in their stead, Christian holidays were enforced. Other non-Christian activities, for example, tattoos, labrets, and wife exchanges, were outlawed. The schools imposed an allocated academic schedule, which held precedence over the Inuit's traditional mobile lifestyle. Also, children were flown to larger towns for education; some Inuit families followed their children to the new locations. The children's relocating for school from fall to spring also created hardships for their families who relied on them to assist during the hunting season. Another hardship ensued when the children brought back diseases of smallpox, measles, and so on.

In Alaska, the excessively consuming whaling industry and growing dependence on mercantilism resulted in a cessation of the seasonal trade route traditions of the Inuit from coastal to inland bands (Brower, Farrelly, & Anson, 1942). In addition, throughout the Arctic, the Inuit people gave up their traditional semisubmerged residences, the accustomed abode of separate men and women houses, to

drafty, wooden houses where families were expected to live together (prior to this, Inuit families lived together only when in camp). These drafty wood-constructed buildings augmented illnesses among the children as well as the elders. Following the adaptation to "white man" products, these single-room houses required oil for heating and induced both sewage concerns and garbage dilemmas. Becoming permanent village dwellers as opposed to living a seminomadic to nomadic lifestyle required permanent employment; having a "9 to 5" schedule was difficult to adhere to, especially during subsistence seasons. In addition, the devastating European diseases could not be cured by their shaman, which prompted the Inuit toward use of Western medicine. The combined circumstances served to reinforce assimilation and the adherence to earning wages.

Enculturation, or the integration of elements from the Euro-American customs into the Inuit culture, has also served as an alliance to augment the Inuit culture in some positive outgrowths. For instance, as sailors began frequenting Nome, assiduous carver Angokwazhuk (known as "Happy Jack") became exposed to scrimshaw and cultivated a new art form of engraving ivory with fine needles, integrating Inuit and American art and thereby inventing a new trade. Carving pervaded the North to become either the main source of income in the Arctic villages or at least a supplement to it. The 1960s witnessed the increase of Inuit artists as Inuit prints and sculptures (i.e., soapstone, ivory, and bone) of modern Inuit art began emerging in fine art galleries. Also, the publications of anthropological monographs and biographies on Inuit lives began to reveal the Inuit's personal perspective on history, for example, Margaret B. Blackman's *Sadie Brower Neakok: An Inupiaq Woman*. The Inuit grassroots movement has also endeavored to capture the culture in documenting autobiographies and personal documentaries. Edna Wider's *Once Upon an Eskimo Time*, which represents a year's span of Inuit lifestyle prior to Euro-American contact, is an excellent example. Another illustration of nontraditional integration is with the drum songs. Originally, drum songs were performed at gatherings, especially during the winter festivals. When the missionaries became established in the Arctic, the drum songs were prohibited. Today, drum songs are once again performed at special gatherings although in addition to traditional or ancient songs, songs are also sung in English and tell stories about contemporary topics.

Arctic Politics

The rich resources in the Arctic appeared to be available for acquisition for the edacious industrial cities to the south, regardless of established Inuit hunting, gathering, and seasonal encampments. This hegemonic perspective

concerning the Arctic has consequently brought the administrations of governments, their policies, and laws within this region. The executions of these policies were alien to the Inuit, which gave the semblance of subterfuge to these northern people, which in turn provoked fear and confusion within the villages. These strange and foreign policies of obtrusive coercion were also enforced to maintain “civilization” in the indigenous settlements and/or subsistence areas, for example, the establishment of the Royal Canadian Mounted Police (RCMP) to oversee the indigenous populations.

The Arctic people were attacked on various levels. These attacks were insurmountable and collapsed the very core of the Inuit lifestyle. First, the deluge of Old World epidemics initiated Arctic-wide relocations as deaths ensued, and the unforeseen accumulation of Inuit orphans was assimilated into Christian boarding schools. Then, the collapse of the whale and fur trade induced poverty throughout the Arctic; the Inuit had come to rely on a monetary system for food and warmth for their new lifestyle. A reindeer industry, imported from Siberia and attempted in Alaska in the late 1800s, deteriorated from enumerable complications such as an ill-managed reindeer association, wolf attacks, and a weak market for reindeer meat. The Canadian Inuit, in addition, experienced unforeseen alterations in the migrations of vital subsistence game, such as the caribou. Starvation ensued as game failed to appear in the accustomed hunting areas. The Inuit were no longer a nomadic people but affixed to villages, and so they could not relocate to better hunting areas. RCMP Henry Larsen (Marcus, 1995) reported on how the self-sufficiency of the Inuit communities was reduced to “starvation camps.” During Rasmussen’s fifth expedition, he assured RCMP inspector Stuart T. Wood with the highly controversial statement that he would “not make public the starving conditions” (Treude, 2004).

In 1952, nearly 30 years later, a highly controversial book, *People of the Deer*, was published by author Farley Mowat, who passionately revealed the Inuit hardships and mean standard of living that had occurred in the Canadian Arctic during his occupancy among the Inuit. The book’s agenda accomplished the awakening of the sensibilities of the southern communities of North America and Europe to the afflictions experienced by the Inuit peoples. The “Eskimo problem” became an insurmountable international discussion (Marcus, 1995), which compelled the Canadian government to appropriate, committed attention. This developed into an experiment of misadventure, involving the perilous relocation of a community of 34 Inuit “volunteers” (both adults and children) into the high Arctic on August 25, 1953. Death, starvation, a lack of mates, and a murder trial are samples of the consequences from this endeavor.

From the mid-20th century, an alternate approach began to be voiced by scholars such as M. Lantis

(1952, 1953), James Van Stone (Van Stone & Oswalt, 1959), and Wendall Oswalt (1990), who recommended assisting the Inuit in the community to accomplish a constructive means toward their achievement of social advancement and leadership. Also, education and training the Inuit in employable skills had been suggested by scholars at that time. The combined suggestions would constructively attend to the aforementioned dependency. Furthermore, scholars such as Van Stone and Alice Wilson would advocate for bilingual Inuit teacher’s and teachers’ aides to enhance the success of Inuit children within the school system. These suggestions are comparably similar to the Danish mode of management toward the Greenland Inuit; the Danish system protects the Inuit culture, designing curriculums translated into Kalaallisut, and are significant to the Inuit lifestyle (as opposed to an urban-focused curriculum).

Contemporary Inuit

Inuit Ethnogenesis

The traditional way of life for the Inuit endured in some areas into the 1960s; nevertheless, as contemporaneous changes were established within the villages, the changes gradually altered their worldview. An Inuit ethnogenesis evolved and disseminated throughout the Arctic (Burch, 2005; Cowan, 1976; Hensel, 1996; Morgan, 1988; Oakes & Riew, 1996; Stern & Stevenson, 2006; Young, 1992). This outgrowth derived from the very challenging circumstances that were experienced that thereby contributed to the impetus of a political consciousness. The institution of this monumental Inuit political consciousness manifested itself as the Inuit began insisting on their inviolable rights as human beings. This consciousness ranged from the humble rebellion of Inupiaq teens in Alaska, who obtained a cessation from the illicit advancements from their teachers at White Mountain School in 1929 (Morgan, 1988), to the Eskimo dancing ban—which had been imposed upon Inuit residents of Noorvik, Alaska, by Quaker missionaries in 1914—lifted in celebration of being the first community to be counted in the 2010 U.S. Census, to the unprecedented first Inuit representatives who in 1959 attended the 10th Eskimo Affairs Committee (with the intention to give their own position and perspective on the Eskimo problem). In addition, a united Arctic-wide Inuit culture was strengthened with the expansion of radio programs (e.g., CBC North Nunavut) and publications in Inuktitut. During the 1960s, there was a launching of new Inuit organizations (Huteson, 2007b): Committee for Original Peoples Entitlement, Inuit Tapirisat (Inuit Brotherhood) of Canada, Alaskan Eskimo Whaling Commission (AEW), and the first Inuit newspaper, the *Tundra Times*, in the fall of 1962 (Morgan, 1988).

There was a reclaiming and redefining of the Inuit culture within new political fields associated with the rights to their culture and subsistence and a response to the encroachment of government and “big business” on their land. For instance, in 1975, the Alaska Department of Fish and Game announced the reduction in the numbers of caribou and endeavored to initiate a regulation on the harvest (concentrating on the Inupiaqs). In the countercase, the Inupiaqs proclaimed that the “lower herd numbers” (that they debated was higher) was symptomatic of the expanding industrial occupation within the caribou’s terrain. In 1978, the establishment of the AEWG ensued in response to the International Whaling Commission’s (IWC) announcement 2 years prior of a reduction in its count of the bowhead whales and an imposed regulation on the harvest. In resolution, the count on whales is now a collaborative effort conducted by a representative of both the AEWG and the IWC.

Inuit representatives maintain dedicated, committed participation in the political achievements of the 1971 Land Claims Act in Alaska and the 1999 Nunavut Territory establishment in Canada. In 1979, Greenland obtained the status of home rule but with limited sovereignty. The next phase toward their independence from Denmark came as a result of the granting of a self-rule government on June 21, 2009. This new government will generate focused attention foremost on the educational and social issues of Greenland prior to the “primary objective” of sovereign independence, as stated by Greenland’s president, Olafur Ragnar Grimsson.

Nomenclature

Of late, the indigenous peoples’ aversion to the ambiguous nomenclature labels (assigned to them by early explorers) has initiated the reclamation of their indigenous identities, while symbolically casting off the collective misrepresentations and discriminations. The Inuit therefore are discarding the label *Eskimo* (Huteson, 2007b), an act comparable to that of the Kwakwaka’wakw of British Columbia who relinquished the name *Kwakiutl*. The Unangan have also renounced their title (Huteson, 2008); they no longer want to be referred to as *Aleut* (a name acquired from the Russians). The term *Eskimo* is credited to origination from an Algonquin expression of a much debatable translation; suggested translations were “to eat it raw,” “speakers of a foreign language,” and also “netter of snow shoes.” In Canada, the name Inuit is accepted as the generic term for their people; however, in Alaska, there is poignancy on being “correctly” identified as either Inupiat/Inupiaq or Yup’ik, while adamant that the Inuit are from Canada (although in Alaska, *Eskimo* is still in usage). In Siberian, the Yuits have become more popularly known as the Yup’iks. Comparatively, within the anthropological

profession, the implementation of Inuit has occurred as an alternative to *Eskimo*; until the mid-1970s, *Eskimology* was the title for the study of the Inuit.

Future Directions in Inuit Anthropology

Comprehensive Versus Regional Focus

The expansive Inuit culture is comprised of socially isolated communities, which are geographically extended throughout four countries. Considering the immensity of the Arctic and the former difficulties of researching in Russia, Inuit researchers have developed a tendency to focus on regional areas or countries as isolated cases rather than on the completeness of a comprehensive study. Ethnologist Pamela Sterns has advocated for the research of a cultural accumulation concerning the Inuit communities from the northeastern coast of Russia to Greenland such as the method described in Charles C. Hughes’s article (1965) “Under Four Flags: Recent Culture Change Among the Eskimos.” Inuit studies would undoubtedly benefit from disembarking from the practice of regional focus and adopting the expansiveness of a comprehensive comparative method.

Underwater Archaeology

Excavating relics concealed below the eustatic rise of the Bering Sea (with the shorelines modified and submerged at the conclusion of the land bridge) can now be explored through underwater archaeology. The 10,300-year-old “Prince-of-Wales-Man” discovered in the On-Your-Knees cave in southeastern Alaska (in an area once presumed to be inaccessible due to glacier coverage) strengthened the discussion of an Inuit littoral migration advancing along the glacier-lined coasts. The ancient shoreline of the land bridge, with the submerged encampments, suggests that underwater archaeology is an important addition to Inuit anthropology.

Arctic Climate Change

Arctic warming has been creating longer summers and shorter winters, which has caused a pertinent and unavoidable concern for the preservation of the tundra biome, which from time immemorial had remained largely reliable throughout the Inuit’s occupancy in the Arctic. The Inuit way of life has become endangered as their source of sustenance is principally derived from a subsistence diet. The safeguarding of the wildlife habitats has become a primary focus, such as the dilemma concerning polar bears that are starving and being reduced in numbers as a result of the latest unfolding conditions. Of late, some Inuit communities have also become compromised due to Arctic warming. In Alaska,

Inuit villages, beginning with Newtok, Shismaref, and Kivalina, have initiated the planning process of expensive relocations caused by permafrost crumbling within the villages and sliding into the ocean or nearby rivers. At the rate of this occurrence, the impending danger may occur to more Inuit villages. The surrounding Greenland coastlines are experiencing new satellite islands as apparent ice bridges melt and break away. The reduction and thinning of Greenland's sea ice has caused dangerous conditions for dog teams on this island, which lacks interconnecting roads between villages; an increased usage of boats and planes for intervillage travel has also resulted from unsafe ice conditions. On a positive note, Greenland's agrarian industries are on the rise, with a burgeoning tourist trade, in addition to the potentialities of oil and other mineral discoveries being made as the ice recedes.

Ecology

The critical awareness of global climate change has confirmed the imperativeness in the 21st century to research the effect on human settlements. In studies of limnology by researcher Marianne S. V. Douglas et al. of the University of Toronto, pond core samples from adjacent encampments of the ancient Inuit whalers were analyzed, and the researchers discovered that these ponds became enriched with nutrients subsequent to the Inuit's arrival due to decomposing whale remains; seemingly, these ponds endured at higher nutrient levels thereafter.

Politically Correct (PC)

A reformation of the *modus operandi* has occurred concerning the research ethics in combination with indigenous rights, concentrating on the reexamination of the standard protocol during bush work (also known as northern field-work). Previous uninhibited research methods involved acquiring information and artifacts (at times) by questionable means to secure intended data from "primitive people." For example, several Northwest tribes experienced the removal of an entire totem pole from their winter villages unbeknownst to them while the community was at its summer fishing camps at the Tongass village in southeast Alaska; Boas and George Thornton Emmons participated in the ransacking of shamans' graves for artifacts; and in 1987, anthropologist Carol Zane Jolles became apprehensive about the encouragement of her professors (prior to her first field experience) to tape-record Yup'iks incognito if necessary. The latter 20th century to early 21st century witnessed a metamorphosis within the anthropological realm concerning PC awareness. As a result, the past methods of biases of the *other* have been transmuted as literary works became decolonized, and Inuit are now welcomed as "part of the team."

DNA

The study of mitochondrial DNA (mtDNA) has broadened the comprehension in researching the bloodlines of the Inuit peoples and has offered near-definitive evidence or lack thereof concerning ancestry. For example, the Norse occupied Greenland settlements from CE mid-980 to the end of the 15th century, with exploration activities in the surrounding territories. An urban legend of "blond Inuits" surfaced following Captain "Charlie" Klengenbergo who informed explorer Stefansson about a "tribe" of Inuit with "European features" although that band of Inuit asserted no prior European contact. In turn, Stefansson observed and proclaimed that the Copper Inuit of northern Canada indeed appeared to have European features, although this declaration was seriously debated. In 2003, Icelandic scientists Agnar Helgason and Gisli Palsson (Steckley, 2008) conducted DNA research on a sample group of both Inuit and Norse descendants, without demonstrating a successful link to either ancestry. DNA research in the Aleutians has been conducted by Dr. Michael Crawford and Rohina Rubicz (Rubicz, Schurr, & Crawford, 2003) from the University of Kansas. Through their research, it was discovered that the Unangan DNA has an extant closer relationship with the Siberian Yup'iks and the Chukchi People.

Inuit Community and Anthropology Cooperation

Although the examination and sampling of prehistoric skeletal remains has aroused concerns by the *Lower-48* (an Alaskan term for mainland America) natives, the Inuit, Unangan, and northern indigenous tribes, in comparison, have been supportive of cooperation with those in the anthropological field and with the inclusion of the determining of genetic similarities between the prehistoric skeletal discoveries and the contemporary native population. In Alaska, the Tlingit and Haida tribal corporations on Prince of Wales Island joined in cooperation with Washington State molecular anthropologist Brian Kemp (Kemp et al., 2007), concerning the remains of the Prince-of-Wales-Man, which were discovered mere weeks prior to the unearthing of the controversial Kennewick man discovered on the banks of the Columbia River. Sealaska Corporation included a volunteer DNA sampling from their members during their 2008 biannual cultural festival, *Celebration*, to ascertain the tribal identity and moreover to discover the possibility of existing relations. The research conclusion noted no direct lineage from the limited sampling; the DNA from the skeletal remains was of the D mutation, which is found among some Unangans in addition to certain tribes in Southern California and farther south. The remains of this ancient person were returned to the tribes on Prince of Wales Island after Kemp's research conclusion. At the burial,

the name of *Shuka Kaa* (Man-Ahead-of-Us) was given to this ancestor of the indigenous peoples of the North American continent.

The dynamics of cooperation within the Arctic have cultivated a collaborative enterprise of both Inuit and non-Inuit scholars. In the beginning, unexpected and favorable developments resulted from addressing the mounting concerns that had culminated from the years of research in the Inuit communities. Examples of problematic concerns are as follows: A range of years may be required for scientists to publish their research reports; in addition, there is an apparent rarity of follow-up from the researchers to the participating communities; also, certain communities had felt the weight from years of study endured and concluded to suspend further research on their people. Addressing the concerns of the Inuit population created partnerships to integrate an agenda to benefit the Inuit communities.

Sample of Mutual Negotiations

The Inuit Heritage Trust of Nunavut is a model of this investiture concerning its cooperation and alliance with academic research in regard to the prehistoric skeletal remains inventoried at the Museum of Civilization:

1. A substantial quantity of skeletal material was allowed (more than researcher Dennis O'Rourke requested).
2. Copies of documentations, published or unpublished, are to be submitted to the Inuit Heritage Trust.
3. A nontechnical report translated into Inuktitut will also be submitted.

This progressive level of cooperation addresses the obvious—research will continue in the Arctic and mutual collaboration can accommodate both researchers and communities.

Conclusion

The practices and methods of Inuit study have become comparably altered and sophisticated since those early expeditions to the Northern Hemisphere. New technology, such as DNA research, has significantly broadened and enhanced anthropological research from the Inuit's epic journey from their traditional way of life, through their many challenges to learn a whole new lifestyle, and to their cultural culmination back to sovereignty, which has been actuated within their cultural arts, education, research, and politics. The Inuit have tenaciously demonstrated the incentive for the reestablishment of their autonomy and inviolate rights pertaining to their accurate representation in research, their rights as hunters/fishermen/gatherers, and their right to speak their own language and govern

their own education, and to establish the direction of growth in their communities. The Inuit's aspiration to study their own culture and direct their own destiny has, indeed, broadened the 21st-century Inuit community and fundamentally established their political stance and desire to enrich their culture.

This 21st-century Inuit anthropological focus will ultimately continue to benefit the expansion of DNA research with the Inuit, the Unangans, and the North coastal tribes. They have been exemplars in forming cooperations with the scientific community to allow DNA sampling, which is increasing the knowledge and appreciation of the family of *Shuka Kaa*, the people who have arrived ahead of us!

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IROQUOIAN PEOPLES

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Iroquoian communities have long been the subject of anthropological discourse. Exemplified by Morgan's *League of the Ho-De-No-Sau-Nee or Iroquois* (1851/1901), initial inquiries and theses served as little more than compilations of technologies, rituals, and myths attributed to only a fraction of all Iroquoian-speaking peoples. By the end of the 20th century, however, Iroquoian-centered research expanded to include analyses of Iroquoian political developments, the effect of European contact on Iroquoian peoples, and the progression of Iroquoian nations through the centuries. This long history of research has resulted in the preservation and knowledge of Iroquoian history and development, providing sound direction for anthropologists throughout the 21st century.

The Iroquoian Language Family

The *Haudenosaunee Confederacy*, its members commonly referred to as "the Iroquois," is only part of the family of Native American nations that speak (or spoke) an Iroquoian language. Member nations of the Haudenosaunee Confederacy initially included the Seneca, Cayuga, Onondaga, Oneida, and Mohawk and were among the first Native American populations Europeans encountered. All speakers of an Iroquoian dialect, the Haudenosaunee nations occupied territory that covered most of present-day New York State. Additional Iroquoian-speaking peoples inhabited areas

north and west of the Haudenosaunee Confederacy, with the Erie, Wenro, and Neutral nations occupying much of the Niagara Frontier and the Huron and Petun settling in portions of present-day Ontario.

South of the Haudenosaunee Confederacy's territory dwelled other Iroquoian-speaking populations. In the areas now recognized as southern New York State and Pennsylvania, the Susquehannock were the dominant Iroquoian nation. Further south, in the region of the Carolinas, other Iroquoian-speaking nations lived, which included the Tuscarora and the Cherokee. Collectively, Iroquoian nations occupied territory covering much of eastern North America.

Early Surveys of Iroquoian Peoples

Champlain, La Salle, and Cartier, among other explorers, provided the first written accounts regarding Iroquoian peoples. Far from the detailed research and texts generated by anthropologists during the late 19th century and onward, their writings relayed details of Iroquoian combat tactics, horticultural techniques, food processing and storage methods, religious beliefs, and architecture. Explorers also recorded the interactions between Iroquoians and neighboring nations, friendly or otherwise, which helped Europeans gauge the extent of Iroquoian territories and how to best manage relations with them. The latter proved

beneficial in both maintaining peaceful coexistence at times and exploiting ties with Iroquoians to acquire resources, land, and allies as European conflicts played out in the New World.

Missionaries interacted with and recorded information regarding Iroquoians not long after explorers penetrated Iroquoian territories. While their journals and correspondence detailed similar events and customs as reported by explorers, Jesuits and other missionaries commented heavily on intersocietal relations and supplied translations of Iroquoian dialects, which added a linguistics component to the Jesuits' efforts. Collectively, these firsthand accounts secured knowledge of Iroquoian cultures while simultaneously providing a foundation for early anthropological research of Iroquoians.

The conflicts, languages, relocation, treaties, and traditions of Iroquoian nations remained the subject of miscellaneous historical accounts. Yet it was not until the late 19th century that recognized anthropologists studied and documented Iroquoian lifestyles, activities, and history. Lewis Henry Morgan's (1851/1901) *League of the Ho-De-No-Sau-Nee or Iroquois* was the most comprehensive such work, and it remains one of the foremost anthropological studies of Iroquoian society to date.

Morgan, an attorney from Rochester, New York, remains prominent among early anthropologists, particularly for his work *Ancient Society* (1877), which promoted and enhanced the idea of cultural evolution. Today, Morgan's ideas regarding cultural evolution are generally rejected. Yet *League of the Ho-De-No-Sau-Nee or Iroquois* (1851/1901), a work he completed earlier in life, still maintains a prominence unmatched by most later anthropological publications.

Living in New York, Morgan was often in contact with members of Haudenosaunee Confederacy nations, commonly referred to as *the Iroquois*. Working in cooperation with Ely Parker, a Seneca and Civil War brigadier general, Morgan studied Iroquoian culture, his focus placed on the Seneca, Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora. The prominence of Morgan's work was due to his providing more than just a simple historical account of the Haudenosaunee Confederacy's formation and interaction with Europeans during the protohistoric period. Morgan's in-depth research, coupled with his reliance on archaeological remains, oral tradition, and collaboration with Iroquoians themselves helped him construct a thorough relation of Iroquoian traditions, language patterns, political structure, religious beliefs, technological advancements, and architecture. Arguably, Morgan, beyond his work in cultural anthropological and archaeological research, also made strides in applied anthropology as he used his legal background and knowledge of Iroquoian history and customs to aid Haudenosaunee members in legal battles. Collectively, Lewis Henry Morgan's efforts provided a foundation for both Iroquoian studies/knowledge and anthropological research; few anthropologists have made as lasting an effect in either regard.

Iroquoian Studies in the 20th Century

Archaeologists, both professional and amateur, provided a new impetus for Iroquoian research during the late 19th and early 20th centuries. Highlighted by the work of Frederick Houghton (1927) and Arthur Parker (1916), the latter being an archaeologist of Iroquoian descent, such research initiatives, while often lacking any definitive scientific framework, helped uncover prehistoric Iroquoian sites and massive assemblages of ceramics, lithic, archaeological features, and faunal remains. The artifact assemblages alone were of monumental importance to anthropologists attempting to understand technological advancements in projectile points, pots, pipes, beadwork, and architecture. While much of this material culture resides in museum storage facilities, unanalyzed, the lithic, ceramic, and bone artifacts studied thus far provided insight into prehistoric Iroquoian communities as well as other northeastern Native American nations. The discovery of prehistoric and historic sites by anthropologists and anthropology enthusiasts of the time was equally important to current knowledge of Iroquoian nations and their societal development.

A. L. Benedict, a medical doctor/Iroquoian specialist from Buffalo, New York, traveled throughout western New York State throughout the late 19th and early 20th centuries, looking for prehistoric Iroquoian sites. Ultimately, Benedict provided thousands of artifacts from Iroquoian sites. Specifically speaking, Benedict recorded the location of the sites he excavated and collected everything from projectile points and pottery shards to net sinkers and faunal remains. While Benedict's notes lacked substantial provenience data, he provided the only evidence for many Iroquoian sites as parking lots and buildings now cover where the prehistoric sites once stood. Today, much of Benedict's Iroquoian collections and notes are contained at museums and colleges throughout the western New York region.

Along with the massive assemblages of Iroquoian artifacts collected during this period, anthropologists also dedicated time to theorizing as to the origins of Iroquoian culture. Guided by archaeological investigations, oral traditions, and historical documentation, early 20th-century anthropologists reasoned that Iroquoian nations migrated into the northeastern regions of North America, replacing other native populations, including Algonquian-speaking nations. This migration hypothesis would dominate Iroquoian studies for decades until additional anthropological research redirected our understanding of Iroquoian origins.

In Situ Hypothesis: Pursuit of Iroquoian Origins

While the focus of cultural anthropologists on Iroquoian peoples comparatively diminished during the early

20th century, archaeologists provided an influx of data to our understanding of Iroquoian culture. With emphasis placed both on single, prehistoric Iroquoian populations/sites as well as regional development of Iroquoian culture, archaeologists, including William Ritchie, Alfred Guthe, Richard MacNeish, Marian White, and James Wright, excavated for, analyzed, and secured Iroquoian material culture from Erie, Huron, Haudenosaunee, and Neutral sites. Anthropologists acquired an improved knowledge of Iroquoian technologies during this time, which is to be expected. Yet a greater understanding of the development of Iroquoian culture(s) was arguably the greater achievement during this period. Archaeologists, most notably MacNeish and Ritchie, uncovered evidence of cultural connections between earlier Owasco societies and proto-Iroquoians via ceramic assemblages and architectural evidence causing some to argue that instead of the hypothesis of Iroquoians migrating into the northeast, it was likely that Iroquoian traditions developed *in situ*, or rather from earlier traditions long established in the region. A radical change in direction from earlier migration theories, the *in situ* hypothesis quickly became the dominant theory regarding Iroquoian origins in the northeast.

Sociocultural Investigations of Iroquoians

Aside from archaeological pursuits, sociocultural research did continue throughout the 20th century. Whereas archaeologists primarily sought to understand Iroquoian origins and the effect of European contact on Iroquoian societies, cultural anthropological interests, as with other indigenous populations throughout the world, focused on recording as much data on current Iroquoian traditions as possible *before* Iroquoians disappeared altogether. Obviously, such fears regarding the disappearance of Iroquoian populations did not come to full fruition. Yet such concerns did help salvage an understanding of Iroquoian culture that likely would have been lost otherwise. That said, these cultural investigations, including those of William Fenton (1951, 1978) and Martha Champion Randle (1951), concentrated on issues from land and nation rights to the contemporary roles of men and women within Iroquoian society. Reflective of the research methodology of Lewis Henry Morgan, these anthropologists ushered in a new wave of ethnological inquiries that accentuated the facts that Iroquoians were living societies, cognizant of their heritage and ceaselessly adapting and contributing to contemporary circumstances.

Given anthropology's dependence on a multidisciplinary approach to the study of humanity, it is fitting that historians were markedly influential to anthropologists' understanding of contemporary Iroquoian culture. While anthropologists long focused on Iroquoian *prehistory*, historians, including Barbara Graymont, Laurence Hauptman, and Daniel Richter, led efforts to record and

interpret the recent history of Iroquoians, particularly that of Haudenosaunee nations. Though historians acknowledged the longevity of Iroquoian culture, their focus was on the effect that contact with non-Iroquoians continued to have on the lives and traditions of Iroquoian people. From the first arrival of missionaries and explorers up to 20th-century events, such as the building of the Kinzua Dam and its effect on Iroquoian societies, historians helped ensure the recording of Iroquoian adaptations to the ever-growing world population, a task anthropologists would have struggled to do alone. Together, anthropologists and historians ensured the preservation of Iroquoian history and traditions while simultaneously reminding the world that Iroquoian societies still existed. Evidence of such collaboration appeared in school textbooks, documentaries, and museum exhibit scripts where Iroquoianists attempted to explain that the Haudenosaunee were not the only Iroquoian-speaking nations and that there was more to *Iroquoian* culture than corn, beans, and squash.

20th-Century Anthropology: Forgotten Studies of Iroquoian Peoples

The aforementioned mid- to late 20th-century anthropological studies often overshadow other pivotal research centered on Iroquoian societies. Specifically speaking, non-Iroquoianists fail to realize that migration theories for Iroquoian origins are still supported, that settlement pattern analyses of prehistoric/early historic Iroquoian populations were prominent throughout the 20th century, and that the last decade of the century was dominated by efforts to inventory Iroquoian collections throughout the country.

Migration Versus In Situ Development

Anthropologists did not simply abandon migration theories once *in situ* hypotheses surfaced. While most anthropologists today still favor the latter category of hypotheses, arguments in support of the migration of established Iroquoian societies to the northeast (as opposed to Iroquoian culture developing in the northeast) remain. Adherents to migration hypotheses, Dean Snow (1996) most prominent among them, cite matrilineal-societal constructs and linguistic similarities between Iroquoian language families and populations outside the northeastern cultural area as evidence suggesting that Iroquoian culture is not indigenous to the northeast.

Debates regarding the origins of Iroquoian culture are not likely to end anytime soon. While *in situ* hypotheses remain more widely accepted, Snow and other migration theorists have raised important issues worth considering, particularly given the fact that so much information is still lacking with which to verify either argument.

Iroquoian Settlement Patterns

The settlement patterns of Iroquoian nations have long been the subject of narratives and anthropological studies, the former including the earliest known written accounts of Iroquoian peoples recorded by European missionaries and explorers circa CE 1600. Initially, such studies were quite basic in detail, providing rough dimensions for longhouses, population estimates for Iroquoians living within household and village boundaries, and analyses of household dispersal patterns relative to matrilineal residency. While this information was useful in early historic period military campaigns on the part of Europeans and non-Iroquoian, indigenous populations likely benefited the most from these rudimentary accounts; the information gathered reflected the fundamental understanding of Iroquoian settlement patterns well into the 20th century.

Between 1920 and 1970, a large quantity of archaeological reconnaissance, tempered by a thorough analysis of features, ecofacts, and artifacts collected, led anthropologists toward a more comprehensive understanding of Iroquoian settlement patterns. The culmination of anthropological understanding of this settlement data was evident in Ritchie and Funk's publication, *Aboriginal Settlement Patterns in the Northeast* (1973). After centuries of studying and interacting with Iroquoians, anthropologists affirmed the general layout of Iroquoian communities up to early historic times, common elements being the presence of multiple longhouses located on an elevated plane or knoll, which were often surrounded by a palisade. In addition, anthropologists, mostly through the recovery and investigation of archaeological features (postmolds, hearths, and storage pits in particular), discerned that villages were composed of multiple clans, each of which maintained one or more longhouses. Residency was matrilineal; husbands moved in with their wives' extended family. Within the longhouse, an additional breakdown of households occurred, each nuclear family maintaining their own apartment area where they slept, ate, and stored personal possessions.

Additional archaeological excavations of Iroquoian sites, particularly the large-scale excavations conducted on Huron sites in southeastern Ontario, further emphasized this understanding. With the addition of historical research and accounts, anthropologists and historians alike have determined that villages were occupied for up to 30 years before natural resources and soil nutrients were depleted, making a village occupation zone inefficient for Iroquoian needs. Furthermore, archaeologists, once again dependent on archaeological features recovered, determined that the architecture of longhouses (and overall village design) was relatively constant throughout northern Iroquoian nations well into protohistoric times, a point most effectively made by Mima Kapches (1993a, 1993b) during the late 20th century. All knowledge considered, including accounts of the assimilation of captured peoples into other Iroquoian

nations, settlement patterns for Iroquoian societies remained relatively constant for a considerable length of time.

Turning attention toward historically recent and contemporary Iroquoian societies, anthropologists, once again, had the benefit of historical documents and field observations with which to determine settlement patterns. As the United States of America expanded, Iroquoian communities were continually forced westward onto reservations. During the 19th century, a series of questionable transactions between Iroquoian nations and North American governments further depleted Iroquoian territories, including arable land suitable for farming. Iroquoians, as with many Native American nations, were compelled to live in cities in order to obtain work and a means to survive. Consequently, Iroquoian household structures increasingly reflected the nuclear family residences. Further erosion of Iroquoian lands continued into the 20th century as state and national infrastructure projects, most notably the Kinzua Dam, claimed thousands of acres of reservation land. Such action further influenced Iroquoians to leave reservations to secure work and resources. Today, individuals of Iroquoian descent live throughout North America, both on reservations in the United States and Canada as well as in cities and towns throughout the continent. As for household structure, nuclear families commonly make up domestic residences. Yet the extended family cohesion still exists as clans maintain political rights and control of property and natural resources.

Native American Graves Protection and Repatriation Act (NAGPRA)

NAGPRA legislation, passed in the United States in 1990, provided a significant opportunity for anthropologists interested in Iroquoian studies. This act required any federal institution or institution receiving federal funding to document all Native American objects and/or remains held and return human remains, sacred artifacts, and objects of cultural patrimony to respective Native American nations. Faced with the prospect of loss of federal funds, museums, libraries, and similar repositories sought archaeologists and cultural anthropologists to help identify and analyze Native American material in exhibits and storage. With the help of federal, state, and local grants, these cultural institutions provided an impetus for research on native cultures including Iroquoians.

From the start, NAGPRA brought together anthropologists and Iroquoians, which helped open a series of dialogues regarding Iroquoian rights, beliefs, and concerns over the preservation of Iroquoian heritage. The resultant dialogue also allowed Iroquoians to provide greater insight into their traditions, political endeavors, and educational efforts. Essentially, anthropologists started placing greater emphasis on contemporary Iroquoian societies, people who were often ignored as opposed to the early historic

populations depicted in narratives and archaeological research. The resultant information, collected quickly, found its way into museum scripts, miscellaneous texts, and educational programming, which helped strengthen a long heeded axiom: Iroquoians still exist.

In addition to the increased interaction between anthropologists and Iroquoians after the inception of NAGPRA, the resulting analyses of collected artifacts and human remains helped validate and disprove long-held beliefs regarding Iroquoian culture. For instance, with so much archaeological material collected and unanalyzed during the late 19th and early 20th centuries, the evaluations initiated through NAGPRA uncovered evidence of European trade goods, including glass beads and metal tools, at Iroquoian sites where previously such evidence was not recovered. In some cases, Iroquoian material stored in the collections of cultural institutions provided evidence of Iroquoian occupations occupying territories longer than previously believed. Ultimately, NAGPRA provided anthropologists with an opportunity to check their findings and correct our knowledge and understanding of Iroquoian societies.

21st-Century Anthropology: Iroquoian Research

Iroquoian studies remain an important part of anthropology. To an extent, the interests of anthropologists, including cultural anthropologists and archaeologists, revolve around long-standing debates, which have yet to be sorted out. Yet new avenues of anthropological research have begun, which are clarifying the resilience and adaptability of Iroquoians to their constantly changing circumstances.

Iroquoian Culture and Societies: Updating the Masses

The arrival of the new millennium and the 21st century brought with it a reconsideration of our knowledge of Iroquoian societies as well as the commitment to rectify the shortcomings of museum exhibits and miscellaneous texts used to educate students of all ages. Such purpose and obligation is by no means innovative since every generation (of anthropologists or otherwise) seemingly renews its pursuit of *truth*. Yet as the first decade of the 21st century draws to a close, evidence of anthropologists rectifying misinterpretations of Iroquoian culture, history, and action is already apparent. In New York State, archaeologists and cultural anthropologists have been enlisted by schools to educate teachers about Iroquoian culture and societies so that school curriculums are accurate. For too long, Iroquoian (and other Native American) peoples remained relegated to a general “native” status with little recognition for the ingenuity of and differences among Iroquoian societies. The input of anthropologists specialized in Iroquoian

studies (including many of Iroquoian descent) has and will continue to rectify such shortsightedness.

Museums, likewise, have hired anthropologists specialized in Iroquoian studies to update exhibits and educational programming. Given the prominence of member nations of the Haudenosaunee Confederacy in recent years, particularly with regards to treaty rights, casino gambling, and taxation enforcement for nonnatives on reservation land, it is becoming harder to ignore the fact that Iroquoian peoples are not locked in a vacuum where bark-covered longhouses are still the preferred form of dwelling. Unfortunately, many museum exhibits and lecture series continue to promote a basic *corn, beans, and squash approach*, which focuses on early historic Iroquoian cultures. There is generally little or no mention of Iroquoian involvement in military campaigns of the United States, the seizure of Iroquoian land via eminent domain on the part of the United States, or the current living conditions for Iroquoians on reservation land. Within the last decade alone, anthropologists as well as historians and Iroquoians themselves have helped rectify such misunderstanding on the part of cultural institutions.

As for general references (encyclopedias, dictionaries, etc.) and textbooks, anthropologists specialized in Iroquoian studies have generated entries regarding Iroquoian culture and societies that have corrected misunderstandings long held by students and teachers alike. Admittedly, with the far-reaching capabilities of the Internet and the volume of incorrect information available therein, questions could be and have been raised as to the benefit of many references available. However, given the rise in Web use by cultural institutions with Iroquoian specialists on staff, the ability of anthropologists to provide verifiable data regarding Iroquoians is certainly greater than in the past. As with the aforementioned feedback, instruction and direction provided by anthropologists, the continued monitoring and adjustment of what is taught to students and the community at large, is a responsibility to all of us Iroquoianists.

NAGPRA Enforcement: An Ongoing Research Project

The effect of NAGPRA has certainly been influential on Iroquoian studies and the development of anthropology in general. For the foreseeable future, NAGPRA will continue to require cultural institutions and staff anthropologists to unbox collections that have remained hidden and unanalyzed for, in some instances, over a century. While these collections rarely are associated with any detailed records—their collectors usually more interested in the object rather than its overall context within Iroquoian culture—the records that still exist could help anthropologists to better understand issues ranging from the origins of Iroquoian culture (migration vs. in situ) to the birth of the Haudenosaunee

(Iroquois) Confederacy. Consequently, anthropologists should remain mindful of the fact that museums, libraries, and historical societies likely contain artifacts, narratives, and correspondence that could enhance our understanding of Iroquoian societies and culture.

Contact and Disease: Population Decline in Iroquoian Societies

The crippling impact of European-borne diseases on Native American communities has long been documented and discussed, such discourse present even in the earliest journals of explorers and missionaries who first entered North America. Yet, detailed and specific understanding of how, when, and through what conditions such diseases became virulent among Iroquoian societies did not surface until the late 20th century as highlighted by the work of Snow and Starna (1989). Part of the interest in the effect of diseases is related to attempts to ascertain the size of Native American populations *before* contact with Europeans. Anthropologists, long concerned with the validity of population estimates of Native Americans relayed in historical documents written in the late 16th and early 17th centuries, questioned if the spread of European diseases outpaced the actual rate of contact between Europeans and Native American societies. This interest has carried over into the 21st century, as evidenced by the work of Warrick (2003), which focused on the depopulation of Huron and Petun Iroquoians due to European diseases. Such recent investigations suggest that European-borne diseases would not have decimated Native American populations until greater concentrations of Europeans, including families, arrived in the New World. Consequently, there is evidence that initial population estimates for Iroquoian nations provided by missionaries and explorers were relatively accurate.

Rise of the League of the Haudenosaunee

The story of Hiawatha and the formation of the Haudenosaunee Confederacy is a staple of school textbooks and museum scripts throughout the northeast. It also remains the focus of anthropological research, discourse, and conjecture. As for the actual date of when the Haudenosaunee Confederacy formed, estimates have ranged from centuries before Europeans first entered North America to years after contact between Europeans and Iroquoians, the confederacy's formation resulting from Iroquoian reacting to European conquest. As for data used to calculate the Haudenosaunee Confederacy's formation, everything from oral tradition to historical records and archaeological remains have been cited, the more distant dates often related to oral tradition. Disagreements over *when* the Seneca, Cayuga, Onondaga, Oneida, and Mohawk nations first united long remained heated, and no

consensus appears likely as anthropologists continue to search for an answer.

As for recent anthropological approaches to determining the confederacy's formation, including that of Kuhn and Sempowski (2001), emphasis has been placed on the examination of related artifact assemblages, the argument being that emergence of similarities in ceramic patterning among Haudenosaunee nations reflects the confederacy's formation or, at the very least, growing contact between the respective Haudenosaunee member nations. Kuhn and Sempowski's research, which linked their findings to some oral traditions, focused attention on the Seneca and Mohawk nations, an understandable data set given that these two Native American nations were the respective western and eastern geographical extremes (doorways) of the Haudenosaunee Confederacy. The results of their comparison of Seneca and Mohawk (pipe) ceramics indicated the confederacy formed circa CE 1600. While these results will not likely end the debate as to when the Haudenosaunee Confederacy formed, the methodology certainly provided guidance for further investigations.

The Forgotten Iroquoians

The Haudenosaunee Confederacy (including the Seneca, Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora), the Huron, and to a lesser extent, the Erie, Neutral, and Wenro are arguably the most noted of the northern Iroquoian populations. What is generally unknown is that additional Iroquoian-speaking populations occupied territories peripheral to these Iroquoian nations, including territory along the St. Lawrence River and in Jefferson County, New York State. History books, not to mention museum exhibits and multiple media outlets, rarely include text, artifacts, diagrams, or maps referring to these populations nor did many manuscripts completed by anthropologists until the mid to late 20th century. Within the first decade of the 21st century, however, research and publications have already devoted more attention to these Iroquoians including research by Engelbrecht (2003) and Morin (2001). While these forgotten Iroquoian populations remain a mystery to anthropologists and other research, continued focus on them will hopefully add to our understanding on the development of Iroquoian culture.

Warfare and Iroquoian Societies

The term "Iroquois" has long stirred fear in the hearts of Europeans and Native Americans, the term itself becoming synonymous with war. Even the earliest historical accounts written by missionaries and explorers seemed to equate the Iroquois, or rather the Haudenosaunee Confederacy with the marked conflicts that seemed almost commonplace throughout the New World. Yet though most Native American

societies were seen as militant and “savage” to Europeans, the Iroquois seemed especially feared and respected, akin to the fiercest of foes one could ever imagine encountering. During the concluding decades of the 20th century, anthropologists endeavored to dispel such sweeping generalizations, arguing that the Haudenosaunee were no more invested in warfare than most societies, turning toward conflict only when pressed by need. Work completed during the early 21st century has already focused on clarifying and supporting this argument.

William Engelbrecht, a leading anthropologist among Iroquoian specialists, provided one of the first such studies, which included data he collected over a long career studying Iroquoian culture. In his book, titled *Iroquoia: The Development of a Native World* (2003), Engelbrecht provided insight into the Haudenosaunee nations and the prevalence war and conflict played in their society. From the construction of village fortifications, such as palisades, to the purposes linked to conflict, ranging from economic concerns to revenge, all Iroquoian nations, as have many societies through time, relied on warfare for protection and acquisition. Engelbrecht’s work, published in the early years of the 21st century, was a major first step in clarifying the context in which warfare arises among Iroquoian societies. His work also helps anthropologists recognize areas of their objectives, theories, and methodologies that still need work.

Iroquoian Societies Today

Iroquoian studies, particularly as presented in museum exhibit scripts and school textbooks, often focused on historical events or changes to Iroquoian societies during the past. Today, while anthropological research continues to emphasize Iroquoians in a historical context, more anthropologists are examining contemporary Iroquoian societies and their effect locally, nationally, and internationally. As previously mentioned, NAGPRA legislation certainly influenced this change in research focus by bringing anthropologists and Iroquoians together. Consequently, anthropologists interacted with Iroquoians in the real world, learning firsthand how Iroquoians were coping in the contemporary world. Now, Iroquoians are more colleagues than subjects being observed from a distance, often collaborating with anthropologists in the development of educational programming for schools, exhibits for cultural institutions, and manuscripts for both academic and general public venues.

Admittedly, anthropologists remain predominately interested in the prehistoric development of Iroquoian societies as well as in the effect of Iroquoians on formation and historical transformation of North America in general. Yet contemporary actions on the part of Iroquoian communities throughout North America, particularly in New York State, increasingly drive anthropologists to examine

Iroquoian actions of today. Furthermore, where anthropologists have long examined Iroquoian societies from a distance, now a growing number of Iroquoians have assumed the role of anthropologist, providing internal viewpoints with extraordinary insight. All things considered, anthropological studies of Iroquoian societies should provide valuable and interesting insight during the next century.

What’s Good for the 20th Century

Anthropological research objectives and activities of the 20th century should not be completely discarded simply because *times have changed*. Much of the work conducted by anthropologists regarding Iroquoian societies during the last 50 years alone remains unfinished as related artifacts in the collections of museums and other repositories have yet to be examined and analyzed within the context of Iroquoian knowledge thus far obtained. In addition, as land is continually developed and Iroquoian sites are uncovered through archaeological reconnaissance, careful excavation and analysis of recovered material remains a priority as the destructive nature of excavation provides only one chance to get our observations right. Consequently, there needs to be a continuation of the analysis of collected Iroquoian material culture, as well as the incorporation of newly acquired artifacts, oral tradition, and historical documentation. Cultural Resource Management efforts, in particular, will undoubtedly serve as a major source of new artifacts and feature analyses. However, NAGPRA-generated research of repository collections will also need to continue as artifacts and records collected by anthropologists during the 20th century may still provide vital information in the effort to better understand Iroquoian societies, then and now.

Future Directions

Iroquoian societies were among the first indigenous populations European explorers and missionaries encountered and extensively interacted with on setting foot on North American soil. With Lewis Henry Morgan leading the way, Iroquoians were also among the first Native Americans thoroughly studied by anthropologists. Now, as the 21st century rapidly approaches its 2nd decade, Iroquoians, fittingly, remain a major focus of anthropological inquiry: not only because Iroquoians have long been a source of interest but also because there is still so much anthropologists still do not understand about the development and histories of these Native American nations. As for the direction of Iroquoian studies for the duration of the 21st century, specific research questions to consider, given the knowledge thus far acquired, include inquiries regarding government structure, Iroquoian diversity, and the ingenuity of Iroquoian peoples through history.

Iroquoian Governments: Beyond the Haudenosaunee

The structure of the Haudenosaunee Confederacy, which still exists, is well documented in historical manuscripts dating back as far as the 17th century. This includes governmental structure at the village, tribe, and national level. The governmental structure of other northern Iroquoian nations, particularly that of the Erie, Neutral, and Wenro nations, is relatively nonexistent. While scholars from multiple fields have hypothesized that the Erie, Neutral, and Wenro confederacies were possibly structured in a similar fashion to that of the Haudenosaunee, extensive research has yet to be devoted to such inquiries. The author (O'Donnell, 2003) opened the door for comparisons between the Haudenosaunee and those Iroquoian confederacies aforementioned. With focus placed on differences in longhouse architectural patterns, it was hypothesized that stark differences did exist between Iroquoian nations at least at the village level. With only a small sample of longhouse patterns to include in the study, there are obvious limitations to what can be determined with regards to the differences among the Iroquoian nations. Yet this initial work provides, at the minimum, direction for future research.

The Depopulation of Iroquoia

Warrick's (2003) examination into the depopulation of Huron and Petun territories/villages offered valuable insight, not only into the effect of contact of Native American peoples but also into the errors of long-held assumptions on the part of anthropologists and historians alike. The belief that diseases spread quicker than the rate of actual contact between Iroquoians and Europeans is certainly in doubt, as discussed earlier. Admittedly, such examinations were limited to only a portion of the northern Iroquoian nations that occupied portions of northeastern North America at the time of contact. Yet the methodology that Warrick implemented as well as his findings certainly provide anthropologists with a direction and a tool set with which to determine if all Iroquoian peoples were affected similarly by European-borne diseases. The methodology may also serve as a guide for the study of other indigenous populations as well since the Iroquoians were not the only societies occupying North America when Europeans first arrived.

To Preserve, Record, and Defend

Too many archaeological sites have been destroyed or rendered inaccessible due to construction activities during the 20th century. As more records recorded by archaeologists during the early 20th century surface, anthropologists learn of more sites discovered. Yet when visiting the site

locations described by these early Iroquoian enthusiasts, all too often we discover that the area of the site is now home to a building, golf course, or parking lot, which leaves little chance for recovery of additional material culture or relevant features. As collections continue to surface, anthropologists must pay heed to documentation of sites uncovered during the recent and distant past. Any site described should be photographed and examined, with current conditions of the area recorded. A lack of trained anthropologists for this initiative certainly limits the volume of records that can be examined and respective sites that can be recorded. However, as more development continues, more Iroquoian sites are at risk to bulldozers and suburban sprawl. This leaves anthropologists with an added burden of excavating sites at danger of destruction through construction and/or preserving sites until such time that they can be examined by properly trained anthropologists. While it is likely not every site will be sampled through fieldwork or protected to any extent, we have to try.

Conclusion

Mima Kapches's (1993a, 1993b) work has certainly provided valuable insight into the complexities of Iroquoian engineering as well as the spatial contexts within Iroquoian villages. The implications of Kapches's discoveries are too important to ignore. Already, other anthropologists have received direction from Kapches's research (Engelbrecht, 2003; O'Donnell, 2003; Williams-Shuker & Allen, 1997), with special interest focused on Kapches's findings and their implications regarding societal differences between Haudenosaunee peoples and other Iroquoian nations. Guiding questions with regard to these findings include inquiries into the power of clans within the various Iroquoian nations and the alliances that may have existed among Iroquoian societies. Ultimately, given our lack of understanding with regard to non-Haudenosaunee Iroquoians, Mima Kapches's (1993a, 1993b) research can only help in providing anthropologists with a course in our research.

Looking to the Future of Iroquoian Research

Anthropologists' understanding of Iroquoian societies has certainly progressed significantly during the last century. From a larger vantage point, it could be argued that Iroquoians are even one of the most studied and understood Native American cultures to date. Yet the work is not finished. From an archaeological standpoint, many sites have yet to be fully excavated and/or discovered, limiting anthropological understanding of how Iroquoian culture formed and the differences that developed between the various Iroquoian nations. From a cultural anthropology standpoint, too little emphasis has been directed toward living Iroquoian communities and the continuing

development of their societies both on reservations and within urban spaces. Also, collaboration with Iroquoian peoples today needs to be expanded as oral tradition and private collections could provide additional information pertinent to anthropological inquiries. The reality of what still needs to be studied and accomplished is not meant to discourage anthropologists or to critique the research currently underway by anthropologists. The points highlighted throughout this article are simply meant to remind anthropologists and Iroquoian enthusiasts that we all have our work cut out for us in the 21st century. Given what we learned about Iroquoians during the last century, it seems fair to say that the next century should provide some interesting insight into Iroquoian culture.

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PART XII

CULTURE AREAS

AFRICA

Past and Present

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This chapter presents the study of Africa from historical and contemporary perspectives and considers its future prospects. It discusses Africa as the origin of humankind, where prehistoric and modern human societies have lived since the remote past. The chapter throws light on the ancient civilizations of Africa and African kingdoms. It outlines briefly the history of European contacts with Africa, first through exploration, then trade, and recently in the form of colonization. Other topics of interest in African studies are also part of this chapter, including the peoples, landscapes, regions, and countries of the continent, as well as the independence movement, postcolonial Africa, disillusionment, and modern challenges, hopes, and prospects. It ends with a summary and conclusion and suggests issues for continued inquiries into the study of Africa. Further readings are provided to enrich the understanding of the African continent and its peoples within the global village of our world.

Ancient Civilizations

Africa is believed to be the cradle of humankind. This belief is becoming even stronger with the recent findings of evidence of our distant roots, such as the remains of “Lucy” (*Australopithecus afarensis*), and more recently “Ardi” (*Ardipithecus ramidus*) in Ethiopia—remains that date our connections to the remote past of 4.4 million years ago.

According to R. Hunt Davis (1998), advanced primates of hominids called *Homo erectus* moved out of Africa to Europe and Asia some 800,000 years ago. Molefi Asante (2007), among many, argued that the source of prehistoric evidence about the origin of humankind is found in Africa. Africans began farming and domestication of animals as early as 5000 BCE. They used iron to enhance their means of production. Trade brought about wealth that added sophistication to the political and economic changes in African society. Continued migration led to social expansion and the introduction of iron-based technology and agricultural skills to wider parts of Africa. These developments helped the emergence of cities and states that later evolved into kingdoms. Davis noted that a massive migration enabled Bantu-speaking people to introduce their agricultural skills widely and dominate large areas of Africa south of the Sahara.

Advanced civilizations in places like Egypt enjoyed the benefits of the invention of written language, which goes back to 3200 BCE and is also part of the history of Africa. Egyptian civilizations along the course of the Nile River reached south to the kingdoms of Nubia and Kush of today's Sudan. The kingdom of Axum in Ethiopia was one of the advanced civilizations of the ancient world. Axum had contacts with Rome, Arabia, and India for trade and commerce. Famous for its carved monuments, Axum formed the foundation of the Ethiopian Empire, which is still a center of tourist attraction and a source of pride for Ethiopia as a reminder of its ancient African civilization.

Major global events have had great impacts on Africa. The expansion of the Roman Empire reached Africa and took control over the northern part, including Egypt and Morocco, at the onset of the first millennium CE. The Romans' conquest was preceded by the Greeks' dynasty in Egypt, one that lasted from 332 to 30 BCE. Toyin Falola (2002) emphasized that Egypt was a center of trade, intellectual discussion, and culture. Likewise, Christianity was introduced to Africa through Egypt, and Alexandria has been the home of theologians who laid the foundations of a new religion. Ethiopia also was one of the earliest countries to be converted to Christianity, beginning in the 4th century CE during the time of King Ezana. Similarly, the rise of Islam had a major effect on Africa. Arabs conquered Egypt in 640 CE, and by the end of the 7th century CE, the followers of Islam controlled most of North Africa. This part of Africa remains predominantly inhabited by Muslim populations. Islam gradually expanded from North Africa to West and East Africa. According to Asante, Africa as we know it today was both influenced and shaped by these two major events, the introduction of Christianity and Islam.

Falola (2002) wrote that contacts with Europeans, beginning from the 15th century CE onward, left enduring impacts on the African continent. The first contact occurred on the coasts, and it was only later that Europeans had access to the interior part of Africa. M. Alpha Bah (1998) noted that the Portuguese were the first Europeans to have encounters with African people when they gained control of the fortress of Ceuta from the Moroccans in 1415. Later, the British, Dutch, French, Swedes, and Spanish joined the Portuguese in the exploration of the African continent for trade. The contacts gradually led to the transatlantic slave trade and then to the colonization of Africa under European rule. By 1885, most African countries were under colonial rule. This development brought with it a major cultural influx. Western traditions and practices were introduced to the African soil, and they have enduring influences to this day. Following independence in the 1950s and 1960s, African states struggled to build nations with stronger links to the outside world. Subsequently, Africa showed progress in many areas while also facing daunting challenges of political instability, civil war, dictatorship, and poverty.

African Kingdoms

Africa enjoyed being the home of famous and expansive kingdoms from the earliest days until the medieval period. According to Asante (2007), Africa was the home of many kingdoms and empires known to be the earliest in the world. One of the kingdoms that developed during the Middle Ages was the Kingdom of Ghana. This kingdom later declined with the attack that came from the north in the 11th century. Another kingdom emerged in Southwest Nigeria, centering in the city of Ife. Ife declined during the 16th century. Benin was the other rich and powerful

African kingdom. The Kingdom of Mali was founded in the 13th century and was known for its famous city of Timbuktu, a city well known for trade in salt, horses, gold, and slaves. This kingdom, which developed during the 14th century, was later destroyed by the Songhai Kingdom in the 16th century. The Songhai Kingdom was also a Mali kingdom, on the Niger River, that developed in the 14th century and was doomed to destruction toward the end of the 16th century by the invasion of the Moroccans. The Kingdom of Kanem-Bornu developed near Lake Chad; it became strong and remained independent until the 19th century. On the coast of East Africa, Arabs founded the states of Mogadishu and Zanzibar. In the south, other kingdoms were organized in Zimbabwe in 1430. The existence of these kingdoms, Davis (1998) argued, demonstrates the ability of the African people to master their environment and develop a political system indigenous to their culture.

Ethiopia maintained its kingdoms throughout the Middle Ages. The Axum kingdom was one of its well-known kingdoms; it dated back to 730 BCE. Later, it transferred its political power to another Ethiopian kingdom called the Zagua Dynasty, with a shift of power from the north toward the center and south. During the 13th century, according to the account of Tadesse Tamrat (1972), the Zagua Dynasty constructed complex monolith churches out of rocks; these churches remain standing today as one of the wonders of global heritage. King Lalibela, who was very religious himself, mobilized his people to construct churches using their remarkable engineering talent. This was a show to make Lalibela the center of politics and religious worship, thus claiming his legitimacy to the throne. Power was later shifted from the Zagua Dynasty to a new dynasty called the Solomonic Dynasty, which established a political theory that Ethiopian kings have their root in King Solomon of Jerusalem. This explanation for the source of their power continued to be used by Ethiopian kings from then until 1974, when the last emperor of Ethiopia, Haile Selassie, was dethroned.

People, Landscapes, Regions, and Countries

Africa is characterized by the diversity of its geography. It is known for its forests, savannahs, deserts, mountains, rivers, lakes, and varied weather. The equator and the Great Rift Valley are part of the geographic features of Africa. The equator divides the continent, and its latitude has a major impact on its climate. The huge water bodies of the Atlantic and Indian oceans, as well as the Mediterranean and Red seas, surround the African continent. Famous rivers such as the Nile, Congo, and Zambezi are part of the African natural makeup. The Sahara Desert, the most massive desert in the world, is also found in Africa. The savannah, an extensive grassland that covers a large area, is the other wonder of the physical landscape of the continent. Also,

Africa is not deprived of forests; it has one of the largest rainforests in the world. According to Davis (1998), 90% of the continent is over 500 feet above sea level. Mt. Kilimanjaro, which is 19,340 feet above sea level, is among the tallest mountains of the high terrain landscape of this continent. Falola (2002) wrote that diversity is one of the characteristics of the African continent that makes up its richness and beauty.

Thousands of languages are spoken in Africa. Contacts with other cultures have also brought to Africa languages from Europeans and other peoples. English, French, Arabic, Portuguese, and other European languages are spoken in Africa. Proverbs and storytelling are among the prominent parts of the traditions of maintaining and passing heritages and wisdom in African societies. An extended family structure, kinship support, cooperation, and respect for elders are some of the common values and traditions upheld among African peoples. Christianity, Islam, and traditional indigenous beliefs are forms of worship and religiosity among African peoples. J. Peter Schraeder (2004) observed that Africa is a mosaic of different languages, cultures, traditions, peoples, countries, and beliefs.

Africa is made up of 53 countries. Davis (1998) wrote that Africa is more than 3 times the size of the United States. The African continent is so vast that it is divided into regions. These regions are east, west, north, south, and central. In the north, one finds the countries of Egypt, Algeria, Tunisia, Libya, and Morocco. These are countries inhabited predominantly by Arabic-speaking Muslim populations. West Africa consists of 16 countries: Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Western Sahara, and Togo. Countries in the east African region are Kenya, the Sudan, Uganda, Tanzania, Rwanda, Burundi, Ethiopia, Djibouti, Eritrea, the Comoros, Madagascar, Mauritius, and Seychelles. Central African countries include Cameroon, Chad, Congo, the Democratic Republic of Congo, Equatorial Guinea, Gabon, Sao Tome, and Principe. These countries are historically connected to French colonial rule; thus, the French language is common in the region. In the southern part of Africa are the countries of Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe.

African literature is characterized by both indigenous oral and written literatures. It is reflective of African traditions, religion, philosophy, culture, and livelihood. African literature has depicted the indigenous heritage of oral traditions before the advent of European colonization and cultural influx. In Africa, literature has also been part of the struggle and movement for independence. Poetry, drama, short stories, and larger prose writings were at the center of the pan-African movement and the Negritude activism to mobilize Africans for independence and to express the pains of colonialism. African literature is written in both African and European

languages. Among the notable European languages are English, French, and Portuguese.

During the colonial period, literature was part of the effort to define and demonstrate African identity, culture, and history to the outer world. The postcolonial African literature has, however, turned to look inward in addressing African challenges and issues. The change in trend is also reflected in the use of African languages, instead of European languages, for literature. African writers have been focusing on political distaste by exposing corruption, dictatorship, and inept leadership on the continent, and writers have become victims of intimidation, harassment, imprisonment, disappearance, and executions. Naguib Mahfouz (Egypt), Wole Soyinka (Nigeria), Nadine Gordimer (South Africa), and J. M. Coetzee (South Africa) are four African writers who received the Nobel Prize in literature. Joseph (2007), however, argued that even though these writers are from Africa, they represent divergent literary backgrounds reflecting Arab-Islamic traditions, conditions of European settlers in Africa, and indigenous African traditions. This is an indication of the great extent of diversity within the African continent and its societies.

European Interests in Africa: From Exploration to Colonialism

Early European knowledge of Africa came from the exploration of European expeditions, which required a series of efforts with challenges and difficulties. The European explorers made continuous efforts to uncover the African continent beginning in the 15th century. Such efforts began with some knowledge about the coastal part of Africa. European explorers first came in contact with places such as Timbuktu, Gambia, Senegal, Tripoli, and Cairo. According to Ieuan Griffiths (1995), Europeans had been familiar with coastal Africa for a long time before discovering the interior of Africa; this took so long because many voyages ended in vain due to the difficulties of surviving diseases, traversing the terrain of deserts, and overcoming the challenges of following the courses of rivers, such as the Niger, to their roots. European explorers were mainly from Portugal, Britain, and France. Griffiths notes that the European interest in Africa was motivated by religious missions, trade, and the intellectual curiosity for explorations. In that process, the Portuguese took the lead and reached the Azores in 1431, the mouth of Congo River in 1445, and the Cape of Good Hope in 1488.

Europeans started to transport slaves from Africa across the Atlantic in the 16th century. The trade transaction followed a triangular route, in which manufactured goods were taken from Europe to Africa and, in return, the ships took slaves from Africa to the West Indies, and finally they took sugar and other products from the colonial plantations to Europe. This was called the triangular trade route. Even though the slave trade was neither new nor limited to the

one that was carried out by Europeans, Schraeder (2004) shared what many believe, which is that the transatlantic route was the one used for the most trade.

Part of the horror of the slave trade was that the slaves were captured in raids and as war captives before they were brought to the coast. Africans took part and became rich out of the business of supplying slaves for European merchants at the coast. Slavery was one of the most horrifying experiences of Africans and humanity at large in terms of its immediate and long-term impact. Slavery brought about cultural shock, humiliation, and exploitation. Thomas O'Toole (2007) wrote that slavery, among other impacts, has overshadowed the glory of the history and civilizations of Africa that stretch as far back as to ancient Egypt. With Great Britain's decision to abolish the slave trade, it became illegal in 1807. Despite the decision, Schraeder (2004) indicated that thousands of slaves continued to be smuggled illegally into the United States throughout the first half of the 19th century.

Another shocking experience for Africa was the advent of colonialism. European countries substituted slavery for an alternative grip on the African soul through a rule commonly called colonialism. Among the notable European powers to rule Africa through colonialism were Great Britain, France, Portugal, Italy, Belgium, Germany, and the Netherlands. According to Griffiths (1995), the colonial powers made Africa virtually their private property, and they scrambled the continent with no restrictions or limitations except the rivalry and competition among themselves. Falola (2002) outlined the timeline in the processes of the scrambling of the continent among the European powers. The Portuguese settled in Angola and Mozambique in the 16th century. The Dutch founded a colony in South Africa. In 1814, the British took the Dutch colony in South Africa. The French invaded and colonized Algeria in 1830. Germany took control of Namibia, Togo, and Cameroon in 1884 and took Tanzania in 1885. The Belgians colonized what is known today as the Democratic Republic of Congo in 1885. The French took Madagascar in 1896 and Morocco in 1912. In the early 20th century, the British added to their stock Egypt, Zimbabwe, Zambia, Malawi, Uganda, and Kenya. The Italians had a colony in Libya, and they also made an attempt to colonize Ethiopia during World War II but failed after five years of occupation. By the middle of the 20th century, nearly all of the African countries had fallen under the colonial rule of the Europeans. Exceptions to this were Liberia and Ethiopia, the only African countries that remained uncolonized.

According to Falola (2002), Europeans were successful in colonizing Africa for many reasons. Africans were not one single force; rather, they were in many separate entities. Europeans took one place at a time, sometimes with assistance from African leaders. With regard to technology and resources, Europeans had professional armies equipped with better firearms and resources than the natives had. In terms of resistance against European invasions, however,

one of the most successful cases in the history of the continent was the victory of Emperor Menelik II of Ethiopia over the Italian colonial army at the battle of Adwa in 1896. Asante (2007) referred to this victory as decisive and monumental in a movement for the liberation and freedom of African peoples.

The Independence Movement

Africans resisted European invasion and colonial rule from the outset. European colonial ambition was not without challenges and resistances from the natives of Africa. In fact, Europeans had to win a number of battles to overcome the resistance. Rebellion movements against the European colonial rule became common throughout Africa in the 20th century. Pan-Africanism, the African National Congress, Negritude, and the Mau Mau movements were among the well-known forms of struggle and movement for independence. Many African countries became independent in the 1950s and 1960s. Some remained under colonial rule until the 1970s and 1980s. Zimbabwe got its independence in 1980. The last country to attain its independence from colonial rule was Zambia in 1990. The independence movement was not only a drive to become free from foreign rule; it also represented a hope for prosperity and development under the rule of Africa's new leaders. Africans hoped for a better life under the leadership of their own children free from the rule by Europeans.

One of the nationalist political movements during the colonial period was the Mau Mau uprising in Kenya. The Mau Mau movement was much more forceful than the forms of struggle in other parts of Africa. According to Falola (2002), factors such as land scarcity and grievance against the British rule led to a more violent form of resistance, which later became guerilla warfare against the government. The movement accelerated Kenyan independence, which was made possible in 1963. One of the leaders of the movements, Jomo Kenyatta, became the first president of an independent Kenya.

The armed struggle resistance in Algeria was part of the struggle for independence in Africa. France had a stronghold in Algeria, claiming that Algeria was a part of France. Despite the various attempts made by the French to ease the colonial rule for appeasement, armed struggle became inevitable. This war became the bloodiest form of struggle in Africa, and it cost the lives of thousands on both sides. After this devastating war that lasted nearly a decade, Algeria became independent in 1962 following a referendum both in France and Algeria. One of the leaders of this armed struggle, Ahmed Ben Bella, became the first president of independent Algeria.

Pan-Africanism was a movement for the independence of Africa from colonial rule. It was a movement aimed at mobilizing the black people in Africa and all over the world against colonial rule. The movement initiated awareness

and unity among black people in the United States, the Caribbean, Europe, and Africa for the end of exploitation and oppression and for the freedom of the African people from European rule. Kwame Nkrumah, who was among the notable activists of the Pan-African movement, became the first president of Ghana after independence.

World War II had its own consequences for strengthening the movement toward the end of colonialism in Africa. Many colonies of the European countries that were participants in World War II used Africans as the source of human power required by the war. Many served in the British and French armies as fighters. Basil Davidson (1994) highlighted what Africa paid for the war with its children. Returnees from the war later became well aware and conscious of their conditions at home and began to join the resistance movement against colonial rule. Opinions also began to change, even in Europe, about colonial rule in Africa. The outcome of World War II brought about a change in the balance of power on the world stage. It also had an impact on the conditions and opinions in Europe that contributed to the changes made in the Europeans' colonial policy in Africa.

The Italian invasion of Ethiopia in 1935 antagonized many independence activists all over the world. Ethiopia remained independent for centuries and has been an example of an independent black nation not colonized by European powers. It was a big surprise when the League of Nations remained silent and did not protect its own member nation, Ethiopia, from being attacked by another member nation, Italy. This contributed to the League of Nations' demise and subsequent replacement with the United Nations right after World War II. Nationalists and Pan-African leaders and supporters were radicalized and made every effort to call for an end to colonial rule in Africa. According to Davidson (1994), the Italian invasion of Ethiopia created outrage among many in Africa and beyond, and it helped to strengthen the Pan-African movement. The effect of this event was clearly seen in British West Africa, with its renewal of commitment and spirit to stand not only against the Italian invasion of Ethiopia, but also the entire imperialist colonial rule in Africa.

International developments have had their contribution to the strengthening of the movement for independence in Africa. The independence of India from British colonial rule in 1947 was a good model to imitate, and it became an example for a peaceful resistance struggle on the African continent. Schraeder (2004) stressed that Asian nationalism provided an impetus for Africa's demand for independence. Internally, politicians were also very committed to the independence movement in anticipation of leadership positions in the new independent Africa. To that end, many political parties were formed and mobilized millions of people in the struggle for the end of colonial rule. Workers established unions and organizations. Students in higher education institutions also joined the movement by becoming activists for liberation. The African-educated elites

took a critical role in exposing the hidden interest of the colonial powers and agitating the African people for resistance. The media also played a part through its publication of materials that challenged the European colonization. Peaceful struggles in the form of demonstrations, mass strikes, boycotts, publications of literary materials and political writings, and armed struggles were coupled with developments from the outside world in Europe, North America, and the Caribbean, bringing to an end European rule over the African continent that had lasted for more than a century.

Postcolonial Africa

The outcomes of independence from colonial subjugation were immense. Achieving independence was significant to the emotional and psychological makeup of the African people. Africans who had been under European rule—deprived of so much with so many restrictions, limits, and indignity—rejoiced in their freedom with the onset of independence. Independence brought about the feeling of freedom, respect, and dignity. The educated Africans, elites, and politicians came to be at the helm of the society and assumed leadership roles. They formulated policies and started the work needed to make changes in the lives of millions of people. Continental associations were also formed in order to unite the entire African continent to move forward. One such entity was the Organization of African Unity (OAU), which was formed in 1961 with headquarters in Addis Ababa, Ethiopia. Following independence, many African countries also joined the United Nations. New businesses and enterprises also began to emerge with the leadership and ownership by Africans themselves.

Expansion in the service sectors was another task of building nations in Africa after independence. Building schools to serve students at both lower and higher levels was a priority for the new African leaders. Education was thought to be the key for development, and much hope for prosperity was put into the schools. The concept of access for all, including girls, was among the new academic policies. Changing the contents of the curriculum, from a focus on European studies to the concerns of African societies, was part of the reform effort in the education system. Education received significant attention among the new leaders as a vital tool for nation building across independent Africa.

Africans began to use their native languages. Cultures and traditions that are indigenous to the African people began to be revived for full use with pride and dignity among African people. Following independence, the publication of literary works grew significantly. Many African writers have produced novels that have a wide readership beyond Africa. These writers include Nobel Prize laureate Wole Soyinka of Nigeria and others such as Ngugi Wa Thingo and Chinua Achebe. Their works of literature reflected on life under

colonial rule, the movement for independence, the hopes and prospects of independent Africa, and the celebration of African traditions and cultures.

In the aftermath of their independence, African countries began to restore their cultural heritages, while they also lived with the carryover effects of the colonial past. European modernity and bureaucracy, which left footprints on the African soul, continued to influence the organization of governments, businesses, and other sectors among African countries. In many sectors, including the education sector, there has been a significant introduction of European culture into the African traditions. Africans have had to make great efforts to regain the cultural identities, traditions, and customs that they sacrificed during the colonial period. Thus, Africa struggled to maintain an equilibrium between retrieving its lost indigenous cultural heritages and the cultural influx it received from European traditions.

Disillusionment

There were many promises that were made during the independence movement concerning Africa once it was back in the hands of the African people. Equally, the African people developed high expectations for a better life after independence. However, these expectations were not met as the years went by with the new leaders in power. Unfulfilled dreams of prosperity began to build up dissatisfaction and doubt toward the new leaders on the part of the people. Many started to believe that the change was only in the leadership, that is, African elites had replaced European rulers. The new leaders became the new elite class in the African society, and not much change was delivered to the population. Louis Serapiao (1998) noted that liberation from colonial rule was perceived as a solution to Africa's problems. Contrary to the expectations, however, limited resources, power struggles, ethnic conflicts, coups, the use of politics as a source of business and wealth, one-party rule, military rule, lack of strong foundations for economic infrastructures, and limited exports all created complications in Africa following its independence. According to Serapiao, some of the roots of these problems are the legacy of colonialism, the global economy and market systems, environmental challenges, and the problems caused by the leadership of the new African leaders.

In an unfortunate way, Africans never realized the dreams of prosperity, freedom, and peaceful livelihood after independence as they had hoped they would during their struggle for independence. For the most part, Africa became a center of political unrest, civil wars, dictatorship, military coups, poverty, and disease. The state of Africa became one of disillusionment for its children, as many became confused by being oppressed by their own so-called liberators. African leaders deprived their own people of political as well as economic freedom. Many were infected with

corruption and diverted state resources to benefit their family members. Africa came to be known for challenges such as coups in Nigeria, Algeria, Togo, Libya, and the Sudan; human suffering in Darfur; genocide in Rwanda and Burundi; civil wars in the Congo and Sierra Leone; and the protracted destabilization of Somalia. According to Falola (2002), there were 21 countries under military rule and 70 cases of military coups on the African continent between 1960 and 1992.

Military regimes that are the outcomes of coups often end up in disaster and further dissatisfaction. Lacking the skill for civilian leadership in matters of economic and social development, military personnel never succeeded in bringing about the desired changes in the lives of millions of Africans. Military regimes have contributed to instability and economic underdevelopment in Africa. These regimes abandoned democratic institutions and multiparty political practices, and they ruined economies through corruption and mismanagement. Poverty has remained an overwhelming challenge for most of the African continent. Fundamental needs for clean water, food, and health services are not met well in the 21st century. The low economic growth rate and unemployment are aggravated by political instability, power struggles, tyrannical leadership, mismanagement, and the embezzlement of resources.

The political ideologies of socialism and communism did not solve the challenges of African people. In the aftermath of the Cold War, since the early 1990s, many of the African countries that had been allies of the former Soviet Union abandoned the communist ideology and began to embrace Western democratic liberalization policies. The reform efforts included the institution of free markets, privatization of state businesses, elections, and multiparty political systems. Despite some success stories, elections have turned out to be less encouraging, having been marred by fraud and voter intimidation. Multiparty systems have resulted in opposition parties whose leaders have sometimes ended up in jails as enemy combatants. The International Monetary Fund (IMF), World Bank, G8 countries, and recently G20 countries are among the notable international bodies and institutions invested in the efforts that are being made to make changes in the lives of millions of people in Africa. Programs such as the African Development Commission and Millennium Development Goals have been outlined with a target of poverty reduction.

Challenges, Hopes, and Prospects

The end of apartheid in South Africa in 1994 marked the beginning of new hopes and prospects in Africa. It brought about not only the freedom of the black majority in South Africa but also an example of the rule of democracy, national reconciliation, and stability for the continent. Some African countries also began the long journey to democracy and human right commitments for their people.

Governments in Ghana, Mali, and Botswana are among the promising political developments of rule by the people, free and fair elections, and the accountability of leaders on African soil.

One of the new developments on the African continent is the newly emerging Asian influence. Richard Dowden (2009) wrote that China's influence on Africa is one of the significant changes in the geopolitics of our recent time. The engagement is based on construction, trade, and raw material extraction. This was marked by the Forum on China-Africa Cooperation held in November 2006, at which China announced a government fund for Africa of about \$5 billion. One of China's policies of engagement with Africa is the policy of noninterference with the internal affairs of countries. Thus, their funding comes with less stringent preconditions. This policy has been welcomed by African governments. This development, Dowden notes, has created an outside ally for Africa that is an alternative to the traditional Western countries.

Development in communication services is an encouraging sign of progress; it has created contacts within and outside Africa and has many implications for business and the exchange of experiences. Mobile phones are now reaching every corner of the continent. Mobile phones, the Internet, and satellite TV have brought about significant access to information and direct contact with the outside world. It is an encouraging development that access to information is being made available that could make a difference in the lives of millions of Africans.

One of the chronic problems that has remained as a challenge in Africa is the negative consequence of aid. Foreign aid, despite the good intentions behind it, did more harm than good for African societies. In many cases, the aid is directed to programs that encourage dependence instead of self-reliance. The programs also favor short-term activities, in which corrupt leaders can embezzle money and make fortunes, rather than contributing to long-term development efforts. April and Donald Gordon (2007) likened foreign aid to a two-edged sword in Africa. Although there are some benefits from aid, it is also used to advance donors' interests. One of the problems of foreign aid is that it comes with conditions that do not reflect the reality of Africa.

The emerging challenges of global warming and climate change are also having impacts on the African continent. Africa is paying the greatest price for climate change and global warming, while contributing the least in terms of carbon emission pollution. Many are making the argument that Africa should get a fair share in overcoming the challenges of global warming in terms of more aid directed to environmental protection and green technology development. In this regard, the shortage of energy is an area that needs to be addressed; electricity supplies are short even in the capital cities of African countries. This is being attributed to the boom in construction, development of diverse companies, growth in urbanization, and greater access to electrical

service for the masses, including those in the remote parts of Africa. Although this may be a sign of good development, on the other hand, it is also indicative of the lack of long-term planning to balance investment and its growing demand for energy with an expansion in energy supplies.

While addressing issues of global warming, climate change, green technology, and environmental issues, the challenges of population explosions need to be addressed as well. Regions such as sub-Saharan Africa are leading in high birthrate. In lieu of environmental deterioration and scarcity of resources, high birthrate could pose a challenge to development and stability, as it may lead to crises in the form of hunger, conflict, and massive migration.

On the political front, recent development and democratization processes in some African countries are an encouraging prospect because of their multiparty systems, free and fair elections, limited terms of office, and the transfer of power through peaceful means. Governments in Ghana, Mali, Botswana, and Zambia are some of the examples of promising signs that the African continent is on the way forward to democratic ideals in the political culture. In a related development, as a means of addressing the need for improved governance, the African Peer Review Mechanism has been put in place—a program that came recently as a system of appraising how well African governments are doing in terms of good governance, economic progress, and human rights. With this program, governments will periodically go through a review processes whereby they will be able to get some feedback about their leadership qualities.

The OAU, which was formed in 1963 as a voice to represent independent Africa, has now been replaced by the African Union (AU). Richard Dowden (2009) underscored that this is a step forward for the African countries in addressing common challenges for the common good. The AU has a practice of intervening in cases of genocide or crimes, as opposed to its predecessor, the OAU, which used to remain silent while many were losing their lives. The AU also rejects a coup as a means of power transfer in member countries. It also desires to extend the consolidation of the union further by creating a continental parliament following the example of Europe.

The loss of skilled young intellectuals and productive individuals, who are leaving the continent in greater numbers every year, poses another challenge to Africa. The exodus of its productive and skilled human resources is draining Africa's crucial asset. This export is not limited to human resources. Dowden (2009) observed that Africans take their money out of the continent and keep it in the outside world. Some of this money is illegally obtained through corrupt practices. Thus, Africa is not only suffering from a brain drain of its skilled human resources but also from a loss of its financial capital. This is a hindrance to development efforts that could bring about changes in the living conditions of Africans.

Central to the efforts and discourses about the place of Africa in the new century are issues of poverty reduction,

debt relief, trade and investment, and information technology. The goal of reducing poverty is one of the Millennium Development Goals (MDG). The achievement of this goal requires decreasing the number of poor people who live below the poverty line and increasing the gross national product. This is the hardest target to meet, as it requires so many changes and inputs, including but not limited to good governance that involves the participation of many and the accountability of leaders, viable strategies for trade and investment relevant to the conditions of Africa, and utilization of advances in technology. According to Gordon and Gordon (2007), so far most of the African countries are far behind in meeting the MDG target for 2015. An integral part of the goal is reducing the number of people living in an extreme condition of poverty. With the recent global economic and financial crises coupled with the already existing problems, the trend appears to be one that, instead of reducing, is increasing the number of poor people in regions such as sub-Saharan Africa.

Indebtedness is one of the burning problems of Africa. While the debt is mounting every year, so does the interest that comes with the debt, and debt is an important part of African countries' budgets. In some cases, the foreign aid that comes from the World Bank and IMF is used to pay already existing debts. This is a vicious cycle that is keeping Africa in the bondage of poverty. Gordon and Gordon (2007) noted that officials of the World Bank and IMF blame African leaders for not using the funding appropriately and wisely. Part of the new initiative to address the problem includes the goals of debt cancellation and increased aid to African countries. The G8 and recently the G20 nations are promising to meet these goals in order to help Africa get out of cyclical poverty.

Increasing trade and investment in Africa are development issues. Africa is being asked to boost its export capacity in order to increase its revenue. Trade with the world outside Africa has been limited to agricultural products, minerals, and fuels. Exports of other industrial products are scarce. The United States is among the major partners in trade with Africa, through its trade liberalization programs. China is becoming visible in trade and investment in African countries as well. Oil is becoming an important export commodity for many African countries, with a growing interest in it from China as well as from the United States. However, Gordon and Gordon (2007) presented the argument, shared by many, that trade liberalization alone is not adequate to relieve Africa of its poverty. Instead, there should be more aid directed toward sustainable development through diversified economies, including local and regional investments in meeting basic needs for health, education, clean water, energy, and transportation. Such development efforts also include investments in information technology. The growing trends of access to mobile phones, the Internet, and satellite TV are promising indicators of the expansion of information technology in

Africa. This development will bring favorable benefits in terms of information sharing with the outside world.

Conclusion

Africa is a center of interest for many. It has been a subject of media coverage more often for the ugly side of human suffering than for its hope for prosperity and opportunity. As the location of the origin of humankind, Africa represents the root of humanity all over the planet. It has also represented the black face of the human race. Africa is known for its ancient civilizations of Egypt and Ethiopia and the famous kingdoms of Ghana. It has attracted major religions of the world—Christianity and Islam right from their very beginning.

Europeans became interested in exploring the continent of Africa as far back as the 15th century. After an ordeal of successful and unsuccessful attempts, Europeans were able to establish contact with Africa—a contact that started at the coastal areas and gradually deepened into the heartland of the continent. They pursued this quest to establish trade relationships, to find new resources for raw materials such as gold, and to satisfy their intellectual curiosity about the unknown world. The contact between Europeans and Africans turned into the worst form of human relationship with the beginning of the transatlantic slave trade, in which millions of Africans were exchanged as commodities. The contact underwent changes when Europeans shifted their interest from slavery to the direct rule of Africans on African soil in what is known as colonialism. By the middle of the second half of the 19th century, most of the African continent had fallen into the hands of European colonial rule.

African countries became independent in the 1950s and 1960s after a long struggle for liberation, and, in the aftermath, they came to be administered by their own children. The postcolonial decades were not full of joy and satisfaction for the African societies. The African people faced serious challenges, such as political instability, civil war, poverty, disease, corruption, dictatorship, and underdevelopment in terms of basic services, such as education, clean water, health, and infrastructure. Development efforts of the last six decades have not been in the best interests of the African societies. Foreign aid has not helped the growth of Africa. Debt has become a challenge to many African countries. Trade has been based mainly on the export of agricultural products and oil but not of industrial goods.

Recent encouraging developments for the prospect of Africa lie in the areas of aid for sustainable development, debt relief and cancellation, investment in infrastructure and basic services, good governance, human rights, and accountability. Africa also seems to be benefiting from the current development of Asian interest in investment, and progress in communication technology such as mobile phones, the Internet, and satellite TV. New initiatives, such

as the MDG and poverty reduction strategies, could make a difference in the progress of the African continent in the 21st century.

Further inquiry and research are necessary to study the impacts of information technology, Asian interest, liberal democracy, one-party rule, green technology, and global financial and market developments on African societies.

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CARIBBEAN

Past and Present

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For many Europeans and North Americans, the Caribbean is known as a tourist destination and a dreamed-of earthly paradise: white beaches, palm trees, turquoise blue waters, and friendly natives. However, the Caribbean is more than this. It is the world's most racially and culturally diverse region; it is also one of the most important Latin American regions in modern history. The first genocide of an indigenous people on the American continent occurred in the Caribbean. The first discussion about human rights in Spain and the Americas began with the Dominican friars Fray Bartolomé de las Casas and Fray Antón de Montesinos. African slavery, which gave shape to modern capitalism, had its origin in the Caribbean. The Haitian Revolution, an unprecedented event, resulted in the world's first black republic and the second independent country on the American continent, after the United States. The Cuban Revolution, the first socialist revolution on the continent, occurred in the Caribbean as well. The Cuban Missile Crisis of 1962 brought the world to the brink of nuclear war for the first time.

The Caribbean is also a source of great cultural riches, of which are known only a few icons such as Wilfredo Lam in painting, Derek Walcott and V. S. Naipaul in literature, and in music Benny Moré, Celia Cruz, Dámaso Pérez Prado, Juan Luis Guerra, las Estrellas de la Fania, Bob Marley, and Harry Belafonte, a product of rapid media expansion. In baseball, the players Juan Marichal, Alex Rodríguez, Roberto Clemente, Sammy Sosa, George Bell, and Tony Bell, among others, are globally known. For an

archipelago inhabited by only 40 million people, the Caribbean has brought a cultural heritage to the world that deserves greater study and deeper appreciation.

The name *Caribbean*, which designates this geographic area, comes from the Carib ethnic group, which inhabited the Lesser Antilles before the arrival of the Spanish conquistadors. The word *Carib* became corrupted in the Italian language and was pronounced "caniba," a pronunciation that gave rise to the words *cannibal* and *cannibalism*, a phenomenon noted by Christopher Columbus on his first voyage (Veloz Maggiolo & Zanin, 1999). The Caribbean basin is composed of more than 1,000 islands, islets, and keys and has a population of 40 million inhabitants.

As a region, the Caribbean can be spoken of in a wider sense and in a stricter sense. In the wider sense, the Caribbean includes the coasts of Venezuela, Colombia, Central America, and the Mexican state of Yucatán. In the stricter sense, the Caribbean includes a chain of islands that extend from the Mexican state of Yucatán to the Venezuelan coast. This chain is divided between the Greater Antilles, which are composed of the islands of Cuba, Jamaica, Puerto Rico, and Hispaniola (shared by the countries of Haiti and the Dominican Republic), and the Lesser Antilles. The Lesser Antilles, for their part, are divided between the Leeward Islands (north of Martinique) and the Windward Islands (south of and including Martinique). The Leeward Islands are made up of the Virgin Islands, St. Kitts and Nevis, Montserrat, Anguilla, Saint-Martin/Sint Maarten, Saint-Barthélemy, Barbuda, Guadeloupe, La Désirade,

Marie-Galante, and Dominica. The Windward Islands are composed of Martinique, Saint Lucia, Barbados, St. Vincent and the Grenadines, Grenada, Trinidad and Tobago, Aruba, Curaçao, and Bonaire.

The formation of the Caribbean islands dates back to the Mesozoic Era. The islands, formed by volcanic activity as well as by fossil and coral sedimentation, are mountainous, reaching a height of 3,087 meters atop Pico Duarte in the Dominican Republic. The Caribbean belongs to the tropical region, with an annual average temperature of 27 degrees Celsius. There are two seasons: the rainy season from May to September, which coincides with hurricane season, and a partially dry season from November to April (Lot Helguera & Salmoral, 1995).

Pre-Columbian History: Taino Arawaks, Ciboneys, and Caribs

At the time of the arrival of the Europeans in 1492, various indigenous groups existed in the Caribbean: Taino Arawaks, Ciboneys, Ciguayos, and Caribs. Their population is estimated to have been no more than three-quarters of a million. The Tainos, which constituted the largest group, were of Arawak origin and inhabited the islands of Cuba, Hispaniola, Jamaica, Puerto Rico, and the Virgin Islands. An agricultural rather than a warrior society, they cultivated manioc, sweet potatoes, corn, sago, and cotton. They also engaged in hunting, gathering, and fishing (Veloz Maggiolo & Zanin, 1999).

On Hispaniola, the most densely populated island, the Tainos were organized into five *cacicazgos* (chiefdoms): Marién, Maguá, Maguana, Jaragua, and Higüey. Every chiefdom was governed by its respective *cacique* (chief). In the social hierarchy, the cacique occupied the most important place, followed by the nobles or *nitainos* and the shamans or *behiques*, the common folk or *tainos*, and the *aborias*, servants of the nobility. They gathered in villas grouped around a central plaza called a *batey*. The houses were called *bohios* and the larger ones *caney*s. Their religion was polytheistic and animistic. Their principal god was Yocajú-Bagua-Maorocoti, protector of the manioc harvest. Huracán was another important god. The Tainos celebrated rites of passage, in which they held celebrations accompanied by music and dances called *areitos*. Of special importance was the *cohoba* festival, in which the behique and the cacique inhaled a hallucinogenic powder called cohoba, with which they entered a trance state and were able to converse with the dead and transmit messages from the *cemis*, or gods.

Other ethnic groups in the region were the Ciboneys, the Ciguayos, and the Caribs. The Ciboneys were an ethnic group that inhabited eastern Cuba and southwestern Hispaniola. They were hunter-gatherer nomads and did not have a political organization like that of the Tainos. The Ciguayos inhabited the northeastern coast of Hispaniola, and their culture was similar to that of the Tainos, except that they had adopted the custom of war. They spoke a language

of Arawak origin and were possibly a Taino-Carib hybrid, due to Carib incursions into the eastern side of the island. The Caribs inhabited the islands of the Lesser Antilles. According to the Dominican anthropologist Marcio Veloz Maggiolo, their origin could date back to Amazonian ethnic groups, evidenced by the presence of *turens* (plates for cooking manioc), which indicates the cultivation of bitter manioc (Veloz Maggiolo & Zanin, 1999). The Caribs were a warlike ethnic group that made incursions into the islands of the Greater Antilles, abducting women and carrying them off to their home islands. Before the arrival of the Europeans, a hybridization process between the Caribs and the Tainos had begun as the children of Taino women abducted by Caribs were brought up speaking the Arawak language.

The Textualized Caribbean: Columbus, Las Casas, and Fernández de Oviedo

The colonization of the Caribbean meant, on one hand, the enslavement and subsequent extermination of the indigenous population and, on the other, the forced immigration of four to five million African slaves (Manuel, Bilby, & Largey, 1995). At the time of Columbus's arrival in the Caribbean, the indigenous population was estimated to be three quarters of a million, with Hispaniola being the most densely populated island at around a quarter million inhabitants. By the time of the Enriquillo Insurrection in 1511, the population of Hispaniola had been reduced to a mere 11,000. The extermination of the indigenous workforce consequently led to the importation of an African workforce. As Eric Williams, prime minister of Trinidad and Tobago, put it, the Europeans "used negroes they stole from Africa to work the land they stole from the Indians" (as quoted in Manuel et al., 1995, p. 3).

The arrival of the Spanish in the Caribbean marked the beginning of the modern European ethnography, or a "utopic ethnology" in the words of José Rabasa (1992), with the production of *Summary Apologetic History* by Bartolomé de las Casas. The first four authors to give an account of the Caribbean were Christopher Columbus in his onboard diary, Fray Bartolomé de las Casas in his *History of the Indies*, Fray Ramón Pané in his *Report About the Antiquities of the Indians*, and Gonzalo Fernández de Oviedo in his *General and Natural History of the Indies*. In these first texts, the Caribbean was invented and inventoried. They describe not only the flora and the fauna but also the inhabitants, for example, their habits, customs, traditions, rituals, physical appearance, and so forth. The four authors of these texts use different rhetorical strategies, which, in the majority of cases, have more to do with their own personal political positions than with the reality they proposed to analyze. For example, in Columbus's diary, of which we have knowledge only through Fr. de las Casas's summary, the Caribbean is constructed as an earthly paradise and the Tainos as noble savages. A common aspect of

these textualizations is that both the black Africans and the horrors of their slavery are neatly passed over.

Immigration

As a place of immigration, the Caribbean possesses an extraordinary fluidity. The first immigration was that of the Spanish conquistadors in their colonial enterprise, and this was followed by the forced immigration of millions of African slaves. During the colonial period, incessant wars among European empires and invasions of their respective territories obliged families to emigrate from one island to another. In the second half of the 20th century, Caribbean immigration to the United States and Europe should be considered within the context of peripheral migration toward the hegemonic centers of the so-called first world. This migration, put in motion by modernization and the globalization of the economy, has reached an unprecedented magnitude and intensity (Chambers, 1994).

Edouard Glissant considers the Caribbean as a “transitory” space, as its inhabitants often find themselves in transit toward somewhere else. Of course, the relationships between former colonies and their mother countries are a hallmark of modern immigration. Spain, England, and France have received the return of their formerly colonized subjects in a kind of boomerang effect. The replacement of the former colonial powers by the United States in terms of political, economic, and cultural influence has also displaced migratory patterns, as the United States has become the principal destination of Caribbean emigrants. Cities such as New York, Boston, and Miami have received the greatest number of Cubans, Dominicans, Puerto Ricans, and Haitians, but this immigration is not definitive. Many Caribbean immigrants return home temporarily or permanently, and with their return they reactivate the process of transculturation as a consequence of their contact with Anglo culture as well as with cultures from Latin America and other parts of the world.

Even when we think of the Caribbean only in terms of the African presence, other migratory patterns that have enriched Caribbean culture must be considered. The end of the 19th century saw a large number of immigrants from the Middle East: Syrians, Palestinians, and Lebanese. After the abolition of slavery, there was also a wave of Chinese immigration into Jamaica, Trinidad, the Dominican Republic, Cuba, and other countries. Other waves of immigration included the East Indians who established themselves in Trinidad and Suriname. The immigration of small numbers of Sephardic Jews has been noted as well, both in the 17th century and before World War II (Thomas-Hope, 1980).

Conflicts Between Nations: The Case of Haiti and the Dominican Republic

A conflict that merits special attention is the one between Haiti and the Dominican Republic, which is the result of

colonial heritage. It has its origin in the 1697 Treaty of Ryswick, by which Spain ceded the western part of Hispaniola to France. This treaty is of utmost importance, because it divided the island into two colonies: Saint-Domingue in the west and Santo Domingo in the east. For more than a century, the two colonies coexisted peacefully, which permitted the free exchange of products between them. Economic and social developments were unequal. On the one hand, the French colony was characterized by the massive importation of slaves and the intensive exploitation of the plantation economy by a white minority. On the other hand, the Spanish colony, although poorer than the French colony, experienced a slow economic recuperation based on livestock ranching in which feudal patriarchal relationships predominated. The immigration of approximately 4,000 Canary Islanders; the small importation of African slaves; the coexistence of free blacks, slaves, and whites in the extensive work of the livestock ranch; and the lack of strict social regulations resulted in a greater racial mixture than in the neighboring colony of Saint-Domingue (Cassá, 1986).

The Treaty of Aranjuez, signed by France and Spain in 1774, fixed the precise borders between the two colonies. Once the two former colonies became independent, two distinct countries came into being on the same island—one of the few cases of this in the world—but border disputes continued for more than a century, during which various treaties and accords were signed between the Haitian and Dominican governments. At the beginning of its independence from Haiti in 1844, after 22 years of Haitian occupation, the Dominican Republic demanded that the border be set at the limits established in the Treaty of Aranjuez, while Haiti claimed the territory occupied by its citizens after the cease of the various hostilities between the two countries. The Treaty of 1936, signed by Stenio Vincent, the president of Haiti, and Rafael Leonidas Trujillo, the president of the Dominican Republic, seemed to put border disputes between the two countries to an end.

However, the border conflicts instead reached their most crucial point in the genocide of 1937. As Gómez-Peña described a comparable issue with respect to the Mexico–U.S. border, it could be said that the Dominican-Haitian frontier became the eternal hemorrhage of “a wound in the middle of a family” (1993, p. 47). During the massacre of 1937, entire families were separated, and spouses, siblings, and children of Haitian, Dominican, and Dominican-Haitian nationality were murdered. The border literally became a river of blood in the Massacre River, whose name alludes to a previous massacre, as if since then Trujillo’s genocide had been foretold.

The primitivist discourse with respect to the Haitians has profiled Dominican identity both racially and culturally. Dominicans do not consider themselves to be black, but rather “Indians” or mestizo descendants of Spaniards and Taíno Indians. This myth has its foundation in the high percentage—reaching more than 80%—of African Hispanic Dominicans, while the majority of Haiti’s population is of purely African descent. The myth of supposed indigenous

racial admixture gained greater traction during the First American Invasion (1916–1924), when, faced with a variety of racial mixtures, the Americans began to register Dominican citizens' color as "Indian" in official documents. In addition, if we recall that the essence of a nation, according to Renan, is found, among other things, in "that which is forgotten" (as cited in Anderson, 1996, p. 6), that which the Dominicans have forgotten is that the Taíno Indians were almost totally exterminated at the beginning of the 17th century and that Dominican culture is eminently African in origin.

Dominican cultural identity has been constructed as a negation of Haitian culture through the primitivization of the "natural" frontiers. Racial, linguistic, and cultural differences are heightened into "internal frontiers" as a way of confronting the terror and anxiety caused by the instability of "floating frontiers." Haiti, as the primitive-other, the neighbor-other, and the other-within, becomes the unconscious primitive that Dominicans want to repress and, because of this, they have constructed a racial and cultural imaginary that differs greatly from their social reality.

Value of Sports

According to Antonio Benítez Rojo, the Caribbean is a performer par excellence. In keeping with this idea, music and sport have been the two areas in which Caribbeans have distinguished themselves most highly. The most popular sports in the Caribbean are baseball, cricket, and soccer. Baseball is played mostly in the Greater Antilles (Cuba, the Dominican Republic, and Puerto Rico) because of the cultural and political influence of the United States. Michael A. Malec, in his important book *The Social Roles of Sport in Caribbean Societies*, suggests that sport constitutes an important object of study in order to understand Caribbean culture in relation to race, gender, class, and postcolonial relations, as well as politics. In this way, Malec states that sports have a social function in fostering cohesiveness, conceding a sense of community and offering a national identity (Malec, 1995).

Although baseball, cricket, and soccer are the best known sports in the Caribbean, other important sports are boxing, basketball, and horse racing. Baseball was introduced in Cuba, the Dominican Republic, and Puerto Rico by the Americans during their first invasion in 1916. In the Dominican Republic, home to a number of baseball academies, baseball has become the national sport, and its players, mainly working-class blacks, serve as role models for many boys who identify with them and hope to rise out of poverty. By 1989, approximately 20% of major league players in the United States were Dominican, and around 300 Dominicans were playing in the minor leagues (Klein, 1995). Among the most famous Dominican players are Juan Marichal, the first Dominican player to be named to the Hall of Fame; Sammy Sosa and Alex Rodríguez, who became members of the 500 home run club; Tony Peña; and George Bell; among others. Outstanding players from Cuba include Luis Tiant, José Canseco, and brothers

Liván and Duque Hernández, while Puerto Rico adds Roberto Clemente, Orlando Cepeda, Bernie Williams, Carlos Delgado, and Carlos Beltrán to the list.

Cricket was introduced by England to its Caribbean colonies in the 19th century, most specifically to Trinidad, Guyana, Barbados, and Jamaica. At first, teams were made up exclusively of white players, and the participation of Caribbean players had to wait until the first half of the 20th century. The victories of the West Indies team in Bourda, British Guiana, in 1930, and in England in 1950 contributed to the creation of a sense of pride for the Caribbean players in beating their English rivals (Cummings, 1995). Cricket, as well as baseball, has served symbolically to resolve conflicts between colonizers and the colonized. Other sports in which Caribbeans have excelled are basketball, boxing, horse racing, and track and field. In Puerto Rico, Félix "Tito" Trinidad won the welterweight world championship in boxing, and the Dominican Félix Sánchez won the gold medal in the 400 meter hurdles in the 2004 Athens Olympics.

Religions in the Caribbean

Although the Roman Catholic Church has a large number of followers, mostly in the French- and Spanish-speaking portions of the Caribbean, and Protestant denominations predominate in the English-speaking Caribbean, syncretic religions occupy an important place: Vodun in Haiti and the Dominican Republic; Santería in Cuba; Revival-Zion, Pukkumina, and Rastafarianism in Jamaica; the Shakers in St. Vincent; the Shouters in Trinidad; and the Jumpers in the Bahamas. In addition, there exists a series of celebrations and cults, such as the cult of Shangó and Rada in Trinidad and the cult of Norman Paul in Grenada (Turner, 1980).

Vodun and Santería are syncretic, polytheistic, and animistic religions that have their origins in the mixture of Roman Catholic practices and African religions. Music and dance play a fundamental role in the rites of both Vodun and Santería. Vodun had its beginnings in Dahomey, and adaptations were made to its new Caribbean environment. Its gods, called *loas*, have both human and divine characteristics. Each one of them is associated with a particular Catholic saint: Papá Legbá with Saint Peter, Zaca with Saint Isidore the Worker, Ogú Shangó with Saint George, and Erzulie Freda with the Virgin Mary. The priest who officiates at the ceremony is the *houngan*, while the priestess is called a *mambo*, and the place where the ceremony is celebrated is the *houmfor*. Each *loa* has its favorite food and drink, as well as favorite colors and objects. The sacrifice of animals, such as goats or chickens, is also part of the ritual practices. The *loa* takes control of the *houngan*, who serves as an intermediary between the *loa* and the worshipper. The *loa* takes possession of the *gros-bon-ange* or "great good angel," which represents the conscience, while the body, represented by the *petit-bon-ange* or the guardian angel, remains intact. The rites are accompanied by drum music, dance, and liturgical chants (Marks, 1980).

Santería is a syncretic religion of Yoruba origin practiced in Cuba and Trinidad. As its name indicates, Santería (a gathering of saints) possesses a pantheon of spirits called *orishas*, who also have their equivalents among Catholic saints: Shango with Saint Barbara, Ogún or Oggún with Saint Peter, Babalú Ayé with Saint Lazarus, Yemayá with the Virgin of Regla, and Ochún with the Virgin of Caridad del Cobre. Stones, leaves, and blood are symbolically important in this religion. Stones represent divinity, and as such must be cared for and fed. Leaves, for their part, are used to bathe the stones. Finally, blood, derived from animal sacrifice, serves to feed the stones (Turner, 1980). The *orishas*, which are gifted with a power known as *aché*, materialize in a human body only in the ceremony called “becoming the saint” when they “ride” the priest or priestess.

Rastafarianism rose in Jamaica with Marcus Garvey’s nationalist movement in 1920 and the movement to return to Africa. When Emperor Haile Selassie ascended the Ethiopian throne in 1930, Jamaicans recognized him as both a prophet and God, and they adopted the emperor’s precoronation name: Ras Tafari. In Rastafarianism, the black man is considered superior to both the black woman and the white man. The use of dreadlocks and *ganja* (or marijuana) as a sacred herb are important components of this religion. Its principal objective is the return to Africa in order to escape Babylon, or white oppression. Rastafarianism gained worldwide recognition through Bob Marley’s reggae, a musical genre created in the poor neighborhoods of Kingston (Turner, 1980).

Music in the Caribbean

Cuban writer and musicologist Alejo Carpentier affirmed, “Everything sounds in the Caribbean, everything is sound” (1981, p. 180). Cuba could be considered an extraordinary case for the quantity and types of music that have risen from this country. It would be enough just to mention bolero, guaracha, son, rumba, mambo, and cha-cha-cha. But to these Cuban rhythms, it would be necessary to add other Caribbean ones such as salsa, merengue, and calypso, which have been disseminated throughout Latin America. Carpentier emphasizes the centrality and impact that Caribbean music has had on culture and, in a special way, on literature. Many Caribbean writers have used the poetic language of music as a general principle that governs their work. Popular music has also had an impact on the identity process of the Caribbean subject by having recourse to some “collective sentiments” (Keil, 1985).

The most important elements in the process of creolization consist of the contributions of the Taíno, the Africans, and the Europeans. The indigenous contribution is slim due to the rapid annihilation of this ethnic group. The contribution cited by some musicologists consists of the *areíto*, ritual chants sung during the celebration of the hallucinogenic cohoba rite, which used the güiras and maracas still commonly used in contemporary Caribbean

music. The call-and-response style coincides with one of the aspects of African music and clearly was an important factor in the encounter between indigenous peoples and the African slaves (Manuel et al., 1995). The traces of African heritage in Caribbean music are found not only in call-and-response but also in syncopation and polyrhythms. Many musical instruments of African origin are in common use in the Caribbean, such as drums, güiras, and cordophones.

Some of the best-known Cuban musical genres are *guaracha*, *son*, and *guajira*. Guaracha had its origin at the beginning of the 20th century and reached its apogee in the 1930s. It possesses a humorous, mocking, and satirical character. It has a 2/4 beat and in the beginning was played with guitar, güira, and maracas. Later, it was played by orchestras like those of Sonora Matancera. Antonio Fernández, also known as Ñico Saquito, the founder of the quintet Los Guaracheros de Oriente, was one of the best known guaracha composers.

Son was born in eastern Cuba at the end of the 19th century. Originally, it was based on a four line quatrain that served as a refrain, and like the guajira, it could be used as a verse competition between two or more singers. Son, which is played with guitar, marimba, claves, bongos, and maracas, has a 2/3 beat in the claves with a syncopated bass. Among the most outstanding groups are Sexteto Habanero, Trío Matamoros, Sexteto Nacional, and, more recently, Los Van Van and Irakere.

Finally, guajira originated at the beginning of the 20th century and is considered to be an evolution of punto. It generally uses a 10-line verse known as a *décima*, but other strophic verse forms are used as well. Guajira, which uses guitar and a Spanish lute known as the *laú*, begins with a 3/4 beat but ends in 6/8. It can also be used in improvised verse competitions between two or more singers. Among its most outstanding performers are Joseíto Fernández, author of “Guantanamera”; Guillermo Portabales; and the duo Celina y Reutilio.

In the Dominican Republic, merengue and bachata are the most popular musical genres. Merengue is the national genre of the Dominican Republic. It was derived during the 19th century from the Spanish *contradanza* and influenced by African rhythms. Merengue from the countryside, also known as *perico ripiao* (literally “torn sparrow”), is played with a güira scraper, a double-headed tambora drum, marimba (a wooden box with metal keys also known as the thumb piano), and button accordion. During the 19th century, merengue was considered vulgar and low class by the Dominican elite. It was the dictator Rafael Leonidas Trujillo who introduced merengue into the dancing salon and used it in political propaganda. Modern merengue, played with electric instruments, became internationally known in the 1970s. Among its best known musicians are Johnny Ventura, Wilfredo Vargas, and Juan Luis Guerra.

Bachata, on the other hand, is both a rhythm and a dance derived from the *música de amargue* (music of bitterness) of the Dominican shantytowns in the early 1960s. At first, bachata was also considered to be vulgar and low class.

There are two types of bachata: popular bachata and middle-class bachata, also called techno-bachata or techno-amargue. In 1991, Juan Luis Guerra and his group 4:40 released the CD *Bachata Rosa* (Bachata in Rose). Bachata became a success in Latin America, the United States, and Europe. Other bachata composers and singers are Luis Días, Víctor Víctor, and Sonia Silvestre.

Puerto Rico is recognized for *salsa*, *plena*, and *bomba*. Salsa had its origin in New York toward the end of the 1960s among Puerto Rican and Dominican immigrants. Salsa combines musical elements of guaracha, son, and jazz. It is played by a combo with keyboard; wind and brass instruments such as saxophone, trumpet, and trombone; and percussion such as congas and timbales. The group La Fania All-Star was created by the Dominican Johnny Pacheco in New York in 1968 and included invited artists such as Tito Puente, Eddie Palmieri, Ricardo Ray, and Bobby Cruz. This group produced one of the most stellar sounds of this genre at its time. Plena is a result of the fusion of bomba and calypso in the beginning of the 20th century; it had its origin in marginalized neighborhoods. The instruments used in plena are guitar, accordion, and tambourine. Among the first plena musicians were Manuel Jiménez, Mon Rivera, and the group Pleneros del Quinto Olivo.

In Trinidad and Tobago, *calypso*, which is associated with that country's carnival celebration, had its origins at the end of the 18th century among the working class. Some say the word *calypso* seems to come from *cariso*, which was a kind of satirical song, while others prefer to refer its origins back to the African word *kaiso* (Manuel, Bilby, & Largey, 1995). Soca, as contemporary calypso is known, shows East Indian influence as well. Steel bands are well known not only for their inventiveness, but also for the sweet, sharp sound they produce. Cultural resistance constitutes an important political component, as they were created as a consequence of the prohibition of drums by the English.

Reggae is a genre that has spread from Jamaica throughout the world. Associated with the Rastafarian religion, reggae had its origins in the poor neighborhoods of Kingston among ska musicians. Reggae, a mix of Cuban son—called rumba in English—jazz, and ska, which in its turn is derived from American rhythm and blues, expresses the suffering and oppression of Jamaican blacks. With his charisma and charm, the Jamaican musician Bob Marley leapt to international fame.

Literature

Caribbean literature is a complex phenomenon, due not only to the multiplicity of languages but also to the mixture of races and social classes in Caribbean countries and their political status. The three Spanish-speaking countries are Cuba, Puerto Rico, and the Dominican Republic. The Spanish of these three countries generally shares characteristics for which it is known linguistically as Caribbean Spanish. The French-speaking countries are Haiti,

Martinique, Guadeloupe, Saint-Martin, and French Guiana. Creoles are spoken by the great majority of the population of these countries. Michael Dash distinguishes between Haiti, where 90% of the population speaks only a creole, and Martinique, an overseas department of France, where the reigning education system is that of mainland France. The English-speaking countries are Jamaica, the Virgin Islands, Trinidad and Tobago, Barbados, and St. Lucia, among others. Dutch is spoken in Aruba, Curaçao, Bonaire, Suriname, and Sint Maarten, along with Papiamentu, a creole of Dutch, Spanish, English, French, Portuguese, different African languages, and Arawak.

Caribbean literature is of an elitist character, since it is written in European languages in countries where creoles are spoken and rich oral traditions are extant. In addition, this is a literature written for markets in Spain and Latin America in the case of Spanish, or for markets in France, England, and the United States in the case of literatures in French and English. Edouard Glissant refers to this phenomenon by saying, "There may be individual Martinican writers but there is no Martinican literature" (as quoted in Dash, 1994, p. 310).

Caribbean culture is eminently popular in many of its manifestations, and literature does not escape this phenomenon. In Haiti, where there exists a complex mixture of race and social class between blacks and biracial Haitians, literature has often served to promote the prestige and interests of a certain class (Dash, 1994).

Nevertheless, the fact that it produces literatures in three distinct languages makes Caribbean literature one of the most important and distinctive of Latin American letters, and has produced writers of great quality: two Nobel laureates (Derek Walcott and V. S. Naipaul) and several perennial Nobel candidates: Alejo Carpentier, José Lezama Lima, Juan Bosch, and Edouard Glissant, among others. The literature of the Hispanic Caribbean in the second half of the 20th century was fully integrated into the publishing phenomenon known as the Boom of Latin American literature. Besides the aforementioned writers, other famous authors and their well-known works are Luis Rafael Sánchez with *La guaracha del Macho Camacho*, Guillermo Cabrera Infante with *Tres tristes tigres*, Marcio Veloz Maggiolo with *De abril en adelante*, and Pedro Vergés with *Sólo cenizas hallarás*.

In the English-speaking Caribbean, noteworthy novelists and their works are C. R. L. James (Trinidad) with the novel *Black Jacobins* about the Haitian Revolution, George Lamming (Barbados) with *In the Castle of My Skin*, and the poet Kamau Brathwaite (Barbados) with *Born to Slow Horses*. In the French-speaking Caribbean, besides Edouard Glissant and Aimé Césaire, both from Martinique, other distinguished writers and their works are the Haitian novelists Jacques Roumain with *Les gouverneurs de la rosée*, René Depestre with *Hadriana dans tous mes rêves*, and Jacques-Stephen Alexis with *Compère Général Soleil*, about the 1937 massacre of Haitians on the Dominican border.

In the Caribbean, there have been important literary movements such as the Beacon Group in Trinidad, Négritude in Martinique, Noirism in Haiti, and Poesía Sorprendida in the Dominican Republic. The most important of these has been Négritude, which began in Martinique with work of the poet Aimé Césaire. Other poets of the Hispanic Caribbean are among the writers of this movement, including Luis Palés Matos of Puerto Rico, Manuel del Cabral of the Dominican Republic, and Nicolás Guillén of Cuba. Négritude came to signify, aesthetically, a rescue of black values, and politically, an anti-colonial resistance to the hegemonic countries.

Besides poets and novelists, the Caribbean has given birth to important intellectuals who have had an impact on Latin American thought, such as José Martí (Cuba), Jean Price-Mars (Haiti), Franklin W. Knight, Juan Bosch (Dominican Republic), Franz Fanon (Martinique), and Marcus Garvey (Jamaica).

Fine Arts and Cinema

Another of the great riches of the Caribbean, besides music and literature, is its painting. If we were to characterize Caribbean painting, it would have the same racial and cultural diversity that exists in the region. There is no style or theme unique to Caribbean painting; its styles range from the costumbrism, landscape painting, and romantic exoticism of the 19th century to surrealism, figurativism, neofigurativism, and—in the last decades of the 20th century—abstractionism as a result of U.S. influence.

The 1920s and 1930s constitute two periods of splendor in Caribbean painting. Modernism in painting parallels the development of nationalism in Caribbean countries, and this combination gave rise to a modality of modernist costumbrism (Poupeye, 1998). Influenced by the ideas of José Martí, Aimé Césaire, Marcus Garvey, and Fernando Ortiz, painters undertook a search for national identity through the rural landscapes, modern architecture, and the revalorization of blacks and mulattos, among other themes. Some musical genres, such as rumba and merengue, were used as themes for many paintings, as in *El triunfo de la rumba* by Eduardo Abela (Cuba) and *El merengue* by Jaime Colson (Dominican Republic).

The movements of Négritude and Noirism also influenced Caribbean painting. In Cuba, the Minorista group and the Orígenes group, although literary in nature, were a notable influence on the formation of the Havana School, some of whose best painters are Amelia Peláez and René Portocarrero. During this same period, Marcus Garvey formed the United Negro Improvement Association, which had deep repercussions for Jamaican Rastafarianism and therefore on the painting of that country. In the Dominican Republic, painters such as Yoryi Morel, Darío Suro, and Jamie Colson became preoccupied by a search for national identity in rural themes. Likewise, in Puerto Rico, the *jibaro* (peasant) constituted a privileged theme in terms of cultural identity.

The trail blazed by Wilfredo Lam, who arrived in Cuba in the 1940s, was followed by many Caribbean painters. His masterpiece *La jungla* includes Cuban cultural icons like sugarcane and tobacco, which allude to Fernando Ortiz's seminal book *Contrapunteo del tabaco y el azúcar*. Among sensual forms in harmony with nature appear figures wearing African masks in a clear display of the influence of Pablo Picasso.

The 1970s gave rise to an important group of painters in the Dominican Republic who employed abstraction, symbolism, and tenebrism as a means of avoiding dictatorial censorship; Silvano Lora, Guillo Pérez, Eligio Pichardo, Ada Balcácer, and Domingo Liz belong to this group. The artists emerging in the 1960s had taken Dominican art in a different direction; Ramón Oviedo, Iván Tovar, Cándido Bidó, José Félix Moya, Alberto Ulloa, and Soucy de Pellerano turned to new forms, from figurative expressionism to chromatic drama, embracing surrealism and sometimes developing social and political themes.

Caribbean film, although somewhat of a late bloomer relative to that of other Latin American regions, has experienced a resurgence in the last few decades. A clear example of this development is found in Cuba, which after the Revolution created a high-quality cinema framed within the current of new Latin American cinema. State support was crucial in the development of Cuban cinematography. The Cuban Institute of Cinematic Arts and Industries (ICAIC), charged with film making and distribution, was created in 1959. A new generation of directors arose during the 1960s, including Humberto Solás, director of *Cecilia* (1982), *Lucía* (1968), and *Miel para Oshun* (2001) among others; and Tomás Gutiérrez Alea, doubtless one of the best Latin American directors, director of *Memorias del subdesarrollo* (1968), *La última cena* (1976), and the acclaimed *Fresa y chocolate* (1994). From then on, a group of directors educated at the ICAIC stepped into the spotlight, among which Juan Carlos Tabío, Jesús Díaz, and Fernando Pérez are preeminent. Pérez is the director of excellent films such as *Madagascar* (1994), *La vida es silbar* (1998), and *Suite Habana* (2003). Within a realist style, all of these directors have created a high-quality and introspective cinema detailing different aspects of Cuban culture.

In the Dominican Republic, from Agliberto Meléndez's first full-length feature *Un pasaje de ida* (1988), which expresses preoccupation with emigration to the United States, other filmmakers like Ángel Muñiz with *Nueba Yol* (1995), *Nueba Yol III* (1997), and *Perico ripiao* (2003) have joined the industry. René Fortunato, for his part, has dedicated himself to the documentary, producing excellent examples like *Abril, la trinchera del honor* (1988) and various videos about the dictatorship of Rafael Trujillo Molina titled *El poder del Jefe* (1991–1996). Since the year 2000, there has been a kind of miniboom in Dominican cinema, with films like *Cuatro hombres y un ataúd* (1996) by Pericles Mejía, *La maldición del Padre Cardona* (2005) by Félix Germán, and *Un macho de mujer* (2006) by Alfonso Rodríguez, among others. Puerto Rico has produced several

features such as *Linda Sara* (1994) by Jacobo Morales and *La guagua aérea* (1995) by Luis Molina.

Martinique has given rise to the group Images Caraïbes, charged with the diffusion and development of Caribbean cinema, which presents a biannual film festival in Fort de France. The director Euzhan Palcy directed *Sugar Cane Alley* (1983), based on the novel *La Rue Cases-Nègres* by Joseph Zobel, and Horace Ové directed the miniseries *The Orchid House* (1984) for the BBC. Jamaica's contribution to world cinema was the film *The Harder They Come* (1972) by Perry Henzel (Meehan & Miller, 2003).

Caribbean Food

Food and music are the two most evident and portable aspects of culture, and all immigrants carry these aspects with them. Caribbean food is no exception and is the best representative of its culture: a flavorful mix of ingredients. With the exception of manioc, sweet potatoes, and corn, many agricultural products are not native to the Caribbean but were brought from Africa, Asia, and Latin America, like certain tubers of African origin such as the yam and the yautia, and others of South American origin like the potato. One of the few remaining foods of the Taíno is cassava, made from bitter manioc. Manioc flour is also used to make a kind of empanada called cativia or manioc empanada. The Caribbean is also known for the variety and flavor of its tropical fruits: coconut, mango, pineapple, guava, nispera, mamey, mamon, cashew fruit, papaya, and bananas, among others.

Among the different varieties of meat, goat and pork are the most appreciated. Jamaica is famous for its goat curry and the Dominican Republic for its goat stew. Pork or spit-roasted suckling pig excites the passions of Puerto Ricans, Dominicans, and Cubans at Christmas. Jerk and “vegetable egg” or *ackee* are well-known Jamaican dishes. Among fish, red snapper, snook, yellowtail, herring, and salt cod are a common denominator in the cuisine of many Caribbean countries. Fish, shrimp, and crabs often appear prepared in coconut milk. Almost every Caribbean country has its own national soup as well: *ajiaco* in Cuba, *sancocho* in the Dominican Republic, and callaloo in Jamaica, Guyana, Barbados, and St. Vincent. *Mondongo* (tripe stew) is also common in several Caribbean countries. Wheat flour empanadas and manioc flour empanadas or cativias delight the Caribbean palate. Dishes based on plantains, such as the Dominican Republic's mashed plantain *mangú* and Puerto Rico's *mofongo* and *pionono*, as well as ripe plantain slices fried or sautéed in butter and sugar, are also very well known. Fried, boiled, or roasted chestnuts are very common in the Caribbean as well. Rice and red, black, or pinto beans are an indispensable part of the basic diet, especially in the Greater Antilles.

The tourism industry, one of the principal sources and in some countries the principal source of income, has created a gourmet Caribbean cuisine in tourist hotels. These

dishes are created from mixtures of tropical fruits, such as mango and pineapple, with different kinds of meat.

Caribbean Cultural Identity: Acculturation and Transculturation

Many authors have used the typical dishes of the Caribbean, such as sancocho, ajiaco, or callaloo, as the most appropriate image to define Caribbean culture as a combination of the different African, Spanish, indigenous, Asian, and Arab cultures. The process of transculturation of these different cultures began at the end of the 15th and beginning of the 16th centuries. It is necessary not only to consider the first instance between Spaniards and Taínos, but also to refer to later instances between Spaniards and Africans, Africans and Taínos, and among the different African ethnic groups—especially in the escaped slave communities, where groups were isolated during long periods. To create a taxonomy in order to enumerate the elements belonging specifically to African, Spanish, Taíno, or Arab culture would constitute a reductionism. Caribbean culture must be considered in its totality, as in what Darcy Ribeiro (1975) termed “a new people” arisen from the peoples who came before. According to Ribeiro, an anthropologist, new peoples are the result of the “conjunction, deculturation and fusion of African, European and indigenous ethnic matrices” (1975, p. 33). New peoples are characterized by the implementation of chattel slavery and the model of the plantation economy. As a new people, Caribbeans are neither indigenous, nor African, nor European. Rather, one must consider as a whole a series of values, attitudes, and self-images shared by Caribbeans.

The Caribbean Now and in the Future

The Caribbean is one of the most culturally diverse regions of the world. As diverse as it is from a cultural standpoint, it is equally diverse in political terms. Different forms of government currently exist in the Caribbean: Cuba was the first socialist country in Latin America; the formally independent democratic countries of Haiti and the Dominican Republic share the island of Hispaniola; several countries have a colonial status, including Puerto Rico (U.S.), the Virgin Islands (U.S. and U.K.), Martinique, Guadeloupe (France), Sint Maarten (Netherlands)/Saint-Martin (France), Aruba, Curaçao, Bonaire, Saba, and Sint Eustatius (Netherlands); and there are commonwealth countries such as Jamaica, and Trinidad and Tobago.

Currently, the common denominator in all Caribbean countries, from a political standpoint, is the influence of the United States in its intervention in the internal affairs and destinies of these countries. The Spanish-American War, supported by the Monroe Doctrine, marks a point of

departure for the United States' interventionist policies in the region: the status of Puerto Rico and the U.S. Virgin Islands as self-governing unincorporated territories; the Platt Amendment in Cuba up to 1905; the invasions of Haiti (1916–1932), the Dominican Republic (1916–1924, 1965–1966), and Grenada (1973, 1983); and support for Caribbean dictators Trujillo in the Dominican Republic and Papa Doc and Baby Doc Duvalier in Haiti.

With 40 million inhabitants, the Caribbean region's most pressing political agenda should be the formation of a self-sufficient Caribbean Economic Community, with which, by means of an open market, residents of each island could supply the others with products they do not produce themselves (Knight, personal communication, July 2007). If Eugenio María de Hostos's dreamed-of Antillean Confederation or the Caribbean Commonwealth has been a failure, then it is possibly the result of their cultural and political emphases to the detriment of economic affairs. Obviously, obstacles such as the dependence of colonies on the mother country and neocolonial relations with the United States persist.

Caribbean culture finds itself in a process of change much more rapid than previously experienced as a consequence of the emigration of Caribbeans to and return from hegemonic centers, which impacts their respective cultures when they bring back other habits, customs, values, and so forth. Although immigration and so-called globalization are not new phenomena in the Caribbean, the current process of transculturation is much more accelerated than that of 50 or 100 years ago. A musical example is that of salsa, which came into being in New York among Dominican, Puerto Rican, and Cuban immigrants and returned to the Caribbean to become the national genre of Puerto Rico.

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EUROPE

Past and Present

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Often European studies are considered to be within the province of history, sociology, art, or political science—certainly not anthropology. But as early as the 1920s, Robert Redfield's student, Charlotte Gower Chapman, conducted a community study in Sicily. Some of the classic ethnographies in anthropology were conducted in Europe. Indeed, one of the seminal community studies was conducted by Conrad M. Arensberg and Solon T. Kimball in Ireland in the 1930s, published in 1941 as *Family and Community in Ireland* (1941/1974) and as Arensberg's *The Irish Countryman* (1937/1968), still is in print and is used as a teaching ethnography today. We would argue that the European culture area is as worthy of study as any other culture area, and this is especially so as the foci of anthropological studies have changed since World War II from isolated, technologically and politically simple societies to more urban and interethnic cultures. With as many anthropologists who study behaviors in the modern United States of America as there are today, it is illogical to hold on to the belief that anthropologists should not study Europe as well.

Of course some sources will be left out of a chapter such as this, and some may question the sources chosen to be included. To the students of Europe, we apologize; not everything could be included in a reference source such as this, and we have chosen to include those topics that we knew better than others. We hope that no one will feel slighted by this entry and that the choices made for

inclusion or exclusion will not be taken personally by any authors or other scholars.

What Is European Ethnography?

This chapter explores the ethnography of Europe. Ethnography comes from two Greek words, *ethnos* (εθνος), a group of people; and *graphos* (γραφησ), to write. Thus, ethnography is writing about a group of people—in this instance people in Europe. There is a prejudice in anthropology against European studies: Susan Parman (2005) wrote that some scholars consider the anthropology of Europe to be a self-contradictory phrase, that anthropologists are supposed to study “the other,” that is, Tibetan nomads or people in leopard skins; to study Europe, she wrote, is considered problematic. Parman wryly has quoted John C. Messenger Jr.'s assertion that Europeanists sometimes are considered people who study those with particularly interesting local vintages. Nonetheless, Europe is as worthy a province of anthropological research as any other culture area, and just because one has studied what Robert Redfield called “the great tradition” of Europe in school does not mean that he or she has the least familiarity with the various little traditions extant in Europe—such as those in Inis Beag, Kippel, Vasilika, Locorotondo, Hal-Farrug, or Cairn, any more than having taken a Spanish language class and visited Mexico city automatically

makes one familiar with rural Tarascan or Zapotec folk culture on the western side of the Atlantic.

Origins of European Anthropology

Were we to situate the origins of Western civilization with the ancient Greeks (more accurately referred to as Hellenes, as many of them actually lived in Asia Minor) and Romans, then we might describe “the other” of their day as “non-Western”—even though quite a few descendants of those “others” claim to be the heirs of their ancestors’ early Western enemies. That is to say, if we consider the origins of Western civilization to be the Greeks and Romans, then their contemporary transalpine peoples may be considered non-Western (and suitable for anthropological study even to “purists”). Descriptions of these early European “others” can be found at least as early as the fourth century BCE in the writings of Pytheas of Marseille, who may have traveled as far north as Iceland and east to Jutland and perhaps into the Baltic.

Other early authors who provided ethnographic descriptions of the northern peoples would include Xenophon, Pliny, Diodorus Siculus, Caesar, Strabo, Posidonius, and Tacitus, to name but a few of the better-known writers of the classical era. Although these descriptions sometimes are muddled or colored by war propaganda, they constitute some of the earliest ethnographic descriptions of non-Mediterranean Europeans. Later, medieval Arab travelers and geographers, such as Ibn Battuta, al Idrisi, and Ibn Khaldun, best known for their descriptions of life in Africa and south and west Asia, also explored southern and eastern Europe, and it is from them that we get an etic (outsider’s) perspective on European ethnography prior to the Renaissance. Some northern authors, such as Geraldus Cambrensis (Gerald of Wales) also made cultural observations during that period.

Late in the 18th century (1786), an Englishman, Sir William James, was attempting to translate ancient Indian Hindu religious texts from the ancient, holy language Sanskrit into English when he noticed Sanskrit’s similarity to ancient Greek and Latin—for example, in Sanskrit the divine father is *Dis Patir*, while in Latin it is *Deus Pater*. These similar words with similar meanings, but in different languages, became known as *cognates*, and they imply a common derivation for the languages. Thus, the Indo-European language family was discovered. Some of the larger and better known members of the Indo-European language family as it is found in Europe today include the Celtic branch (Irish Gaelic, Scots Gaelic, and Manx in the Goidelic subfamily, and Welsh, Breton, and restored Cornish in the Brythonic subfamily); the Italic, or Romance, branch (Italian, Spanish, Portuguese, French, and Romanian); the Germanic branch (High German, Low German, Yiddish, Swabian, Dutch, English, Danish, Swedish, Norwegian, and Icelandic; although geographically Iceland is not part of Europe,

Anderson [1971] included it culturally); Greek; and the Balto-Slavic branch (Russian, Polish, Czech, Serbo-Croatian, Lithuanian, and Latvian). Some smaller groups would include Romani and Basque; the latter is a linguistic isolate found in the Pyrenees border region between Spain and France that may have its origins in the late Pleistocene. In 1818, 32 years after James’s discovery, Rasmus Rask painstakingly compared the grammatical structures of the languages of Scandinavia. In 1822, folklorist Jakob Grimm (who, with his brother, Wilhelm, is best known for collecting and collating *Grimm’s Fairy Tales*) developed a set of laws to show how shifts in phonemes occur regularly between related languages. With these developments, historical linguistics was born, and research since has pinpointed the origins of the Indo-European language family to be in either the southeastern Ukraine or in eastern Turkey.

In the mid-19th century, writers such as Herbert Spencer and Sir Edward Burnett Tylor tried to explain society and social differences more scientifically and less philosophically. Indeed, Marvin Harris, in his *The Rise of Anthropological Theory* (1968), cited Spencer’s *Descriptive Sociology*, which laid out a design for the collection of ethnographic data, as the forerunner of the Royal Anthropological Institute’s classic field research guide, *Notes and Queries on Anthropology*. Despite their pioneering work, Harris argues that racial determinism was the form in which the culture sciences emerged from the industrial capitalism of the 19th century, an unfortunate offshoot of which persisted into the 20th century in the form of Nazism’s polemic arguments for the development of a “master race.”

One comes away from the late 19th- and early 20th-century authors with the impression that, although some wrote about life in Europe, they wrote about Europeans as a hypothetical control group to compare with non-Western cultures about which they had collected data. Nonetheless, in 1908, Belgian theorist Arnold van Gennep published *Les Rites des Passages*, in which he compared the rites and ceremonies of Europeans to those of non-Western cultures to determine what constitutes the patterns of liminal passages between the various stages of life. Van Gennep cited the authors of various ethnographic studies of extant societies around the world, including Europe.

However, in *Sex and Repression in Savage Society*, Bronislaw Malinowski, the father of participant observation, took Sigmund Freud to task for just such armchair theorizing in Freud’s 1914 *Totem and Taboo*, for which the 19th-century early evolutionists, such as Spencer and Tylor, were accused. Following Freud’s successes in the psychoanalytic field, he had become interested in the relatively new discipline of anthropology. Freud wrote several papers, which were well received, but his *magnum opus* as an anthropologist was to be *Totem and Taboo*, in which he explained the origins of the incest taboo, the Oedipus complex, and totemism. Freud’s hypothetical control group of mid Europeans and his presentation of a hypothetical

parricide within the primal horde (a term he borrowed from Charles Darwin) as facts led the anthropology community to become disenchanted with him. Yet Malinowski himself compared his ethnographic data on the Trobriand Islanders to just such a hypothetically described mid-European culture in his critique.

Also, prior to World War I, Swiss linguist Ferdinand de Saussure began to view the functional meaning of language as a synchronic system (*la langue*) separate from its changing, diachronic usages in speech (*la parole*), and he began his search for the underlying rules and grammar that form the unconscious “deep structure” of the language. Saussure broke up language into *phonemes* (sounds), which can be combined to generate *monemes* (words) that signify concepts. What allows this system to operate is the pairing of opposites, or *binary oppositions*. Saussure’s binary paradigm was used by Roman Jakobson of the Prague School of Linguistics in studies of the linguistic consequences of brain damage.

Development of European Anthropology

Physical Anthropology

Physical anthropology in the early 20th century was heavily concerned with osteometry, anthropometry, and the establishment of racial categories. Some notable figures conducted other types of research, such as Hungarian psychological anthropologist Geza Roheim, who made early laboratory ventures into primate studies, but by and large the determination of racial physical types was the order of the day. Franz Boas attempted to dispel the prevailing ideas about race at that time by demonstrating that, among Europeans, the supposedly long-headed (dolichocephalic) Mediterranean race and the supposedly round-headed (brachicephalic) Alpine race could occur within the same biological family, depending upon whether one were born in Europe or North America. Boas (1940) measured the cephalic index (the width of the head at its broadest point divided by the length of the head at its longest point, multiplied by 100) of Jewish immigrants from Europe, and then he compared them to the same measurements from their children who had been born in America. Boas found the European parents to be members of the Mediterranean race and their American children to be members of the Alpine race. Boas claimed that the differences were based on diet, not race, and he believed that he had disproven the claims about various races in Europe.

Nonetheless, the anthropometry of racial categorization continued. One of the more prominent proponents of this type of racial anthropology was Carlton Coon, who studied under Earnest Albert Hooton at Harvard. In 1929 and 1930, Coon conducted a study of Albanians that laid the groundwork for a number of his later works, such as his 1939 opus, *The Races of Europe*. Racial categorization was abused in

the 1940s and rapidly fell out favor following the Nazi atrocities of World War II. In 1951, this led Sherwood L. Washburn to call for an end to racial categorization in his proposition for a “new physical anthropology” that concentrated on genetics, primate studies, and fossil evidence.

Sociocultural Anthropology

Some of the earliest modern ethnographic research conducted in Europe was done by Alfred Haddon in Ireland in 1892, after the first Torres Straits expedition. Haddon also included anthropometric research in his study. Earnest Hooton and Wesley Dupertius also conducted anthropometric studies in Ireland in 1932 as part of Harvard University’s anthropological survey of Ireland. Two other young Harvard anthropologists were involved to conduct an ethnographic account of Ireland: Conrad M. Arensberg and Solon T. Kimball. Arensberg’s and Kimball’s pioneering work had its inception when they both served as research assistants under W. Lloyd Warner in his American community study of “Yankee City” (Newburyport, Massachusetts). Warner then accompanied Arensberg to Ireland in 1932, but left to be replaced by Kimball. Arensberg’s and Kimball’s *Family and Community in Ireland* is considered by many to be a foundation work not only in community studies but also in the ethnography of Europe. Indeed, Thomas M. Wilson, the current president of the Society for the Anthropology of Europe, refers to it in several of his works as a “sacred text,” to which other contemporary authors (especially those writing about Irish culture) feel compelled to measure their own work seven decades later.

Arensberg and Kimball conducted their study less as cultural anthropologists and more as social anthropologists in the tradition of Alfred Reginald Radcliffe-Brown, who had influenced Warner and whose structural-functionalism heavily influenced their work. Among their main contributions were their observations about the “stem family” and how rural inheritance patterns were integrated with marriage patterns, family structure, emigration, and careers. (Because of impartible inheritance and arranged marriages, some offspring never could marry and, thus, were stems off the family tree that never would bear fruit unless they left their rural homes.) The National University of Ireland-Galway recently (2001) published a third edition of *Family and Community in Ireland*, sponsored by the Social Science Research Council, with a major introduction by Anne Byrne, Ricca Edmondson, and Tony Varley. Anne Byrne also recorded the reactions of Arensberg’s and Kimball’s key respondents’ descendants to her reading to them of Arensberg’s actual field notes (Byrne, 2006).

World War I

During World War I, some American anthropologists were believed to have acted on the behalf of espionage

agencies to spy on German citizens in Central America (the reader may recall that this was the era of the Zimmerman telegram, which exhorted Mexico to invade the United States on behalf of Germany). This group of anthropologists is believed to have included Arthur Carpenter, Thomas Gann, John Held, Samuel Lothrop, Sylvanus Morley, and Herbert Spinden, according to David H. Price (2001).

In reaction to the alleged espionage against German citizens by American anthropologists, Franz Boas, the father of American Anthropology, who himself had immigrated to the United States from Germany, wrote a letter to *The Nation* in 1919 condemning four unnamed anthropologists for spying. In reaction to Boas's letter, the American Anthropological Association voted to censure Boas that same year. Price quotes a letter from Leslie Spier that indicates that although Boas was sympathetic to Germany, he believed both sides to be mutually culpable and mutually justified in the war. Spier argued that Boas's motivations were in the interests of disinterested (not necessarily uninterested) science, not "Germanophilism."

World War II

World War II halted much of the ethnographic work in the European theatre that had been begun in the previous decades, but certain studies continued under the leadership of Margaret Mead. During the war, much ethnographic work was virtually impossible because of political restrictions and actual danger, but under Mead a group of anthropologists and other social scientists served as part of the U.S. war effort in the Office of Strategic Services, the forerunner of the Central Intelligence Agency on the Culture at a Distance national character project. Mead (who, herself, was married to an Englishman—the anthropologist Gregory Bateson) had conducted a study to determine why there were so many shotgun weddings between American servicemen stationed in Britain and young Englishwomen who lived near the military bases. She determined that, despite a common language and the former British colonial status of the United States, the two nations were, in fact, two very different people, and that what the American boy took to be lighthearted playfulness, the English girl took to be a proposal of marriage. Lectures were given and town meetings were held that helped to avert what could have turned into a very unpleasant international incident with the United States' closest ally. The Office of Strategic Services was so impressed by Mead's handling of the situation that she was put in charge of the national character project that was to help the United States work more effectively with its allies and learn its enemies' weaknesses in order to defeat them. Mead led Conrad Arensberg, Sula Benet, Ruth Benedict, Rhoda Métraux, David Rodnick, Geoffrey Gorer, and John Rickman, among others in the assignment.

Because of the war, ethnographic data were gathered on the cultures to be described by reading novels, magazines,

and newspapers; watching popular films; and interviewing diplomats, merchants, military personnel, recent immigrants, and prisoners of war from the cultures in question. Among the studies relevant to the ethnography of Europe, Conrad Arensberg described the culture of east European Jews, and Sula Benet wrote about Poland; in 1951 she published her work as *Song, Dance, and Customs of Peasant Poland* (1951/1996). Ruth Benedict researched Rumanian culture. Rhoda Métraux described France and later collaborated with Mead on *Themes in French Culture* (1954). David Rodnick was assigned Czechoslovakia. Geoffrey Gorer studied France and Great Russia with John Rickman, and their study (1962) resulted in the controversial "swaddling hypothesis," in which, to put it colloquially, the Russians were "wrapped too tightly" (psychologically) as adults because they were wrapped too tightly (literally) as infants. Gorer and Rickman collaborated on *The People of Great Russia* in 1948. The description and some of the results of their projects were published by Mead and Métraux after the war as *The Study of Culture at a Distance* (1953). The national character approach to ethnography began to fall out of favor in anthropology by the 1960s, when it began to be seen as prejudicial.

Mid-20th Century

In the mid-20th century, French anthropologist Claude Lévi-Strauss, influenced by the linguists Saussure and Jakobson, produced anthropological structuralism, in which he provided a model of the human mind (*not* the biological organ, the brain) based on binary oppositions. He also was influenced by binary computer codes. Lévi-Strauss believed this to be a universal organizing system based on linguistic thought input. Thus, "primitive" thought is not primitive at all, but is based on the same set of logic as is "civilized" thought, leading Lévi-Strauss to reject Eurocentric interpretations of non-European cultures and mental statuses.

Post–World War II

The post–World War II era also brought a rise in the number of anthropologists, thanks in part to so many people in uniform having seen parts of the world that they never would have hoped to see before, and to the GI Bill, which afforded them the chance to earn a university education. It was in this period that more ethnographies of the folk cultures of Europe began to appear. One should note that for the most part these are the product of North American and British authors. One reason for this is that ethnographic research in European folk communities tends to be the domain of folklore specialists in Europe, rather than anthropologists. Hungarian ethnographer Tamás Hofer's 1968 article in *Current Anthropology* makes the case that, in Europe, scholars who study European folk societies are considered very different from those who study folk societies in non-Western cultures, and he quotes no less a figure than Claude Lévi-Strauss (1966),

who asserted that anthropology is a science that sees cultures from the outside. (As contradictions to this view, one might point out the work of Igbo anthropologist Victor C. Uchendu and Kikuyu anthropologist Jomo Kenyatta, or Chinese anthropologist Martin C. Yang.) The European looks at the historical process of folk ethnography on a national scale, not the deep ethnography of a single community in the American tradition, other than when it has been practiced by local, amateur scholars. Robert T. Anderson argued in his 1973 *Modern Europe: An Anthropological Perspective* that, in the 1950s, anthropological literature on contemporary European cultures was so sparse that “it could be covered in a month or so” (p. 3).

Susan Parman composed a list of some of the classic English language articles and chapters relevant to European anthropology as part of her groundwork for a session titled “American Perspectives in the History of the Anthropology of Europe” at the 1994 national meetings of the American Anthropological Association held in Atlanta and for the benefit of the Society for the Anthropology of Europe. She chose articles and chapters that she deemed “to illustrate the history, paradigmatic shifts, cultural context, and future of the anthropology of Europe.” (Parman’s list is available from the SAE’s Web site on H-net at <http://www.h-net.org/~sae/bibs/parmpick.html>.) Although Parman suggested a rather lengthy list, those items relevant to the 1950s were J. A. Barnes’ 1954 *Class and Committees in a Norwegian Island Parish*, E. Estyn Evans’s 1956 *The Ecology of Peasant Life in Western Europe* (although, we note, Evans was a geographer, not an anthropologist), Charles H. Lange’s 1957 *Acculturation in the Context of Selected New and Old World Peasant Cultures*, Julian Pitt-Rivers’s 1958 *Ritual Kinship in Spain*, and Robert Redfield and Milton B. Singer’s 1954 *The Cultural Role of Cities*. Ronald Frankenberg suggested that classic monographs also should be included in the list, such as his 1957 *Village on the Border* and his 1965 *Communities in Britain*, a suggestion seconded by Anthony Galt. We would add Lawrence Wylie’s 1957 monograph, *Village in the Vauchuse*.

In the 1960s, ethnographic monographs on the European culture area began to become more common. The author of this entry suggests that some of the classic ethnographies of Europe were produced during this decade, including Julian A. Pitt-Rivers’s *The People of the Sierra*, published in 1961. East European peasant conferences also were held during the 1960s and 1970s. It was during the 1960s that George and Louise Spindler became the editors of a monumental ethnography project that was published by Holt, Rinehart and Winston (many of their titles were republished by Waveland Press in the 1980s and 1990s and republished again by Thomson Wadsworth in the 2000s). The Spindlers’ project involved the publication of a series of ethnographies from dozens of authors, including such classroom classics as Joel Martin Halpern and Barbara K. Halpern’s 1967 *A Serbian Village in Historical Perspective*, Ernestine

Friedl’s 1967 monograph *Vasilika: A Village in Modern Greece*, Jeremy F. Boissevain’s 1969 *Hal-Farrug: A Village in Malta*, and John C. Messenger Jr.’s 1969 *Inis Beag: Isle of Ireland*.

The 1970s continued this trend with Hugh Brody’s 1973 *Inishkillane: Change and Decline in the West of Ireland*, John Friedl’s 1974 *Kippel: A Changing Village in the Alps*, Robin Fox’s 1978 *The Tory Islanders: A People of the Celtic Fringe*, and Nancy Scheper-Hughes’ 1979 *Saints, Scholars, and Schizophrenics: Mental Illness in Rural Ireland*. It was during this decade that Europeanist anthropologists began to concentrate less on the harmonious, traditional nature of European folk societies that guided Arensberg and Kimball’s functionalist portrait of Luogh, County Clare, and more on the changing nature of European folk culture and the dysfunctional fit of the old ways with the late 20th-century world. This was the decade of Margaret Mead’s 1970 *Culture and Commitment: A Study of the Generation Gap*, in which she argued that at no other time in human history could one know almost instantly what was taking place on the other side of the world. Mead wrote that this led to a gap in the way that people born before and after World War II experienced history and that younger people of the late 20th century—on a worldwide level—were more aware of what was going on the other side of the globe than their parents may have been aware of what was going on in the next country. Thus the old ways of life seemed dysfunctional in the changing world—including in the rural cultures of modern Europe.

The 1970s also included two classic survey works by Robert T. Anderson, who, with his then wife, Barbara Gallatin Anderson, had conducted field research in both Denmark and France. (The Danish experiences were humorously described in her 1990 book, *First Fieldwork: The Misadventures of an Anthropologist*.) Robert Anderson’s surveys were *Traditional Europe: A Study in Anthropology and History* (1971) and *Modern Europe: An Anthropological Perspective* (1973). In *Modern Europe*, Anderson argues that European subsistence-farming peasants had become market-oriented commercial farmers over the previous century and that many elements of the transformation were the result of a “silent revolution” brought about by the new availability of mass-produced goods and the new ability to purchase them. Anthony Galt recurred to this theme in his 1990 case study, *Town and Country in Locorotondo*, the research for which was completed in the 1970s and early 1980s. Galt credits the availability of construction and manufacturing jobs during the rebuilding of Europe with having transformed occupational, social, residential, and domestic life in rural southern Italy.

The Late 20th Century and the Society for the Anthropology of Europe

According to current Society for the Anthropology of Europe president, Thomas M. Wilson, and the former editor

of *MAN*, Hastings Donnan, in their comprehensive survey text, *The Anthropology of Ireland*, anthropologists and other social scientists began to influence government policies in the late 1980s in the Republic of Ireland by way of economic and social partnerships with the government. As noted above with regard to Conrad Arensberg, Solon Kimball, John Messenger, and Nancy Scheper-Hughes, anthropology had been the province of nonnative researchers, frequently North Americans, who analyzed remote rural populations. The change from this pattern to that of the late 1980s makes the input of anthropologists into government policy a noteworthy contribution that helped to forge the “Celtic Tiger” economy prior to the recession of the late 2000s. Now anthropologists are assisting the Irish government to understand and deal with divergent cultures following the influx of new ethnic minorities—especially Poles, Latvians, and Nigerians—and American-trained anthropologists, such as Chris Curtin at the National University of Ireland, Galway, are heading up social science departments in the country.

In 1986, the Society for the Anthropology of Europe (SAE) was envisaged as a section of the American Anthropological Association. An organizing letter went out to colleagues stating the purposes of the organization, including (among other things, according to the SAE’s Web site on H-net) the enhancement of the visibility and legitimacy of Europeanist anthropology and reinforcement of a set of national and international connections among Europeanists. In the fall of 1987, SAE’s organizers held their first elections. Susan Carol Rogers was the founder and served as the first president of SAE. James Taggart served as the first SAE program chair, in 1986 and 1987. At the 1986 breakfast roundtable that Taggart led, Stanley Brandes spoke on “Religion, Folklore and Ideology”; John W. Cole addressed “Class, Culture and Political Economy”; Ernestine Friedl discussed “Sex and Gender”; Jane Schneider looked at “Historiography and Anthropology”; and Katherine M. Verdery talked about what was to become a major topic in the news in the following decades: “Ethnicity and Regionalism.” Taggart was followed by William Douglas in 1988 and by Linda Bennett in 1989. The 1989 inaugural Distinguished Lecture was presented by Ernest Gellner and was titled “The European Roots of British Anthropology.” The previous year had had no Distinguished Lecture but rather several major addresses, including one by Carlo Ginsberg titled “The Inquisitor as Anthropologist” and another by Laurence Stone titled “Money, Sex, and Murder in 18th Century England: A Story and Its Meaning.” Further breakfast roundtables followed in 1987, 1988, and 1989 with participants whose names form a “Who’s Who” of Europeanist anthropologists, including, among others, Ruth Behar, Linda Bennett, George Saunders, Nancy Scheper-Hughes, and Jeremy Boissevain.

The 1990 SAE program chair was Ellen Badone, known for her 1989 study of Breton death imagery, *The Appointed Hour: Death, Worldview, and Social Change in Brittany*.

The 1990s continued the SAE tradition of Distinguished Lectures and breakfast roundtables. The 1990 breakfast was led by Lawrence Taylor, known for his studies of Catholicism and salmon fishing culture in County Donegal, Ireland, but the topics shifted to the changing, post-Communist Europe with Katherine Verdery’s presentation titled “National and Ethnic Issues in the Eastern European ‘Transition to Democracy’” and to migration within the continent with Caroline Brettell, known for her study of illegal Portuguese immigration in France (*We Have Already Cried Many Tears*), speaking on *Migration in Europe*. Brettell also served as president of the SAE in the mid-1990s, and she was followed by Peter Allen in the later 1990s. In the 1990s, the focus also shifted to southern and eastern Europe, where rapid political changes made for rapid social and cultural changes, and in his 1998 presidential address, Peter Allen commented not only on the influence of Brown University scholars on the SAE but on how many of them were Greek or other Mediterranean specialists, including former SAE presidents Michael Herzfeld and Jill Dubisch. Allen then pointed out that, since the fall of the Iron Curtain, it was time to consider a merger of the SAE with the East European Anthropology Group in light of contemporary political realities.

Other topics in the 1990s were the new nationalism in Europe, political activism, the reemergence of a European Right, the rise of the supranational European Union (EU), the location of the boundaries of the European culture area, and east-west differences within the culture area—if it even existed. During this period several authors, including John Messenger, Ernestine Friedl, George and Sharon Gmelch, Joel Halpern and Barbara Kerewsky Halpern, Susan Carol Rogers, Nadia Seremetakis, Regina Bendix, Susan Parman, Caroline Brettell, and Stanley Brandes allowed their fieldwork slides to be reproduced for sale to members to be used for pedagogical purposes, a practice which, sadly, ended in 2005.

In what we consider to be one of the most important statements on the anthropology of Europe in the last decade—Susan Parman’s lengthy 2000 presidential address to the SAE at its meeting in San Francisco—Parman reaffirmed the organization’s commitment to a four-field approach to the anthropology of Europe. In her address, Parman pointed out that anthropologists are willing to discuss issues and ethnic groups that frequently are ignored by practitioners of other disciplines, such as historians, political scientists, and economists. She cited a 1973 text by geographer Terry Jordan, *The European Culture Area*, in which Jordan referred to the European culture area as though it were a homogenous, Christian, Caucasian conclave of healthy, well-educated urbanites (an image that some Europeanists have to battle with within the ranks of American anthropology itself) and ignored the Jews, Gypsies, Turks, and Muslims who also were responsible for creating what we see as the Europe of today.

Now these other groups are being studied in the four-field manner peculiar to American anthropology that includes archaeology, biological anthropology, cultural anthropology or ethnology, and linguistics, along with its (ironic for a four-field approach) “singular way” to study Europe. Archaeologically, we can gain a perspective on the relatively late emergence of Europe as an important player on the world scene. The author of this entry suspects that this is a perspective that may be lacking in the other disciplines noted at the beginning of this paragraph. Biologically, anthropology can dispel unsubstantiated beliefs in racial superiority. In Parman’s own words, the “American anthropology of Europe has tended to focus less on race and place and more on understanding centers of power that generate identities.” With regard to linguistics, she notes the irony that now English is becoming Europe’s new *lingua franca*. (One recalls John Messenger’s lectures in graduate school in the late 1970s, when he would comment on the near universality of English usage in Denmark at the expense of Danish.) Finally, Parman argues, the American cultural perspective’s tradition of pragmatism and empiricism, as revealed in ethnography, allows the ethnographer to describe cultural fact, while it allows the readers to come to their own conclusions. This four-field ethnographic pragmatism, Parman maintains, is distinctively American and contrasts with European theoreticism. It is for this reason that we have concentrated on the American perspective in European ethnography in this entry.

We would note, also, the role of American biological anthropology and archaeology in uncovering and demonstrating instances of ethnic cleansing in Europe. Following the Balkan tragedies of the 1990s, forensic anthropologists and archaeologists aided authorities in providing evidence of the reported genocidal atrocities in the former Yugoslavia. Jon Stereberg, a forensic archaeologist, has substantiated proof of gas attacks that occurred in 1992 from examinations of the victims’ clothing, while another forensic archaeologist, Clyde Collins Snow, has conducted research into Bosnian burials.

Anthropology of Europe in the 21st Century

In his 2002 SAE presidential address, David A. Kideckel, an Eastern Europeanist, described Europe as an “anthropological laboratory of globalization” because of the influx of Kurdish, Turkish, Vietnamese, Chinese, West Indians, and North Africans who were transforming the social and cultural landscape. Kideckel sees a European backlash (post-9/11) to strengthen its borders and cleanse its ethnicity concurrent with the expansion of the EU and waves of immigration, which we find to be analogous to the waves of European immigration to the Americas a century ago (see Ireland in the 1990s, above). Kideckel views this as a rich ground for study by anthropology, especially in the rapidly transforming states of Eastern Europe, and he believes that anthropology should be prepared to

prevent its misuse for purposes of nationalistic racism recurrent to the 1930s.

Likewise, Anastasia Karakasidou, SAE president from 2006 through 2008, concurs with Kideckel that an understanding of the globalizing events in Europe is key to understanding the changing theoretical orientations of anthropology. Thomas M. Wilson, known for his work in Ireland and with the meanings of borders, is the 2008–2010 president of the SAE.

European Ethnography Today

At the 2008 SAE roundtables at the American Anthropological Association meetings in San Francisco, the presentations included such diverse topics as Amy Ninetto’s “Intellectuals, Cosmopolitanism, and Internationalism in Europe,” in which she argued that intellectuals have been seen as the “culture producers” in the past but that now they are redefining what it means to be European from a cosmopolitan vantage point that may conflict with the perspectives of others. Jack Murphy’s “A Culture of Lawlessness? Juvenile Criminality in Europe Today” noted the rise in crimes committed by minors in Europe. Murphy examined two opposing perspectives on the problem: a “youth culture of criminality” and gang mentalities versus racial, ethnic, or class divisions in criminal behavior. Emanuela Guano discussed “Practicing Citizenship in Contemporary Europe” and how people steer their courses through the various entitlements and responsibilities that come with citizenship. Douglas Holmes explored the new identities that people are creating for themselves in Europe as the EU tries to be diverse in some ways, but homogenous in others at the same time. Levent Soysal surveyed European Difficulties, European Accolades with regard to the EU and its effect on the ethnography of Europe. Krisztina Fehervary looked at the explosion of communications technology in Eastern Europe and its creation of transnational communities in formerly isolated areas, as well as the transformation of our positions as ethnographers. This has been a constant theme in the teaching of the author of this encyclopedia entry—that through the use of the communications revolution (as well as with some “boots on the ground” familiarity with the culture in question) we are capable of conducting virtual ethnography in a 21st-century modification of Margaret Mead’s World War II Culture at a Distance project. We believe that this can have a transformative impact on the discipline of anthropology in this century.

Future Directions

Some of the areas for future research in European anthropology that might be considered would include the effects

of the current worldwide recession on the Celtic Tiger economy now that Ireland is seeing a return to the unemployment and economic implosion that characterized it in the past, and the effects of the recession on European unification—might there be a secessionary trend among some states that find themselves worse off now than before they joined the EU? How will the failure of the Lisbon treaty affect the balance of power when Brussels demands a new referendum in Ireland, the only country that could legally vote on it, despite Irish law? Other areas for investigation might include the economic transformation of the former Iron Curtain countries and the rise in racist ideologies with a return to the recessionary politics of ethnicity of the 1930s that the 1990s Balkan tragedies show us are not that far in the past.

Conclusion

This chapter has explored the subject of European ethnography as a subject of anthropology, rather than folklore, as it is done in Europe. The author chose to look at it from a historical angle so that the reader might develop a sense of the processes whereby the anthropology of Europe has come to the state in which we find it in the early 21st century. First we looked at a justification for an anthropology of Europe, which is every bit as worthy of investigation as other areas of the world.

A brief definition of ethnography was followed by a review of the origins of the ethnography of Europe in ancient and medieval times. The rise of Europeanism in anthropology in the 19th century was mainly from the viewpoint of biological anthropology and racial classification. This led to a consideration of the atrocities of World War II. In the 1930s, a major pioneering study was conducted in Ireland by Conrad M. Arensberg and Solon T. Kimball that became a standard for the measurement of other European ethnographies for the rest of the century. Margaret Mead's World War II Culture at a Distance project produced several ethnographies of the European culture area, and George and Louise Spindler's Case Studies in Anthropology series introduced several new generations of students to the ethnography of Europe. The segment on the later 20th century and the creation of the SAE led into the anthropology of Europe today and topics for future research.

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INDIA

Past and Present

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“Sources” are always “texts,” it has been increasingly realized, and no text is “innocent.” It always embodies power relations and contains implicit principles or strategies of construction and deployment. (Sarkar, 1989, p. 4)

For over 2,000 years, Westerners have been traveling to India and returning with incredible tales of a mysterious and exotic land. Many of the early descriptions came from adventurers who were also splendid storytellers, fond of weaving fascinating and fantasy-filled accounts of their exploits and experiences. Since that time, a rich and varied fabric of narratives and interpretations has been stitched together to form the legacy of Indian studies. One of the most formidable tasks for one seeking to understand an academic survey of Indian history, culture, and religion is the investigation and comprehension of the various threads that constitute this creation, so that they may be more accurately used in any contemporary study of the land and her people. In this context, the path resembles that of the ancient Indian sages who filled their days seeking to discriminate the real from the unreal.

It must be remembered that the concept of objective recording and analysis by dispassionate observers, foundational in an academic study, is a relatively recent phenomenon, itself possessing a decidedly subjective quality. A serious reflection on both the process of humanities research and the psychological nature of humankind, however, makes it apparent that objectivity is an exceedingly

relative concept, existing more as an orientation than as an absolute. We all bring into our data collection, record keeping, and research not only our knowledge and understanding but also our preconceptions, preferences, and prejudices. These all play important roles in the processes of observation, information gathering, analysis, and interpretation. This is as true for the native informant as it is for the academic and the historian. Thus, the more we, as researchers, are able to understand the general predispositions that have led to what we accept as sources, the more clearly we can utilize them in our own work. In reflecting on his years of field research in India, Harold Gould notes that the observer is inevitably a “biased mechanism” whose perception is conditioned by personal and intellectual biases (Gould, 1974, p. 66).

Early Studies

India has an ancient and indigenous intellectual tradition, dating back to Vedic times. The earliest recorded accounts of the religious and social life in India come primarily from Brahmin and Buddhist scholars, each group having proffered a vast corpus of material covering a wide range of religious and secular topics. With the development of sectarian writings like the Puranas, the sectarian Upanishads, and the literature of the Tantric and the devotional schools, many additional viewpoints found their way into the

corpus of sacred literature. The composers of all these early works had distinct agendas that motivated their perspectives and guided their writings.

In addition to the indigenous material, a variety of accounts from foreign travelers and traders from the West and the East provide insight into and help create the groundwork on which anthropological research in India finds footing. Beginning in the centuries just prior to the first millennium CE, Greek and then Roman traders made their way to India and began to reflect in writing about the land and its people. The earliest of these may have been the Greek Megasthenes, who was an ambassador to Chandragupta Maurya in the early 3rd century BCE. Although only fragments of his book, *Indika*, survive, they reveal details about prevalent customs, beliefs, mythology, and even geography (Rowe, 1965). In the fifth century CE, Chinese Buddhist scholar Fa-Hien traveled to India and spent close to 15 years studying Buddhism and the other cultural and religious traditions. His writings provide insight into monastic lives during that time period. Two centuries later, the Buddhist monk Hiuen Tsiang also visited and spent nearly a decade and a half traveling in the subcontinent studying the people and their traditions. The writings of these travelers added to the corpus of early works of anthropological value.

In 1017, the Persian scholar and scientist Abu Rayhan Biruni (Al-Biruni) arrived in India with the conqueror Mahmud of Ghazni. Al-Biruni remained for more than a decade conducting ethnographic fieldwork. He was a prolific writer and has been called the first anthropologist because of the way he conducted his research. He learned several Indian languages, studied cultural and religious traditions, conducted participant observation of religious and ethnic groups, and recorded his findings and experiences in what he sought to be as unbiased a way as he could. His two books on India, especially *Ta'rikh al-Hind*, are considered important anthropological works that provide valuable insight into the social, religious, and political life of medieval India.

The year 1498 brought the arrival of Vasco da Gama in the southwestern coastal town of Calicut (Kozhikode). Within a few years, the Portuguese had established trade in India. Although Portuguese knowledge of the indigenous people's religion and culture was almost nonexistent, their feelings of animosity toward the Muslims in India were great, fueled by past interactions in Africa and the Mediterranean. This led to violent confrontations and the need for military support for Portuguese adventurism in India. Missionaries began to accompany the seafaring traders to convert Asian subjects, and the presence of the military helped make possible aggressive efforts at proselytizing as well. Thus, by the early part of the 16th century, Christianity, commerce, and colonial expansionism had become closely bound together in the European encounter with Asia (David, 1988). While European traders were successful in securing a great deal of Indian goods for the West, the early missionaries were not as prosperous. Francis Xavier, a Spanish Jesuit, arrived in the 1540s to

assist in the conversion efforts of the Portuguese. The church calls him the apostle of the Indies for his apparent leadership in establishing Christianity in India, yet he actually seems to have detested the land and her people. His stay there was relatively short because of the "un-Christian" ways of the Portuguese there and the Hindus' lack of interest in his religious wares. In a letter to Ignatius Loyola in 1548, he demeaned Indians as "very barbarous, vicious, and without inclination to virtue, no constancy of character, no frankness" (as quoted in Wolpert, 1979, p. 138). He left for Japan the following year, leaving the "heathens" to the efforts of others.

In 1583, a merchant named Ralph Fitch was one of the first Englishmen to make his way to India, and he wrote of his experiences in letters sent home. His descriptions were lively and interesting, and they helped stimulate British interest in the land. Unlike Xavier, Fitch found India possessing both goods and goodness, with a nonviolent but strange people who worshiped the cow and had hospitals for lame animals (Wolpert, 1979). Although he wrote as an outsider lacking insight into the existing culture, his views of the people and their ways nevertheless are far less clouded by the kinds of preconceptions and prejudices that distinguish other English writings of the colonial period.

During the next two centuries, additional European missionaries made their way to India. The Portuguese spread Catholicism, while Dutch missionaries brought Calvinism. Abraham Roger, one of the early Dutch missionaries, wrote reflections and observations of his time spent in India. His description of the caste system is presented from the traditional orthodox perspective; his informant was a *Brahmin*, a member of the priestly caste (Jackson, 1907). Many subsequent missionaries and ethnographers tell of encountering Brahmins anxious to give their perspective and interpretation of whatever the foreigners observed or sought to understand. When the narrow religious orientation and objectives of the missionaries were coupled with the narrow version of orthodox Hinduism to which the missionaries were exposed by these informants, an extremely limited view and understanding of prevalent beliefs and practices resulted. English-language writings by the British during the period depict Indian religious traditions as having no truth or viability. At best, they were seen as but forms of superstition and paganism. Many of these early writings focused on caste and its inequities, presenting Christianity and the missionaries as saviors of the impoverished and the low caste. At the same time, the racial prejudices of the authors are often blatant. These early works set the tenor for much of the subsequent literature that would be produced about India by westerners.

British East India Company

As religious, economic, and political interests in and designs for the subcontinent grew, so did the corpus of

literature. Simple reflections in the form of memoirs, written by travelers, British East India Company (“the Company”) workers, and missionaries gave way to more elaborate accounts, usually composed by scholars who served as administrators for the Company. These writings became additional sources for use in subsequent sociological and anthropological research that has occurred. The establishment of British suzerainty in India after 1757 generated an increasing administrative need for a better understanding of Indian social and religious structures. In the period from 1768 to 1771, Alexander Dow, an officer in the Company’s army, published a three-volume translation of *Tarikh-i-Firishta*, an early-17th-century Persian account of the history of Muslim India by Muhammad Kasim Hindu Shah, Firishta. In the introduction, Dow acknowledges the obvious prejudices against Hinduism in the original, yet his translation and commentary help perpetuate these very prejudices. He prefaces his work with two essays, in which he refers to the native as inclined “to insolence and ease; and he thinks the evils of despotism less severe than the labour of being free. . . . His happiness consists in a mere absence of misery” (Dow, 1772, p. vii).

There was already a developing interest in Sanskrit in England. In 1776, N. B. Halhed published a translation of the *Manusmriti*, an orthodox Hindu law book. His introduction expresses the belief that has come to handicap most subsequent writings on Hinduism, namely, that such Brahmanic texts provide an accurate picture of the religious customs, beliefs, and practices of the Indian people. Several years later, in 1784, a British linguist and lawyer, William Jones, started the Asiatic Society in Calcutta with the goal of promoting both greater research and greater understanding of Asian peoples, societies, and cultures. He was keenly interested in Sanskrit and comparative linguistics, and his efforts led to an increase in the number of Hindu texts being translated. At the same time, the British government, through the Company, was in control of the Bengal region of eastern India, and there was a conscious effort to collect both historical and ethnographic data on the newly conquered land. Henry Verelst, then governor of Bengal and Bihar, stressed the importance and need of gathering such information, especially with respect to leading families and their customs. British officials and missionaries were used for much of this work (Srinivas & Panini, 1973). In 1815, the Company began publishing a series of gazetteers that contained information on the various aspects of India and her people, including culture, agriculture, religious beliefs, castes, economics, and politics. The first one looked at the Bengal region and eastern India, while subsequent texts in the series focused on the various provinces and districts in the colony as well. The series was valuable to both the Company and the subsequent colonial government and was periodically expanded and updated over the next century or so. The last publication during British rule was a 25-volume work completed in 1933.

During the 18th and 19th centuries, the political and economic elite in the countries of Europe saw their right to rule their colonies as axiomatic. In this vein, Charles Grant, a director of the East India Company in the late 1700s and early 1800s, was a staunch supporter of the notion that India belonged to the British, who were justified in keeping it under their control at almost any cost. Like others after him, especially missionaries, he justified this attitude by promoting the idea that the British could surely “govern our Asiatic subjects more happily for them than they can be governed by themselves” (Embree, 1962, p. 143). The writings of Grant, an evangelical Christian, were instrumental in shaping the British attitude toward and involvement in India. In a report on Company affairs, for example, he inserted his evaluation of the people of India:

Upon the whole, then, we cannot avoid recognizing in the people of Hindostan, a race of men lamentably degenerate and base, retaining but a feeble sense of moral obligation, yet obstinate in their disregard of what they know to be right, governed by malevolent and licentious passions, strongly exemplifying the effects produced on society by great and general corruption of manners, and sunk in history by their vices. (Singer & Cohn, 1968, p. 8)¹

The more ignorant and decrepit the portrayal of Indians, the more Company and British authorities could justify the extension of their dominion over India’s land, people, and goods. Much of the ethnographic data collection of the time was done to further this goal. In the process, Indians were characterized as not only incompetent to meet their own needs, but even incapable of satisfactorily articulating them. Bernard Cohn divides the writings of the day into three general categories: the orientalist, the administrator, and the missionary.² As for their epistemological stance, he writes, “Each had a characteristic view, tied to the kinds of roles which foreign observers played in India and the assumptions which underlay their views of India” (Singer & Cohn, 1968, p. 6). Because of Grant and other Christians in the Company, it had been helpful to missionaries who had traveled to India, most of whom were armed with a strong social and religious revolutionary zeal but little formal education. Then, toward the end of the 18th century, British administrators came to be wary of missionary activities, since they seemed to be generating a resistance by Hindus toward Christianity and British government activities as well. Lord Minto, governor-general of India (1807–1813), had strong objections to the evangelists, noting that the written material they generated and used was filled with anti-Hindu rhetoric that condemned all Hindus to ignorance and damnation.

The 19th century was a pivotal time period in the development of anthropology as an academic discipline, which occurred in the environment and context of imperialism. Many of the early ethnographers in India functioned to further the hegemonic designs of both politicians and missionaries with their assumptions of superiority over the natives. The amassing of ethnographic material on

customs, beliefs, and habits of the tribes and castes required patience for detail but little in the way of scholarly insight, insider perspective, or respect for the people being studied. The phenomenological approach that came to be seen as integral in many subsequent anthropological studies was nonexistent here. Because so many of the scholars who visited and wrote about India were employed by the Company, this affected not only what data they collected but how it was interpreted. Most found the rituals and beliefs of the Hindu too alien to their own Judeo-Christian viewpoints and cultural conceptions to be seen as having any merit. The intended purposes of these observations and investigations were, after all, the forging of economic, political, and religious inroads, with the ultimate goal of establishing control. Empathetic understanding was hardly a consideration. European intellectuals of the time were being strongly influenced by the ideas of early 19th-century French social thinkers like Henri de Saint-Simon and Auguste Comte. Comte asserted that the evolution of human thinking and belief can be seen in theological conceptualizations, the lowest being animism, followed by polytheism and then monotheism, the highest. This provided the missionaries in India an intellectual rationalization to go along with their ideological rejection of indigenous beliefs. They found easy justification in setting about degrading such beliefs verbally and in writing without stopping to consider their context or the positive role they might play in the lives of the people.

Due to the efforts of Grant and other evangelicals, a clause in the passage of the Charter Act of 1813 gave missionaries even freer rein to proselytize in India. Information for the bulk of their early writings was gathered from converts, high-caste intellectuals, and urban Indians who had business or political connections with the foreigners. Data collectors seldom possessed any real knowledge of local languages, religion, or culture, and their information was almost entirely dependent upon the whim and agendas of their few English-speaking informants. By the latter part of the 1800s, the theories of Charles Darwin and Herbert Spencer on human and cultural evolution were becoming popular, and many of the ethnographers at the time saw themselves as observers of the behaviors of inferior primitive peoples. Although this general attitude was ameliorated to some extent by the end of the century, these earlier writings continued to be utilized as sources by many historians and anthropologists. Limited understanding of what was heard and observed contributed to conflicting interpretations and conclusions.

Interest in and travel to India by Europeans swelled throughout the 19th century. This was especially true of the British, who were drawn by their government's growing economic and political control of the subcontinent. The collection of writings and memoirs of India continued to grow as well, and in 1823, the Royal Asiatic Society of Great Britain and Ireland was founded by Henry Thomas Colebrooke as a British counterpart to the society started by Jones.

Colebrooke had worked for the Company for 32 years and had also served for 9 years as president of the Asiatic Society. The British counterpart soon began its annual *Journal of the Royal Asiatic Society (JRAS)*. It was initially devoted to publishing ethnographic and historical studies of all of Asia, although research on India tended to dominate in its pages. While several members of Asian royalty were made honorary members, only with rare exception did the work of any Asians appear in the journal's pages. This is because they were not generally seen as having the scholarly acumen or even the intellectual ability to add any meaningful insight to their own history or cultural traditions.

As the number of literate Indians who dealt with the English grew, many came to realize that, like the Muslims before them, the British wanted to acquire control not only of their economic and political life, but of their religious life as well. This caused an increasing number of Indians to look upon the British with the same disdain, resistance, and resentment they had long felt for their Muslim rulers. It led many to resist further attempts by the British to expand their data collection, and it also inspired a group of educated Indians in Bengal to begin to counter the British depiction of India with their own version. Ram Mohun Roy (1774–1833) was one of the early figures in this movement. He was an active writer, starting several newspapers and journals in Calcutta, and he inspired Bengali intellectuals to discuss and promote philosophy and theology to help counter British depictions of them and their traditions. In 1828, he founded the Brahma Sabha, which in time became the Brahma Samaj. The goals of the organization were the reformation of what Roy saw as degraded religious ritualism and the rekindling of pride in Hinduism among the young intelligentsia. Bengal had been the center of British intellectual activity in India, and it soon became the center of indigenous intellectualism, giving birth to the vast majority of Indian English language writers and scholars during the 19th and early part of the 20th centuries.

The Sepoy Mutiny of 1857 turned out to be a blessing in disguise for the missionaries and their efforts in India. During the preceding decades, the Company had generally sought impartiality with respect to religion, being more concerned with business. At the same time, however, the evangelical influence on the British government had been growing, and there was once again a move to send more missionaries to Christianize India. As a result of the 1857 conflict, the government stripped the Company of its control in India and took it over in the name of Queen Victoria. In her proclamation in 1858, she stated that, as good Christians, the British had “the right and desire to impose our convictions on any of our subjects” (David, 1988, p. 88).

Early Academic Studies

In 1871, the Royal Anthropological Institute of Great Britain and Ireland was formed, and it began publishing

Indian Antiquary (IA) the following year. The aim of this journal was slightly different from that of *JRAS*; it concentrated more on customs, rites, festivals, and other dimensions of religion and culture. Occasional text translations appeared as well, as did writings by some Indians. Nevertheless, both the *JRAS* and *IA* were European in sensibility and outlook, for even the infrequent indigenous author had usually been trained by western scholars and looked at India through westernized eyes. Throughout most of the 1800s, field research remained essentially in the form of ethnographic work on tribes, undertaken primarily by missionaries, travelers, and government officials, including military officers. Work not relevant to church or government had a more difficult time procuring sponsorship, and thus it was less likely to be undertaken.

Friedrich Max Muller, the famous German philologist and orientalist, began his Sacred Books of the East series in 1876, and this marked the first time there was a concerted effort to make Asian scriptures accessible to the English-speaking world. Muller drew on the groundwork laid by the earlier Western Sanskritists, bringing together some of their students and other translators to work on his series. Most of the translation efforts were focused on classical Brahmanic texts, and little or no attention was paid to the contemporary Hindu tradition. The translators were based primarily in Europe, and their understanding of the concepts of Hinduism came solely from what they found in the way of classical literature. The ethnographers in India, on the other hand, were largely unaware of India's literary heritage. While the translators found a storehouse of ancient literary and cultural achievements, the ethnographers continued to perceive a strange amalgamation of primitive peoples and superstitious idol worshippers.

Access to translated accounts of early Hindu life and society did, nevertheless, stimulate and influence the development of sociological studies of India. One of the first attempts to look at the accumulating knowledge about India and its social institutions from a comparative and theoretical perspective came in the late 19th century. Although Karl Marx made use of some of the available Indian material in his 1853 work, *On Colonialism*, it is Sir Henry Maine's *Village Communities in the East and West* (1871) that stands out as one of the original comparative works, approaching the subject using a sociological methodology. It was not until the 20th century that this approach became an integral part of Indian studies.

The establishment of textual studies resulted in the addition of an assortment of new perspectives with which to view the religions and cultures of India. This approach generally presented a more positive side of India to the Western world and had an influence in both India and the West. It gave those studying India, especially sociologists, access to material in which to search for the origins and history of Indian social institutions. Translated texts also found their way into the hands of European and American philosophers and writers, from

Madame Blavatsky (1831–1891), founder of the Theosophical Society, to Ralph Waldo Emerson (1802–1882) and Walt Whitman (1819–1892). They were drawn by what was perceived to be deep metaphysical truths hidden in ancient Hindu literature. Although much of the work that resulted may not generally be considered academic, nevertheless it has had a profound influence on Western perceptions of India, and it has long inspired many who have subsequently done extensive scholarly work on the land and its religious and cultural beliefs and practices.

Hinduism

Hinduism started to have a new face for the West, but it was, for the most part, the orthodox Hinduism of classical Sanskrit texts, not the popular religion of the rural and contemporary people. This changing view of Hinduism in the West encouraged many educated upper-caste Indians to become involved in Sanskrit studies as well and to help promote the view of India and Hinduism as presented by these texts. Writing on these developments, the well-known Indian sociologist M. N. Srinivas suggests that the “discovery of India's past, and the antiquity, richness and versatility of its heritage, gave self-confidence to the elite and the material necessary for national myth-making” (Srinivas & Panini, 1973, p. 184). He further notes that the missionaries' criticism of Hinduism and their conversion of the poor fed the nationalist sentiments of the upper-caste Hindu elite and encouraged efforts to counter British writings about their traditions.

Nearly all of the 19th-century writings by Hindus about their own society and culture were authored by Bengali Brahmin philosophers and Sanskritists, not by academic scholars. The purpose of their work was, for the most part, to present the Hindu tradition in a favorable light and to counter some of the earlier one-sided presentations by European missionaries and officials. During the late 1800s, Indians also began to add to the treasure chest of ethnographic and other academic writings on India. Their work started to appear in European journals and occasionally in book form. Ramachandra Ghosha's *History of Hindu Civilization: As Illustrated in the Vedas and Their Appendages* (1889) was one of the first of a long list of indigenously written academic texts on India. It combines scholarship with an orthodox Brahmanic perspective to depict an idealized version of the history of Indian society and religion. Several years later, Pramatha Nath Bose published the first volume of his four-volume *A History of Hindu Civilization During the British Rule*. In it, he includes data on contemporary aspects of caste, culture, religion, economics, and education. For the next three decades, the authors of nearly all such writings continued to be predominately Bengali Brahmins, although the works of some Brahmins from Western India and the South emerged as well.

During the latter part of the 19th century, the writings of British thinkers such as E. B. Tylor, James George Frazer, Charles Darwin, and Herbert Spencer were influencing the approach to ethnography and the development of anthropology in India. Their views were far more theoretical than empirical, and this approach was often used. Early ethnographers believed that if they spoke with representatives of the high caste and the orthodox, they would get an accurate picture of the culture. They also functioned under the assumption that scientific observation is sufficient to reveal the vital dimensions of another's culture. After all, the observers believed themselves to be of superior intellect and culture and thus capable of thoroughly understanding primitive peoples, as Indians were clearly believed to be. In the process, the ethnographers tended to ignore those whom Edwin Ardener calls the "muted" voices (Ardener, 1975).

In 1886, the first anthropological society in India was founded by Edward Tyrrel Leith in Bombay, boasting such members as D. Ibbetson, Sir Herbert Risley, William Crooke, and R. E. Enthoven. The approach of these field researchers extended beyond data collection and began to bring some aspects of phenomenology into their work. Although prejudices continued to color much of their view of the contemporary situation, these same writers were generally impressed with what they found in the Sanskrit texts. Compared with the missionaries, most of them were better educated, often in classical European languages, and from upper-class families in England. Coming from a hierarchical society in which they often resided near the top, they could relate to the social structure as depicted in the classical texts, seeing it as beneficial for maintaining stability. Their appreciation of these texts facilitated their acceptance of the Brahmanic version of the ideal society as valid. With the help of Brahmin pundits, they came to believe that the difference between the prevalent state of Hindu society and the idealized version in the texts was due to the degradation of the society, exacerbated by 1,000 years of foreign domination. In the process, these Indologists helped promote Brahmanic law as the law of the land, thinking that a return to this system would be more readily accepted by Indians and would also improve the society, making it more secure, smoothly functional, and easier to control.

20th-Century Studies

The 20th century brought an increase in the number of indigenous scholars making substantial contributions to Indian studies. They started their own professional associations with the aim of furthering indigenous scholarship and ethnographic work. In 1902, Satish Chandra Mukherjee founded the Dawn Society in Calcutta, which encouraged and published the work of young Bengali scholars. Four years later, the Bangiya Sahitya Parishad (Bengali Literary

Association) was started by the National Council of Education with the purpose of furthering ethnographic studies. Indian universities in Calcutta, Lucknow, and Bombay became centers of indigenous anthropological research and writings. The work of scholars such as G. S. Ghurye, R. K. Mukherjee, D. P. Mukherjee, and D. N. Majumdar stood out and became accepted as genuine and valid representations of insider perspectives. However, since they were all from urban high-caste backgrounds and were almost all Bengali, the picture of Hindu society they constructed continued to be dominated by Bengali and high-caste urban points of view. Indian academic journals adopted the basic format of their European counterparts, with the exception that contributors and perspective were urban high caste Hindu rather than European.

The University of Calcutta opened the first department of anthropology in the country in 1921. Three years later, B. S. Guha earned a doctorate in anthropology from Harvard University; he was the first Indian to obtain such a degree. Among the more significant archaeological discoveries in India is that of Harappa in the mid-1800s by Charles Masson and Alexander Burnes. However, the efforts of Rakhaldas Bandyopadhyay (aka Rakhaldas Banerjee), superintending archaeologist for the Archaeological Survey of India, led to the unearthing of Mohenjodaro in 1922, and this discovery not only allowed for a far greater understanding of ancient India and culture but also brought more attention to indigenous archaeology.

As mentioned earlier, the legacy of intellectualism and scholarship in India is quite old. Indian philosophers and scholars have traditionally come from the urban high caste, and their own orthodox religious and cultural values and viewpoints have nearly always set the parameters of such learning. With the introduction of Western-style academic scholarship to India, it too became another vehicle with which some perpetuated, in academic discourse, the orthodox view of India and Hinduism, especially with respect to history, religion, and the caste system. This is not to suggest that Brahmins have not been able to look at their own culture and tradition dispassionately, or that none has produced quality and insightful scholarship, for this is far from the case. Clearly, some of the foremost academic work on India has been done, and continues to be done, by Brahmin scholars. However, acknowledgment of their social and economic background and influences is important. The Subaltern Studies Series is a recent example of writings by Indian scholars with the intention of being "self-consciously and systematically critical of elitism in the field of South Asian studies" (Guha, 1984, p. vii). The various articles in the series raise some fundamental questions about the nature of much of the writing and history making in South Asia. Significantly, the majority of the series' contributors are Bengali Brahmins, although some work of non-Bengali Brahmins, other-caste Hindus, Muslims, and Western scholars can also be found in the series.

Because caste consciousness has been such an integral part of Indian society, it is deeply seated in the Hindu psyche. Its justification and defense have been fundamental parts of the cultural and religious indoctrination of most upper-caste Hindus, even many of those with a secular upbringing. As a consequence, their writings on the topic of caste have traditionally been closer to a form of orthodox apologetics than to objectively oriented research into and critique of the system. For an upper-caste scholar who maintains reverence for his religious and cultural traditions yet seeks to undertake scholarly research, a conflict inevitably arises that pits his socioreligious belief system against his academic training. This, no doubt, has the potential to circumscribe research perspectives and subsequent analyses. Thus, while much of the indigenous work done on caste prior to Indian independence was by Brahmins, it tended to be less fieldwork dependent and more textual in nature, relying heavily on the early Sanskrit writings to produce theories on the origin and historical development of caste that were consistent with the prevalent views of the social and religious elite. Little attention was given to direct empirical investigations, which would run the risk of putting high-caste scholars in close and direct contact with those considered low caste or untouchable (also known as *Harijan*, Scheduled Caste, or simply SC).

In the 1930s, the perspective of the low caste began to be revealed in written form. With the help of British laws and patronage, some *Shudra* (lowest of the “touchable” castes) and *Harijan* (the name used for bottom caste members by Mahatma Gandhi in place of “untouchable”) became educated and found employment privately or in government service. Dr. B. R. Ambedkar, the most renowned SC of the time, began writing his critique of Hindu society and religion, continuing to do so until his death in 1956. An intriguing and charismatic figure who fought caste inequities all his life, he converted to Buddhism just before his death. His writings are extremely critical of the Indian government, orthodox Hinduism, and especially of Mahatma Gandhi, whom he felt had a misguided approach to helping those of the lowest caste that did them more harm than good. Ambedkar’s writings present a dimension of Hindu society that most high-caste Hindus were, and continue to be, incapable of understanding or accepting (see *The Annihilation of Caste*, 1990, by Bhimrao Ambedkar).

By the 1940s, the interest of social anthropologists working in India grew to incorporate village studies in addition to their traditional work on tribes. The belief was that one could extrapolate from village studies theories that would shed light on ancient social and religious life. Sociological studies on caste were mostly historical and still undertaken, whether by foreigners or Brahmins, from a predominantly high-caste perspective. However, secularized Hindus from other castes were beginning to take part in academic studies and added to the compendium of

indigenous literature about India and Hindu life. The Anthropological Survey of India (ANSI) was founded in 1945. Its vision statement (ANSI, n.d.b) set as one of its primary goals “mapping the bio-cultural profile of Indian populations.” During its first several decades, ANSI supported and promoted research that tended to focus on tribal issues, especially beliefs, practices, and health-related issues (ANSI, n.d.a). By the 1960s, caste and clan studies, as well as genetics and archaeology, received increased attention from the organization. Since that time, research trends have changed somewhat, due in part to a variety of contemporary ethnic and political influences. Tribal and genetic studies have continued to be important to ANSI members, as is reflected in their publications.

Shortly after the founding of ANSI, the Department of Anthropology was established at the University of Delhi. Lucknow University followed suit within a few years. The latter department was begun by Majumdar with an emphasis on a scientific approach to research and intensive fieldwork-based ethnography and archaeology. Indigenous anthropology in India was gaining attention and status, and there were several notable scholars in the field. The department took its inspiration from them (Khare, 2008). Still, most anthropologists working on India were trained or influenced by the work of British and American anthropologists such as Bronislaw Malinowski, A. R. Radcliffe-Brown, E. E. Evans-Pritchard, Franz Boas, and Robert Redfield. All these figures had studied “others” and never used the tools to look at their own cultures and peoples, so the work of Indian anthropologists in India brought a new dynamic to the process. The post-Independence period saw the Indian government increase funding for indigenous research scholars, but at the same time it sought to influence the types of research done. This functioned to add another set of agendas to the construction of Indian studies and the reconstructing of Indian history. Whenever a government funds research by its own nationals, it can go a long way toward determining what topics are to be studied. In Independent India, this has often been the case (Barnes, 1982).

In 1951, Ghurye, who was head of the Department of Sociology at the University of Bombay, founded the Indian Sociological Society. It functioned to promote indigenous research within India. In much of the work in Indology done since Independence, authors have continued to depict the orthodox religion and its value system as the primary, if not sole, religious paradigm within Hinduism. One often wonders if some such researchers are even aware of the myriad sets of values, beliefs, and practices that are prevalent. India is a land of diverse value systems and religious traditions; each subcaste, ethnic group, religious sect, and region has its own unique formulation that mixes pan-Hindu, regional, ethnic, and caste elements.

In his discussion of the social dynamics of “center and periphery,” Edward Shils (1975) asserts that the majority of the population in most premodern societies has existed

outside the domain of direct influence of the orthodox value systems dominating their respective societies. Most people have maintained and functioned within their own sets of values, understood as the “periphery” by those in the “center.” Periodically and in certain situations, however, these popular sets of values may be expressed within the parameters of the central value system to give the values, or their espousers, a veneer of orthodox legitimacy. For the most part, however, a sharp distinction remains on the functional level.

This theory can be correctly applied to India, both historically and in modern times, and it makes clear the limitations of depending on the orthodox view of culture and society as an accurate interpretation of the lives of the masses. Because of the social and religious separation between themselves and the low castes, urban high-caste Hindus generally have a limited understanding of the complex and nuanced value systems that motivate most other Indians, namely the rural low caste and tribals. Instead, they tend to assume that most of the beliefs and behaviors of the rural majority are being generated from and are simply modifications of high-caste values. While it is apparent that some high-caste scholars have been successful in their efforts to bracket out their own “casteness” while performing field research, others have not, and some do not even attempt to do so. As in the case of the writings of 18th- and 19th-century Europeans, such biases do not negate the work done, but they do demand contextualization to put the studies into proper perspective. As has been observed, the social position of observers determines what they are likely to see (Vidich, 1970).

In a social hierarchy like that in India, the determinants are often very clear. Srinivas's own work reveals a great deal of caste-influenced myopia. He reluctantly acknowledges in *The Remembered Village* (1976) that his friends and informants were all upper-caste Hindus. Even then, he suggests that the views on the religious beliefs and practices about which he writes were likely shared by *Harijans* with whom he had admittedly never talked or even interacted (Srinivas, 1976). Unfortunately, this approach was more the rule than the exception. Louis Dumont, a well-known French social anthropologist who was also considered an authority on Indian society, wrote of the importance of learning from the people themselves which modes of thinking are appropriate for scholars to use in researching them (Dumont, 1970). The difficulty here is that the people from whom Dumont apparently gained his understanding seem to have all been members of the urban religious and secular elite. There is an ease with such an approach for those who seek validation of traditional preconceptions and those who find such views convenient when constructing orderly academic theories about Hinduism. Other scholars have rightly questioned this often-used methodology. The well-respected sociologist Triloki Nath Madan suggests that intellectuals must cultivate a “skeptical attitude” when attempting to utilize

“simple-minded” dichotomies and other theories to explain complex societies (Madan, 1982).

Conclusion

Since the mid-20th century, research on India has become a regular part of many anthropology programs in the West. Departments and programs focusing on Indian studies and South Asian studies have also been established, and anthropological research has played a fundamental role. Anthropology has become a prevalent academic topic in most larger Indian universities as well. Bachelors and masters of science courses and degrees are offered throughout the country. The various subfields in the discipline include prehistoric archaeology, physical anthropology, social anthropology, linguistics, and applied anthropology. Increasingly, Indian universities are holding conferences focusing on the various subfields, as well as on issues such as poverty, human rights, tribal studies, and caste studies.

Although teaching is one of the career paths for graduates, it is not a highly emphasized career in the country, and graduates instead tend to seek out employment in other fields. These include the government sector, both locally and nationally, in the areas of urban planning, tourism, cultural resource management, community development, public service programs, and rural and tribal development. Other less prevalent but occasionally available career options include museum work, documentary film making, or jobs with nongovernmental organizations working in underdeveloped areas of the country. Indian anthropologists have also found employment with international organizations like UNESCO, UNICEF, and WHO. Because both government and private sector organizations view assistance and development of target groups as their goals, training in applied anthropology reflects this approach. Government sponsorship is done with the expectation that ideas and approaches will be instituted to further government efforts in those directions.

Using the concept of applied anthropology, an increasing number of academics in the field now see themselves as social advocates and activists rather than simply observers. Although this has had positive results in many situations, it has also become the justification for some to take a less than objective approach to information gathering and presentation. Good scholarship is hampered when researchers use a “the ends justify the means” argument to overlook truth and accuracy in using academic writing to promote a favored cause, even when that cause is a positive and worthwhile one. Nevertheless, the research and writings that have been produced have contributed immensely to the ongoing examination of Indian society and culture. While the promotion of the Brahmanic perspective has generally died away, it has often been replaced at larger Indian universities by a Marxist orientation that tends to be

highly critical of not only the orthodox religious perspective but also the increasingly capitalist direction of India. This reflects the kind of orientation that has become prevalent in various Western university departments.

Coupled with the writings of orientalist, missionaries, and Indologists over the last several centuries, the aggregate of literary works that have been produced provides an abundance of perspectives and viewpoints from which to examine India and Indian studies. A fundamental portion of these writings is a direct product of ethnographic and anthropological research. The work of both Indian and Western scholars has increasingly shown an awareness of the need to use multiple techniques and perspectives in everything from the development of theoretical considerations to the collection, interpretation, analysis, and presentation of data. While such an approach is understood, it is still missing in much of what ultimately gets produced. Studies based on limited research and narrow perspectives and agendas, be they academic, religious, or political, have proven to be too myopic to grasp and express the diversity and subtleties that are inevitably existent in any people's social and religious belief systems, especially in a land as culturally and religiously varied as India. Nevertheless, if adequately contextualized, much of this work can have scholarly value and yield revealing insights. As Western scholars are able to set aside many of the traditional Western and academic preconceptions of India and Hinduism, and as Indians are able to set aside indigenous biases, these scholarly works will inevitably lead to a more genuine understanding of the land, her complexities and diversities, and her wonders.

Notes

1. This was originally an extract from *Report on East India Company Affairs* #14, General Appendix I (1833).

2. The category *orientalist* becomes subsumed in the 20th century under the term *Indologist*.

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POLYNESIA

Past and Present

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In 1832, Captain Dumont d'Urville basically defined the term *Polynesia*, which is derived from the Greek words for “many” and “island.” It comprises the islands found within the “Polynesian Triangle,” with Hawai'i in the north Pacific, New Zealand in the southwest, and Easter Island (Rapa Nui) in the far southeast. This definition stood in opposition to Micronesia (little islands) and Melanesia (black islands, due to the dark skin color of its inhabitants). Polynesia is further subdivided into two regions, West Polynesia (Tonga, Samoa, Futuna, 'Uvea, and a few smaller islands) and East Polynesia, which includes the central archipelagoes of the Cooks, Australs, Societies, and Marquesas and the more isolated islands and archipelagos of Hawai'i, Easter Island, and New Zealand (far to the southwest but culturally “East Polynesian.”)

The colonization of the widespread islands of Polynesia stands among the most amazing feats of human exploration ever. They are very diverse, including atolls, high volcanic islands, and temperate continental ones. Polynesians not only reached every one of these but managed to establish a foothold on even the most inhospitable. Polynesia was the last region of the world to be settled by humans, and the Polynesians themselves were arguably the greatest seafarers ever. Expert navigators guided great double-hulled voyaging canoes, well stocked with necessary plants and domesticated animals, over vast distances utilizing the sun, stars, currents, birds, and winds as their guides. The variables of

each island demanded different strategies of colonization and settlement. As the centuries passed following initial landfall, these conditions changed, resulting in a dynamic interplay between the islands and their inhabitants.

By the time of European contact in the late 18th century CE, some islands, generally the biggest and most plentiful such as Tahiti, had developed into highly stratified chiefdoms. In contrast, other regions such as the atolls of the Tuamotus had retained a much simpler social system. Still other islands, Pitcairn for example, had been altogether abandoned. How and why these processes took place reveal a great deal about the nature of human societies and how humans interact with their environments. Humans transformed these islands from inhospitable forests to productive agricultural landscapes, with significant consequences for local biota; the sociopolitical entity known as the chiefdom developed in response to a complicated web of natural and cultural influences.

Ancient Polynesian Origins: The Austronesians

Polynesian origins begin with the homeland of the Austronesian settlers of the Pacific Islands. *Austronesian* is a linguistic term for the most widespread language family in the world, stretching from Easter Island in the east all the way to Madagascar in the west. It was colonized by

Austronesian speakers about 600–700. Linguistic and archaeological evidence indicates that the original ancestral Austronesian homeland was located in the lower Yangzi region of China, among the Neolithic cultures of the Hemudu (5000–4500 BCE) and the Majiabang (4200–3000 BCE). These cultures apparently adopted the settled mode of life that came with rice agriculture in the area. They spread southward via the rivers, arguing for some kind of transportation technology, which, judging by the house structures, was easily conceivable. Eventually, the spread reached Fujian in southern China and crossed the channel into Taiwan, where it developed into the Dapenkeng, the earliest ceramic-making archaeological culture on the island, dating to around 3500–3000 BCE. Contact with nearby Fujian through maritime transportation may have led the way to the succeeding cultural phases beginning around 2500 BCE. Taiwan's and Fujian's pottery and lithics show enough similarities to be considered parts of a single tradition around that time. Influx of the Longshanoid culture into Fujian and Taiwan is also evident in the period around 2500–1500 BCE.

The Austronesian colonization into the Pacific may have begun in part because of a trade network between Taiwan and the small P'eng-hu islands. Essential resources, such as basalt for adze making as well as other, more perishable materials, might have spurred on the advancement of seafaring technology. The P'eng-hu islands, near Taiwan, appear to be the only possible source for the basalt adzes found in Taiwan. The fact that the Austronesians sailed across 45 kilometers of open sea to these islands makes it likely that their seafaring abilities grew enough in Taiwan to make longer voyages possible.

From around 3500–3000 BCE, the Austronesians began their move south into Near Oceania, a process that would take around 1500 years. Linguistic evidence and lexical reconstructions, which try to determine at approximately what time certain words (and hence, their significance) appeared, supports the hypothesis of a Taiwanese origin for the Austronesians. The axiom that the homeland will be where the greatest variety of languages is found is lent weight by the fact that there are around 21 or 22 different indigenous languages of Taiwan. This is backed up by the cultural history of Taiwan as determined linguistically. It appears from archaeological evidence that the Taiwanese mode of life (rice agriculture, pottery, etc.) is similar to that of mainland Chinese culture of around the same time. The hypothesis that major advances in seafaring occurred by this time is supported by the large amount of (reconstructed) seafaring terminology in the vocabulary. Words for different parts of the canoe appear, of particular significance being the word *outrigger*, as well as do numerous other maritime terms. In addition, there are manifold increases in the number of recognized fish, plants, and avifauna, suggesting the discovery of new terrain and the accompanying new species. The Austronesians were fishermen who brought with them the domesticated pig, dog,

and chicken. They were also horticulturalists who, from lexical reconstruction, had essential crops such as taro, breadfruit, coconut, and banana.

As the Austronesians spread to the south and west into Melanesia, a meeting of cultures occurred. The indigenous inhabitants, who had been there for at least 35,000 years, spoke languages completely unrelated to those of the Austronesian family. The mixing of these cultures in Near Oceania, which genetic studies have also confirmed, are thought to have been concentrated in the Bismarck Archipelago and resulted, in the mid-second millennium BCE, in a new entity entirely that historians call the Lapita people.

The Lapita People

The term *Lapita* refers to a specific site (Site 13) on the Foué Peninsula on the west coast of New Caledonia, where the first examples of a unique and intricate dentate-stamped pottery were found. As their pottery is the virtual hallmark of the Lapita people, a short discussion of it is an appropriate way to begin a discussion of them. The first specimens were found in 1910, but it wasn't until 1952 that Edward Gifford and Richard Shutler Jr. named the pottery style, and hence the people who made it, "Lapita" after a village close to Site 13. Examples of this specific style of pottery are found from Melanesia to West Polynesia, indicating a migration of vast proportions and impressive speed (around 500 years in total). The earliest examples of the Lapita people's pottery appeared around 1500–1400 BCE in the Bismarcks and the Santa Cruz islands; thus, it appears that at this time, the Lapita people remained in Near Oceania. They eventually expanded beyond the Solomon Islands and reached Vanuatu, the Loyalty Islands, and New Caledonia around the mid to late second millennium BCE and thereafter West Polynesia (Fiji, Tonga, Samoa) in the late second millennium and early first millennium BCE.

Lapita pottery comes in a wide variety of forms, such as jars, bows, stands, and globular pots with outturned rims. Incised designs often occur. The pottery was made without wheels, using a paddle and anvil technique. Because there is no evidence of pottery kilns, it is thought that the vessels were probably fired in open air blazes, often leading to incomplete oxidization. The designs could be in imitation of tattoo motifs (or vice versa), often including representations of human faces. (Tattooing needles have been found in Lapita sites.) These decorated vessels were likely non-utilitarian ritual and prestige objects; practical everyday use was probably restricted to plainware vessels. The faces could well be associated with ancestor cults. Few Lapita skeletons have been found, but in 2004, in Vanuatu, archaeologists found 13 headless examples, one of which was buried with three skulls. The absence of the heads is likely associated with a form of ancestor worship involving the

reverence of the departed's skull. To extend this tradition to the decorative arts is but a small stretch.

The most highly decorated vessels appear in the earliest sites, such as those in the Bismarcks. There was an increasing trend toward simplification as the centuries passed, and the decorations gradually vanished from pottery in West Polynesia not long after colonization. This suggests a change in the sociopolitical structure in West Polynesia, while in Melanesia the tradition lived on for centuries after. Archaeology has increasingly revealed that these islands and archipelagoes were exchanging pottery, obsidian, chert, stone tools, oven stones, ornaments, and other necessary materials, over hundreds of kilometers, for centuries. Chemical analysis of the pottery and obsidian furnish empirical evidence for long-distance exchange. This exchange in materials gradually dwindled over time, as island populations became increasingly self-sufficient, something that would occur in West and East Polynesia as well.

The Lapita people were above all seafarers whose sailing and navigational skills were unprecedented for the region, and the two to three centuries it took them to move the 4500-kilometer distance from the Bismarcks to West Polynesia is a blink of the eye in archaeological terms. The reason for these rapid colonization events is a matter of speculation, for given the necessarily small populations of Lapita people at that time and the sufficient size of the islands they were colonizing, factors such as population pressure are simply not enough to explain these adventurous voyages of intentional settlement. Among several factors, the sociopolitical system probably was a very large factor, yet this was a phenomenon that we will see again in the colonization of East Polynesia.

The Lapita people's colonization voyages were well-stocked with all the necessities that such ventures required. The Polynesians colonized their islands with a very specific cultigen inventory, which was for the most part derived from Southeast Asia. This inventory consisted of five main groups of starch staples: aroids, yams, bananas, and breadfruit, in addition to other foods such as the Tahitian chestnut and others that originated in Melanesia and were picked up during the Austronesian expansion. They also brought with them the domesticated pig, dog, and chicken, and perhaps the stowaway rat.

The Pacific islands in their natural state contained no edible plants, consisting of forested and, for human purposes, useless, land. The only sources of terrestrial protein were birds and, in some cases, reptiles. Consequentially, the Lapita people, and their Polynesian descendants after them, practiced what archaeologists call the "transported landscape." Essentially they recreated the environments they came from, which they had also transformed. We may postulate that one of their first actions upon settling an island was to burn the existing vegetation to make room for swidden agriculture, horticulture, and arboriculture.

The consequences upon the natural environments were sudden and irreversible. Indigenous and endemic species

of plants were forced to compete, mostly unsuccessfully, with introduced ones. The establishment of agricultural systems also required deforestation. The universal practice of shifting, or slash-and-burn, cultivation had an especially profound impact. As tracts of land were set fire for planting dry land crops such as yams and sweet potato, the relatively thin soils on the hill slopes became denuded of their natural forest cover, thus exposing them to accelerated erosion. After prolonged periods of repeated burning, which could grow out of control, little other than pyrophytic *Dicranopteris* ferns and *Miscanthus* grass were able to grow on the hillsides. This had the overall effect of reducing the total amount of an island's arable land. At the same time, however, as soils washed off the hill slopes, they eventually accumulated on the valley floors and enriched them, making them ideal for wetland taro cultivation. As a population expanded and more land was cleared, the processes of deforestation, erosion, and sedimentation fed upon themselves. Small islands with low elevations were especially vulnerable to advanced deforestation.

Landscape modification also combined with human and animal predation to severely affect native species. The archaeological record has revealed that numerous land and sea bird species went extinct or were extirpated from a variety of islands. Human predation and habitat destruction were probably the two principal factors that led to these events. Recent studies have demonstrated that these extinction events were extremely rapid, occurring within around 200 years. This is significant in terms of correlating initial colonization to the earliest archaeologically visible sites. This trend, like others of island colonization, continued throughout the settlement of West and East Polynesia.

The Lapita people constructed sizable coastal settlements, often consisting of up to 30 to 40 family groups, forming small villages. These settlements were sometimes on stilted platforms over shallow waters. They thus had access to the sea and to their inland gardens, crop fields, and orchards. Although there is no evidence for irrigation, wetland crops such as taro could have easily flourished in naturally occurring swampland. Fish was the main source of protein, as it would be for their Polynesian descendants, with the domesticated animals being increasingly relegated to high-status individuals. Being near reefs was essential, as inshore fishing practices are confirmed by the faunal record of fishbone. They subsisted primarily on inshore, reef-dwelling species such as parrotfish, and less upon benthic or deep-dwelling fish such as groupers, and even less upon pelagic or open-sea species such as tuna. Shellfish were also an important part of the diet. Fishing gear included shell fishhooks and trolling lures, but it is likely that net fishing (with nets made of plant fiber) was of great importance, although such perishable materials are only very rarely recovered in archaeological sites in humid, tropical environments (unless the sites are waterlogged and therefore anaerobic).

The sociopolitical organization of these Lapita societies was likely fairly simple, with households basically competing among one another for prestige through the accumulation of such things as valuable exchange goods. Linguistic evidence provides the reconstruction of basic terms such as *chief*, *mana* (power, good grace with the gods and ancestral spirits), and *tapu* (taboo, forbidden), concepts that became widespread in later Polynesian society. Social relations are nearly impossible to deduce from the archaeological evidence alone, so linguistics is relied upon to gain whatever insight is possible. These were not, however, what we refer to as the chiefdoms that would later arise in West and East Polynesia. With the settlement of West Polynesia, numerous changes began to occur, both sociopolitical and technological, and the Polynesians effectively became what we call Polynesians there.

The Settlement of West Polynesia

West Polynesia comprises the archipelagos of Fiji, Samoa, and Tonga as well as the smaller islands of Futuna, 'Uvea, Niuaotupapu, and Tokelau. When the last of the Lapita people colonized West Polynesia in the late second millennium and early first millennium BCE, significant changes began to take place, and the unique Polynesian culture emerged as an entity unto itself. This conception of the time of the emergence of a unique Polynesian culture is fairly recent; it took hold after archaeological excavations in West Polynesia in the 1950s and 1960s, prior to which many scholars believed that the Polynesian culture emerged more or less “whole” from Asia. However, it is important to keep in mind that this viewpoint preceded the discovery of the Lapita people.

Geographically, Fiji, being the westernmost archipelago in West Polynesia, was probably the first to be settled, followed by the Lau Islands, then Tonga and Samoa, including the smaller, more isolated islands in the region. Again, we see a very rapid colonization event of significantly sizeable islands within a couple of centuries, a phenomenon that was a direct continuation of the earlier Lapita migrations. Once again, there is evidence for interaction networks between these archipelagos in the early phases of occupation, as they were exchanging pottery, chert, basalt adzes, and perishable materials as well as marriage partners and other things that cannot be recovered archaeologically. While artifacts such as fishhooks and ornaments remained consistent with the earlier Lapita examples, new distinct adze forms developed. Once again these interaction spheres gradually diminished over the centuries following colonization, as the islands became increasingly self-sufficient, although contact between them was never entirely broken off.

Again, it must be noted that the finely decorated dentate-stamped and incised Lapita ware was gradually replaced by plainware utilitarian vessels. It was during these centuries

that what we call “ancestral Polynesian” culture emerged. We can thus say that West Polynesia was in fact the Polynesian homeland that earlier scholars assumed was to be found in Asia or even South America. The name “Hawaiki,” later used by East Polynesians to describe where they ultimately came from, most likely refers to West Polynesia, in which the unique ancestral Polynesian society developed. The lexically reconstructed language that was spoken is referred to as proto-Polynesian.

Like their Lapita predecessors, the West Polynesians relied on horticulture, arboriculture, and swidden agriculture, and there is no evidence for irrigation canals for wetland taro. The transported landscape concept is equally applicable in West Polynesia as well, as they remade their islands to suit their needs. The accompanying devastation of endemic species of flora and fauna also occurred, and birds were hunted and their environment destroyed. The West Polynesians maintained essentially the same groups of crops as their Lapita ancestors, and their domesticated animals (pig, dog, chicken) as well. Again, fish and shellfish were the primary sources of protein. Social organization became more complex, as family groups formed that traced their descent from a common ancestor with a single male leader in charge of both secular and sacred matters, the predecessor to the later chief. Again, this evidence, which cannot be recovered archaeologically, is reconstructed linguistically through cognate terms found throughout West and East Polynesia.

The pottery sequence, so important to our knowledge of the Lapita people, went through three different phases, eventually, *perhaps*, disappearing altogether in the early first millennium CE throughout West Polynesia except for Fiji. We could explain the lack of pottery in East Polynesia as resulting from its dying out in the west, but this still does not explain why it apparently died out in West Polynesia. Technologically, its absence could be due to the use of earth ovens to cook food and the use of such things as coconuts and wood to make more durable vessels that could survive harsh conditions such as would have been the case in long-distance voyaging.

West Polynesian culture was (and is) distinct from East Polynesia's in numerous ways. We must keep in mind that, according to the most recent archaeological information, East Polynesia was not settled until around the late first millennium CE. The first and perhaps most mysterious difference is the total lack of pottery making in East Polynesia; only a handful of imported sherds have been found in the earliest strata of the earliest sites there. Morphologically, there is little continuation in the styles of ornaments and fishhooks. However, the fishhooks of East Polynesia were at first primarily made of pearl shell, which is far more abundant there than in West Polynesia and lends itself to the manufacture of a wide variety of forms. Adze types are also dissimilar to a certain degree, although certain aspects allow direct correlations. Simple manufacturing tools, such as shell fruit scrapers, stone flake tools

such as scrapers, and coral and sea urchin files for things such as fishhook manufacture, remain virtually identical in both West and East Polynesia.

Other differences between the two regions include reverence for only one major deity in West Polynesia as opposed to multiple deities in East Polynesia. Clearly these are not deduced from archaeology, but rather from linguistic and ethnographic studies. Another difference is in ceremonial architecture. Whereas the *marae* in East Polynesia was a constructed stone platform with varying degrees of elaboration and reserved for ceremonies, the *malae* of West Polynesia was simply an open-air area for public gatherings. We may deduce from this that, as the chiefdoms became increasingly more complex, so did the religious systems.

Aside from the obvious differentiation of languages that occurred, these are but a few examples of the differences, but they serve to suffice as a basic introduction. It is important to note that, to date, no site has been found in West Polynesia, which would presumably date from the late first millennium CE, that would serve as a direct link to the earliest sites in East Polynesia, leaving us with an important gap in the overall colonization sequence. We may now turn to the subsequent colonization of East Polynesia; followed by a discussion of the later development in both West and East Polynesia.

The Settlement of East Polynesia

East Polynesia was colonized, according to our best archaeological information to date, in the late first millennium and early second millennium CE. This leaves us with a mysterious gap of around 2,000 years between the Lapita colonization of West Polynesia and the West Polynesian colonization of East Polynesia. In the 1980s and 1990s, a “pause” debate was a serious concern in Polynesian archaeology. It revolved around the question of whether or not Lapita settlers, once having reached West Polynesia, abruptly stopped their eastern migration for approximately 2,000 years before they colonized East Polynesia. (That they had the sailing technology to do so is beyond doubt.) The “long pause” advocates maintained that the archaeological and linguistic evidence was overwhelmingly in favor of this pause. The “short pause” advocates acknowledged that while solid evidence might be missing, reason and theory suggested that no such significant pause could have logically occurred. They believed that it was only a matter of time before tangible proof surfaced that there was only a short pause, that is, that East Polynesian sites dating from the late first millennium BCE would eventually be discovered.

Pivotal to this controversy were the subsistence and exploitation strategies of the colonizers, which are differentially viewed by the two viewpoints. Long pause or late settlement advocates appealed to economic efficiency in

arguing that horticultural prominence, substantial landscape degradation, and perhaps a slower rate of population growth ought to follow, not precede, a colonization phase that emphasized pristine indigenous resources. Consequentially, early-phase sites (although likely not the very first) were expected to contain large deposits of animal remains, especially those of wild foods such as birds. Short pause or early settlement advocates believed that, in part, population growth caused the expansion of economic activities and that the greater abundance and variety of remains eventually moved archaeological evidence into visibility. The short pause chronologists emphasized the horticultural aspect of colonization, while the long pause advocates highlighted the hunting-gathering facet. The short pause school assumed that once a new island is colonized, the settlers will almost immediately begin to clear forest for horticulture. The long pause school, conversely, believed that new islands were settled primarily because they were rich, untapped sources of animal protein that would permit a leisurely existence for generations.

Archaeology, as of now, has still not yielded any evidence of East Polynesian settlement earlier than about 900 CE, so the question of why the eastern Lapita people stopped their migration in West Polynesia remains a mystery, although hypotheses abound. The differences in material culture between early East Polynesian sites and first-millennium CE West Polynesian sites are clearly recognizable, suggesting a period of change between the two regions that we have no archaeological links to at present. Now, most of the short pause advocates have yielded in the face of the increasing number of Archaic period (ca. 1000–1450 CE) East Polynesian sites, whose dates remain consistent, mainly grouping within the early second millennium CE. However, let us turn to what the facts themselves tell us.

Just as ethnographers in the early 20th century argued for an Asian homeland for the West Polynesian culture, they also suggested that a different East Polynesian homeland existed, from which the people emerged to settle every archipelago from New Zealand to Hawai'i to Easter Island. The first and most obvious candidate for this homeland was Tahiti, being the biggest island in central East Polynesia (meaning that this excludes New Zealand and Hawai'i). This model held sway for decades before serious archaeological work began to be done, first in the Marquesas in the late 1950s and 1960s. Prior to these excavations, the time depth of East Polynesia was thought to be only around a few centuries, and many believed that nothing of value could be unearthed by archaeology. When serious archaeological work began, radiocarbon dating of artifacts revealed many dates of origin that were as early as 100 BCE. However, radiocarbon dating was then in its infancy; now these sites have been redated and are known to be far younger, from the early first millennium CE.

However, the inaccurate early dating prompted archaeologists to turn their attention away from Tahiti and the

Societies to the Marquesas as a homeland, especially since some (imported) sherds of plainware pottery had been found in the earliest deposits. Now, however, with the excavation of many more Archaic period sites throughout East Polynesia, we see a very different pattern emerge: The dates from one end of East Polynesia to the other all fall within the early first millennium CE, indicating that, like the colonization of West Polynesia, the colonization of this vast region was accomplished with almost unbelievable speed. In addition, the Archaic artifact assemblages are virtually identical throughout East Polynesia at that time. Consequentially, archaeologists have now turned away from the concept of a single archipelago as an East Polynesian homeland to a model of a regional homeland, composed of interaction networks much like those that existed during the early phases of Lapita colonization of West Polynesia.

Central to the idea of a regional homeland is the fact that important resources are unevenly distributed from island to island throughout East Polynesia. Two of the most important raw materials are fine-grained basalt for adze making and pearl shell for fishhook manufacture. Islands that did not have one or the other may have had to import it from an island that did. Following the colonization of an island, multiple trips back to the home island or to neighboring ones might have been necessary to supply the new population. Geochemical fluorescence analysis of volcanic basalt has traced adzes to geological sources hundreds of kilometers from where they were found. Most of these tools are found in Archaic period deposits, indicating that communication did take place until about 1450 CE, after which evidence of imported artifacts gradually diminishes.

Afterward, by the time of European contact in the late 18th century, long-distance voyaging had virtually vanished from most of East Polynesia; only the resource-poor (especially because they are without basalt) atolls of the Tuamotus maintained trade out of necessity. Again, we have seen this decline in interaction in the Lapita sequence and the West Polynesian one as well. Postulated reasons for the decline in interaction include increasing self-sufficiency and therefore the economic impracticality of building and outfitting canoes for long-distance voyages; climatic change; resource depletion, especially of timber; and sociopolitical change. Some islands had lost all touch with others, even their nearest neighbors, and may have given up the construction of voyaging canoes altogether.

This regional homeland model has important implications for how researchers now view the initial colonization process and has also changed how archaeologists now view artifacts associated with Archaic deposits (pre-1450 CE). The number of shared characteristics can be attributed to the exchange and diffusion of ideas and technology in the centuries following colonization, when long-distance interaction was taking place, rather than simple diffusion from a single homeland. As archaeological work progressed in the decades after the 1950s and

more early sites were studied, the regional homeland model developed. This view suggests that the archipelagos of East Polynesia were colonized very rapidly, almost simultaneously (confirmed by radiocarbon dates), and then maintained a degree of contact among themselves for some centuries after, for trade and other reasons. During this period of interaction, the sharing of ideas allowed for the development of a uniquely East Polynesian culture throughout the archipelagos.

The way researchers have regarded long-distance voyaging has contributed a great deal to these changing models of colonization. For much of the 20th century, it was thought that voyaging was a very difficult and dangerous endeavor. Indeed, some researchers believed that the islands must have been settled accidentally. Beginning in the 1970s, however, experimental voyaging demonstrated that two-way journeys were completely possible even between the farthest islands of East Polynesia. Voyages were certainly long and required a well-equipped canoe, a skilled crew, and expert navigators, but they were manageable and perhaps not quite as hazardous as previously thought. In addition, studies using computer simulations that took numerous factors into account, such as distance, sailing difficulty, and wind direction, have launched hundreds of “voyages” between islands in order to calculate success rates. The statistics of safe arrivals are high enough to suggest that intentional voyaging might have been a very active element in the colonization of East Polynesia. Two-way voyages would have allowed colonizers to make return journeys home for supplies, marriage partners, and to meet other needs, and only rarely could an island have been so cut off as to remain in abject isolation.

One of the great feats of East Polynesian voyaging was the reaching of South America, proven by the fact that the sweet potato, which originated there, was taken back by the Polynesians and spread throughout Polynesia to the farthest corners, including Hawai'i and New Zealand, the latter of which emphasized its cultivation over all other staples. Despite two-way voyaging, however, some islands and archipelagos remained in relative isolation, namely Hawai'i, Easter Island, and New Zealand, the three corners of the Polynesian Triangle. Not all the introduced animal species, namely the pig, dog, and chicken, made it to these marginal areas, perhaps because of the impracticality of return voyaging. The pig and chicken were absent in New Zealand, and the pig and the dog were absent in Easter Island.

Early East Polynesia: The Archaic Period (ca. 1000–1450 CE)

The Archaic East Polynesian artifact assemblage is quite unique and lacks immediate parallels in the West Polynesian material culture of the mid-first millennium CE. We are therefore probably missing the hypothetical “first landfall” sites that would ideally contain typical West

Polynesian artifacts and perhaps pottery. As Archaic East Polynesian material culture is already distinct from its West Polynesian ancestor, it can be inferred that this culture had some time to develop on its own. Therefore the Archaic represents an early period in East Polynesian prehistory, but not the earliest, suggesting a period of time, perhaps of around one to two centuries, in which the culture was developing its own distinctive style. Diagnostic artifacts include perforated tooth pendants (whale, human, dog, seal, porpoise) that were strung together to form necklaces and bracelets, bone reel units that could be combined with tooth pendants to form a necklace, pearl shell pendants, tattooing needles, coconut graters, a variety of one-piece pearl shell fishhooks, pearl shell harpoon tips, and a wide array of adze types.

However, West Polynesia lacks abundant pearl shell; one-piece fishhooks of this material are exceedingly rare, and those that have been found may have been imported. Most West Polynesian fishhooks were made of turban shell, which is far more brittle than pearl shell and lends itself to the manufacture of only a very few forms. Ornaments of the Archaic East Polynesian type are also unknown in West Polynesia. Other items common, but not restricted, to Archaic assemblages are shell chisels, files and abraders of sea urchin spine and coral, and octopus lures made from cowrie shells, which are not unique to East Polynesia. The few sherds of pottery that have been found in East Polynesia come from Archaic strata and probably represent imports. The Archaic kit occurs with little variation throughout East Polynesia. Habitation sites appear often to have had round-ended huts, and there was no distinctive religious architecture. This is not surprising, since, as noted above, in West Polynesia the open-air *malae* have little or no resemblance to the ceremonial structures of the later, post-Archaic period, East Polynesian *marae*.

The colonists of East Polynesia also brought with them the social framework that had developed subsequent to the Lapita colonization of West Polynesia. The social classes in ancestral Polynesian society (the chief, the warrior, the expert/craftsman/specialist, and the sea expert/navigator) continued to exist in East Polynesia. The following short discussion applies to sociopolitical developments in both West and East Polynesia.

With the settlement of the East Polynesian islands, what was probably once a largely egalitarian society began to change in response to varying environmental and social conditions. By the time that European contact occurred in the late 18th century, significant linguistic and sociopolitical variation had taken place from region to region. The number of classes or ranks differed greatly between chiefdoms, from two at the lowest extreme (basically chiefs and nonchiefs) to many gradations of chiefly and nonchiefly status with very specific rights and privileges relegated to each. The processes that led to such cultural differentiation were fundamentally bound up in the ongoing dialectic between human society and the island environments. Both

social and environmental factors, among others we can only hypothesize about, caused such changes to occur. For example, chieftainship was an ascribed, inherited office that carried both sacred and secular power. The dialectic between achieved and ascribed status was a crucial element of the Polynesian sociopolitical system. Although the chief was so by birthright, other social classes, namely warriors and priests, were a source of competition for power. People born outside the chiefly class were thus able to escape the confines of the class system and actually compete with the chief himself. Ecological factors also played an important part in the differential development of island chiefdom. In the late 18th century, highly stratified societies were found on large, productive islands (Tahiti, Hawai'i, Tonga), whereas far more egalitarian ones were found in impoverished environments such as the Tuamotu atolls. Middle-range societies existed where conditions that can be described as marginal existed, where land was circumscribed and natural disasters such as drought were a threat to the society.

The Later Periods of West and East Polynesia

We can now turn to the developments that occurred in West and East Polynesia up until European contact in the late 19th century, when their traditional societies came to an abrupt end. In addition to archaeological evidence, we also possess invaluable ethnographic accounts, which mariners and missionaries wrote during their sojourns in the islands. If the long pause debate is a mystery in and of itself, so are the facts surrounding the first millennium CE in West Polynesia. The paucity of sites that date from that period contributes to the gap in our knowledge, both of that era of West Polynesia and of how it impacted the subsequent colonization of East Polynesia. One of the few facts (unless proven otherwise in the future) is the disappearance of pottery (except for in Fiji), as mentioned above. Changes in the adze kit might also have developed, but on the whole, in archaeological terms, not much else seems to have changed, although certainly the sociopolitical systems evolved, the chiefdoms became more complex, and the languages continued to differentiate. In terms of complexity, Tonga surpassed both Samoa and Fiji. As populations grew, agricultural intensification did also, although which caused which is academic. Systems of irrigated pond-field agriculture contributed to the efflorescence of wetland taro. Far more is known about the period after the first millennium CE and before European contact. The most visible change is the development of monumental architecture in East Polynesia.

Forming a relatively tightly knit group of archipelagoes and islands, contact was maintained throughout West Polynesia throughout the second millennium CE, which is well documented archaeologically and ethnohistorically.

As we shall see again in East Polynesia, West Polynesian population centers drifted away from the coast and moved inland where their crops were. Stone house platforms compose much of the visible archaeological landscape. The *malae*, or ceremonial and public gathering places, were marked by stone walls.

In the latter part of the second millennium CE, Tonga, the most complex of the West Polynesian chiefdoms, went on to conquer and annex several small surrounding islands. Reflecting its great power, Tonga featured large burial mounds for the upper classes; these mounds were covered with cut and dressed limestone slabs. James Cook and his crew were eyewitnesses to a ceremony of offerings presented to the mounds of former great chiefs, called Tu'i Tonga. In Samoa, unique star-shaped mounds were used for chiefly and religious functions, as were mounds of less elaborate shapes. The development of fortifications in Fiji, Tonga, and Samoa strongly suggests increased warfare as settlements and valleys became increasingly competitive.

Fiji (also considered part of Melanesia), like its Lapita ancestors, continued its pottery tradition, which also became increasingly simplified, becoming mostly plainware. This reflects that some degree of contact was maintained with Melanesian islands such as Vanuatu, whose obsidian is found in Fijian archaeological sites from that period, is certain, as is its contact with its West Polynesian neighbors, Tonga and Samoa, where artifacts of Fijian origin have been found. Fiji possessed both lowland raised fortified settlements surrounded by ditches and more extensive hilltop terraced ones, both designed to protect valuable cropland, such as irrigated terraced taro plantations. Fiji is, more than any other island group in Polynesia, known for its cannibalistic practices, documented both archaeologically and ethnohistorically.

The Later period (post-1450 CE) of East Polynesia, often referred to as the Classic period (ca. 17th to early 19th centuries CE), emerged as the endpoint of centuries of adaptation to divergent environments and the sociopolitical development that ensued. Many changes accompanied this transition from the Archaic period. As interisland and interarchipelago voyaging lessened after around 1450 CE, languages differentiated at a greater pace, and islands developed along more individual lines. Overall East Polynesian trends do occur, however. These include a demographic shift away from the coast and into the valleys, the efflorescence of monumental architecture, and a reduction in the variety of forms of utilitarian items, most notably fishhooks and adzes. As in West Polynesia, while agriculture intensified and populations grew, habitation shifted away from the coast, becoming more and more concentrated in the backs of valleys near the crops. It is also likely that during this time, intervalley competition over resources intensified, making the coastal habitation more dangerous due to the possibility of raids from the sea.

Competition was evident not only in increased warfare but also in the monumental architecture of the era. This

correlated directly to the ability of chiefs to command the surplus necessary to mobilize a labor force. All reliable radiocarbon samples from *marae* in the Societies date to within the last centuries prior to European contact. Ceremonial architecture such as the *marae* of the Societies, Cooks, Australs, and Marquesas and the *heiau* of Hawai'i were built during this period. This monumental architecture developed in a context of competitive, possibly hostile interaction. Some of these structures were directly related to conflict, dedicated to gods of war. Furthermore, the fortified settlements of New Zealand and Rapa Nui were also constructed during the Classic period.

Another trend is apparent in the material culture of the Classic period, which changed distinctly from its Archaic predecessor. Variety among utilitarian objects such as fishhooks and adzes decreased dramatically, some changing entirely while some forms remained the same. Archipelagoes increasingly favored fewer adze and fishhook forms. These changes in adze form may also be linked to different lifestyles; perhaps prominent Archaic forms were designed largely for canoe-making, while later forms were made for tree chopping to clear land. These changes in the tool kit agree well with the overall environmental and social trends here explored and merit further attention.

In addition, pearl shell was used less and less as a material for making utilitarian items (fishhooks, coconut scrapers, tattoo needles), presumably because it was harder to obtain. Instead, where it was not abundant, it tended to be restricted to ornamental use. Local substitute materials became preferable for manufacturing fishhooks, such as turban shell or bone. In terms of morphology, small jabbing hooks, most suitable for inshore fishing, become predominant in Classic assemblages; such hooks are comparatively less prominent in Archaic ones. This decision regarding fishhook styles appears to have been linked to an emphasis on inshore fishing, which can be correlated with the diminished use of canoes and, consequentially, diminished long-distance voyaging that characterized the Archaic period.

The Endpoint Culture, European Contact, and Evangelization

The first Europeans to happen upon Polynesia were the Spanish in 1595 under the command of Alvaro de Mendaña de Nehra. Further European discoveries, such as that of Easter Island, were made in the 17th century, but the majority were made in the 18th. These renowned voyages of Pacific exploration will forever be associated with the names of such famous navigators as Louis de Bougainville, James Cook, George Vancouver, and Jean-Francois de Galaup, Comte de La Pérouse. The great age of European exploration involved tremendous feats of navigational skill (albeit with the use of sophisticated instruments that the Polynesians never had), with the voyages taking years to

complete as the islands were charted and mapped. It is due to the meticulous journals of men such as Cook that we possess much of ethnohistoric information that we do.

Trade between the Europeans and the Polynesians began simply, with metal objects such as nails (which could be fashioned into fishhooks) being prized, as well as trade beads, pipes, glass, and other exotic things. In return, ships would acquire fresh meat, fruit, and water. Unfortunately, European contact brought European diseases, such as influenza and venereal diseases, which had decimated the local populations by the end of the 19th century. As a result of these diseases, an island that might previously have had a population estimated at around 3,000 would have only 200 or 300 inhabitants afterward. Fortunately, the populations have grown back substantially in the past 100 years, although probably not to the extent of the prehistoric ones.

While American and European economic interests such as whaling depended upon many of the Polynesian islands for resupplying, the missionaries of all Christian religions accompanied them for other purposes. Catholics, Protestants, and Mormons were the first to arrive, and further sects and branches followed closely behind. Conversion was a different process from one area to another. Hawai'i's paramount chief, later known as King Kamehameha, embraced Christianity in the late 18th century so that he could acquire Western arms and ships in order to conquer the entire archipelago. On the other hand, residents of the Marquesas, which had a far less stratified chiefdom, clung tenaciously to their traditional religion and independence from France until well into the 19th century. Evangelization of course marked an end to the traditional religions and imposed many restrictions on dress, marriage, sexual relationships, and so forth. However, it is thanks to some of these missionaries, such as William Ellis, that we have detailed ethnohistoric accounts of traditional life and dictionaries and word lists of languages that are no longer spoken as they were in their pristine condition. These help greatly to fill in the gaps in the archaeological record and flesh out what we know about prehistoric life.

What the Europeans witnessed from one point of the Polynesian Triangle to the others were societies with very similar social structures and languages. For over a century, hypotheses abounded as to how these islands, separated by vast stretches of empty ocean, could exist with such homogeneity; the most extravagant of these proposed that the islands were mountains, once part of a giant continent that subsided beneath the ocean, leaving the peaks in isolation. The social structure, as stated above, ranged between two extremes. At one end were the highly stratified chiefdoms such as those on Hawai'i, Tahiti, and Tonga, with high chiefs and numerous levels of subordinate chiefs, and commoners forming the greater part of the population. These high chiefs were considered semidivine, and they fought amongst themselves for absolute power. At the

other end were the simplest societies, such as those on the Tuamotu atolls, where the chief acted more as a headman than an absolute ruler.

Two of the most important concepts to the Polynesian social system were *mana* and *tapu*, *mana* being a form of positive force that people and objects could possess depending on their success, and *tapu* (from which we derive the word *taboo*) being an absolute restriction on certain things. For example, a chief could place a *tapu* on eating pigs for a given period of time, or certain sacred areas could be *tapu* to certain of the lower social classes. *Tapu* foods, such as turtle, pig, and varieties of fish, were forbidden to all but members of the highest social orders, and these foods were forbidden to all women and children as well.

Religion was generally polytheistic, with priests and shamans often responsible for communication between the real and divine worlds. In the most stratified societies, the high chief would also take on the function of intermediary between people and gods and revered ancestors. Most of the population subsisted on farming individual family-managed (sometimes technically belonging to the chief) plots of land and fishing. The first fruits would typically be given to the chief as his hereditary due. Other classes, in existence since the time of ancestral Polynesian society, were specialists such as navigators, artists, performers, and toolmakers, whose labors would be paid for with food and other goods. Warfare was endemic practically everywhere in Polynesia. Sometimes it consisted of sportlike battles in which there would be few casualties, but at other times killing played a far more crucial role. Human sacrifice and cannibalism were probably universal, the latter being so secretive and restricted that few European accounts can be relied upon. Contrary to many popular depictions of the inhabitants as living in a state of half or complete nakedness, *tapa* (barkcloth) robes were often worn by both sexes. Children were given almost complete liberty and adoption was common (as it still is).

In sum, Polynesian islands were both very diverse and very homogenous, with a descent from a common ancestry. Societies that took centuries to develop were completely overturned by the clashing of worlds, and truly traditional Polynesian life had vanished forever by the late 19th century. Its remnants provided subjects for Western artists such as Paul Gauguin (who died in the Marquesas, his adopted home), and Herman Melville, whose novel *Typee* (a fictionalized account of his stay in *Taiipi* valley on Nuku Hiva in the Marquesas) launched his writing career and introduced the romance of Polynesia to the rest of the world.

Conclusion

Today, the islands and archipelagoes of West and East Polynesia are independent nations, self-governing states, or overseas territories. For example, in West Polynesia, Fiji

and Tonga are independent nations, as is half of Samoa, but the other half, American Samoa, is a U.S. territory. In East Polynesia, the Cook Islands are an independent nation in free association with New Zealand (also an independent nation). The rest of central East Polynesia (Tahiti, the Australs, the Tuamotus, and the Gambiers) is French Polynesia, an overseas territory of France; Easter Island is part of Chile; and Hawai'i is the 50th state in the United States of America.

These varying government systems have important implications for the economies of the different regions. French Polynesia, for example, no longer exports enough copra to support itself and depends mainly on tourism for income; the rest of the economy is supported by France. Also, the archipelagoes of French Polynesia have French as the primary language; whereas English is the primary language in the closely related but politically separate Cooks, as it is in West Polynesia, New Zealand, and Hawai'i, of course; while Spanish is the primary language on Easter Island. Most of the islands throughout Polynesia are no longer subsistence economies and depend largely on imported (and therefore expensive) goods and foods.

Fortunately, the implications of archaeological discoveries and long-distance voyaging are becoming increasingly relevant to Polynesians in the modern world. Experimental voyages have helped to restore a tremendous sense of cultural pride among Polynesians from all over West and East Polynesia. These voyages have shown that such undertakings were feats of tremendous skill and bravery. Importantly, they have managed to traverse the modern political boundaries that separate East Polynesians from one another. For example, while the closely related Cooks and Australs compose the same archipelago (the Cook-Austral chain) they currently represent the interests of two different nations, and yet it is becoming increasingly clear to the Polynesians who live there that such boundaries are entirely artificial. In the past, they faced and surmounted considerable difficulties by working together to colonize untouched islands, remake them, and then help each other in the precarious centuries following landfall. These accomplishments are equally applicable to future issues, when today's overseas territories may well become tomorrow's independent nations that will no longer be able to rely on welfare. Fortunately, this sense of cultural pride through the revival of tradition has already taken root in many areas.

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PART XIII

SOCIAL BEHAVIOR

SOCIAL RELATIONSHIPS

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This chapter describes the importance of support systems such as family, friends, communities, and religious groups. Such support systems form the core of an individual's social network. Anthropologists are interested in these relationships and how information flows through networks. Along with this, we will describe the history and major current uses of social network analysis (SNA) in anthropological research, as well as introduce common barriers to the effective use of SNA. These obstacles include ethical and power issues that come into play with some forms of SNA research. We conclude with a discussion of diverse anthropological case studies that used SNA methodology, pulling from the diverse contexts of nonprofit organizations, business, early childhood development, medical anthropology, and even primatology.

Social relationships form between two or more people through interactions. It is these complex, and often symbolic, interactions with other people that make us distinctly human. The entire discipline of anthropology is concerned with social relationships of some sort. To give a description of how linguists, cultural anthropologists, biological anthropologists, and archaeologists study social relationships is a daunting and formidable task. However, SNA is proving to be a powerful methodology for many anthropologists, as well as diverse groups of other social scientists.

SNA is one of many methodologies used to study and analyze groups of people, be they individuals, organizations,

communities, or even countries. This methodology analyzes whether a relationship exists between these units, called *nodes*, and places a value on that relationship. SNA is not a new technique and has been in use since the early 1930s. However, its usage has increased over the past 20 years as a valuable tool for anthropologists, economists, sociologists, planners, program evaluators, and those in the corporate world, among other researchers. Social network analysis is particularly well suited for understanding complex systems and relationships, as it depicts systemic elements and their interactions to form a complex whole. By identifying the individuals interconnected, a researcher can also identify leaders or those developing as leaders. It is for this reason that SNA has become so valuable in the business world.

Social networks are formed in society through contacts in many aspects of daily life. While most people think of a social network as a collection of people that they know socially, it is more than just personal friendships and connections. Social networks include the people we know professionally—through work, school, and volunteerism. This extends to the people that our friends and relatives know as well. Such networks can be studied from the perspective of identification of the network, effectiveness, and meaning.

Social network analysis research focuses on two types of social networks: *sociocentric* and *egocentric* networks. Sociocentric networks aim to depict the relationships among members of an entire group. Anthropologists may

use this form of analysis to study clubs, classrooms, or entire villages. The purpose of sociocentric network analysis is to understand the structure of the group and how it relates to individual or group behavior or perceptions. Egocentric networks consist of the relationships of an individual. The respondent, called *ego*, names the people he knows and the social network is mapped out. Egocentric data enable the researcher to study social support networks, the relationship between disease and certain help-seeking behaviors, and many other interpersonal interactions (Gravlee & Kennedy, 2002).

A factor aiding the popularity of the SNA methodology is the availability of computer software that helps create *sociograms* to facilitate analysis. A sociogram is a visual display of the individuals (nodes) and their connections. These connections encompass a wide range of relationships, such as communication ties, formal ties, kinship ties, and proximity ties. These ties are visually distinguished from each other, and the length of the ties indicates the social distance between individuals. The most popular SNA software is UCINET because it is continually updated and provides many forms of data manipulation and network methods and tools. Additionally, this software is robust and capable of handling large amounts of data for numerous individuals, such as for sociocentric analyses. Other network data analysis software programs include Egonet, NetMiner, STRUCTURE, NetDraw, FATCAT, JUNG, and StOCENET.

The anthropological use of SNA can be viewed in direct contrast to traditional anthropological research. Instead of the key informant, individual-centered ethnography, SNA assumes that all actors are linked in an intricate latticework of social relationships, affecting their worldview and influencing their behaviors. Understanding these relationships at a deeper level delves into the realm of sociology and social psychology in terms of viewing people as groups of social beings. Anthropologists are becoming more concerned with understanding structural relations because they are often more valuable in describing behaviors than demographic characteristics like age, sex, and religious beliefs. People's social relationships vary widely depending on the circumstances of the different environments in which they interact; people have an ability to "status shift." That someone can be a quiet individual at work and an outspoken member of his or her community gives testimony to the fact that these relationships cannot be explained by demographics, since that individual retains those demographic characteristics regardless of the social context. Anthropologists are still conducting traditional ethnographies and engaging in SNA, which adds to the breadth of the discipline.

History of Social-Network Analysis

Long before the term *social network analysis* was coined, there were examples of its use. This begins with Lewis Henry Morgan's analysis of kinship of the Iroquois. In the

mid-19th century, Morgan's *League of the Iroquois* (1851) detailed and diagramed kinship of the six nations that composed the Iroquois Federation. In fact, many early anthropologists recognized the importance of kinship in the societies that they were studying. Anthropologists then began to study kinship extensively and use diagrams to represent relationships. However, SNA is not an exclusive tool of anthropologists and can be found in use in many disciplines including sociology, psychology, mathematics, information technology, business, political science, and the medical field.

Formal social-network studies were developed in two social science fields independently of one another. Psychotherapist Jacob L. Moreno is credited with developing sociometry around 1932, a quantitative method for measuring social relationships, and the sociogram, the tool for representing these relationships. At this time, sociometry was used by psychologists and consisted of investigating who was friends with whom in order to explore how these relationships served as limitations and/or opportunities for action and for their psychological behavior (Scott, 2000). Although social scientists had spoken of *webs* or *networks* of people, it was Moreno's invention to use spatial geometry to graphically represent these relationships in a sociogram. People were "points" and relationships were "lines" and people were placed closer together or farther apart based on the strength of their relationship. This makes it immediately apparent upon viewing a sociogram who the individuals were and how they were related. Moreno's gestalt orientation toward psychotherapy led him to investigate how mental health is related to the social networks to which people belong.

Moreno recognized its utility in identifying well-connected people and how information flowed through a group. He coined the term *sociometric star* to refer to the important leaders that were able to influence many others in the network. In Figure 74.1, the sociometric star is the friend choice of everyone in the network, yet individual A only chooses two individuals as friends.

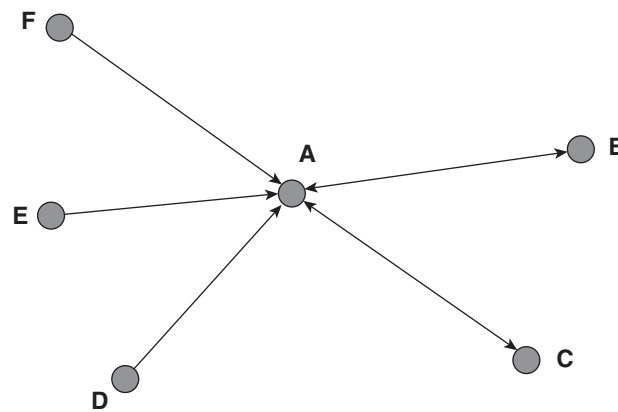


Figure 74.1 A Sociogram Depicting the Sociometric Star
SOURCE: Scott (2000).

Moreno also studied these microlevel personal interactions and SNA to infer the basis of large-scale *social aggregates*, which included interaction with the economy and the state (Moreno, 1934). Shortly thereafter, psychologist Kurt Lewin, pioneer of social psychology and action research, picked up on this study of group behavior as a series of interactions with the environment that could be studied mathematically using vector theory and typology in the mid-1930s. Lewin (1951) aimed to mathematically explore the interdependence between the group and the environment as a system of relations. Lewin's early work in SNA brought him close to what would later develop into systems theory. In 1953, Cartwright and Harary (1956) pioneered graph theory applications to group behavior that drew on Lewin's use of mathematical models for group behavior. Their use of SNA was also characterized by an important shift in thinking about group behavior. These models facilitated a shift in thinking of cognitive relationships existing in people's minds to the understanding of interpersonal balance in social groups. This allowed researchers to build models of the interdependence among the different individuals' views and attitudes in a group (Scott, 2000, p. 12).

Around the same time, anthropologists Alfred Radcliffe-Brown, Claude Lévi-Strauss, and also Émile Durkheim posited their views that the main purpose of social, or cultural, anthropology was to identify social structures and the formal relationships that connect them, and that this could be accomplished with discrete mathematics. They began investigating subgroups within social networks and ways to identify these subgroups from relational data. Another important development at this time was the way in which relational data was obtained. Social scientists began using anthropological observation methods to record and diagram the formal and informal relationships of people within networks.

In the 1950s, Manchester University's department of social anthropology began focusing not on group cohesion, but on group conflict and how social relationships affect not just the individuals involved, but the society as a whole (Scott, 2000, p. 26). This placed emphasis on not only the relationships, but also the nature of those relationships, a fundamental tenet of SNA. The Manchester anthropologists were unable to record their findings in the simplistic kinship diagrams of their field, and so turned to Radcliffe-Brown and others for the use of SNA. Anthropologist Harrison White, of Harvard University, is credited with further developing the mathematical and schematic nature of SNA in the 1960s and 1970s, which allowed notions like *social role* to be mapped and measured.

The development of SNA tells us much about how the different social science fields can use this methodology to achieve their goals. Although different researchers have different backgrounds and theoretical orientations, Scott (2000) states that SNA is especially valuable because it does not mandate a specific theoretical framework (p. 37).

SNA can be thought of as a series of methods instead of a theoretical orientation; however, all researchers engaging in SNA are attempting to reveal the structure of societies or social groups. SNA is well suited to uncover social structures, predict the emergence of leaders and relationships, and represent these relationships graphically.

Support Systems

The dynamic of the family creates a social network that uses the power of shared DNA and marriage as the basis of forming a support system through kinship. This system is further expanded through friendship, adoption, and godparenthood. In looking at the social network of kinship as a support system, clues are given by the terms used between members to describe their relationships, and by the frequency of contact between them. For example, an individual may consider the relationship with a cousin stronger than that with a cousin twice removed, regardless of any difference in the biological relationship. A survey of the members of a kinship group to determine the terms used and the frequency of contact between members can identify the support system within the larger context of the complete kinship group.

Support networks can also be found in neighborhoods, care facilities, education systems, and workplaces. Jacobson's (1987) work on the support systems found in elder care facilities looks at the meaning of social support as a framework for analyzing the network. A spontaneously organized breast cancer self-help group is the subject of study into how consensus is used to negotiate belief systems and knowledge (Mathews, 2000). The support network found in the agricultural society of Madagascar looks at how the network contributes to the economic system (Gezon, 2002).

Each of these studies examines very different types of support systems from various angles, showing good examples of the depth and breadth of the possibilities for finding support systems. The viewpoint of each of these studies shows the manner in which a network can be viewed, whether from the viewpoint of the families, as in the elder care facilities, or the members who formed the network, as in the self-help group. The final example of the economic system in Madagascar views the network from the viewpoint of those who are on the fringe of the network rather than the central members. This is much like a discussion involving kinship where determining who is ego is important to determine the relationships to that individual.

Current Trends in SNA

Popular uses of SNA extend to the creation of online communities such as MySpace, Facebook, LinkedIn, and Spoke as SNA gains popularity and momentum. Greatly

increased access to personal computers has expanded the available tools to more easily analyze and create networks. The current popularity of SNA among the public can be traced to the game “Six Degrees of Kevin Bacon.” This actor has appeared in such a wide variety of films throughout his career that it is possible to connect him to any other actor through the films that they have in common. For example, actress Sophie Marceau was in *The World Is Not Enough* with Pierce Brosnan, who was in *The Thomas Crown Affair* with Rene Russo, who was in *Major League* with Tom Berenger, who was in *Gettysburg* with Sam Elliott, who was in *Tombstone* with Bill Paxton, who was in *Apollo 13* with Kevin Bacon, for six degrees.

Other current trends in SNA are in researching organizational structure, nonprofits, and nongovernmental organizations (NGOs). Provan and Milward (2001) define a network as “a collection of programs and services that span a broad range of cooperating by legally autonomous organizations” (p. 417). They go further to point out that there are “network administrative organization(s)” that facilitate networking by the distribution of funds (p. 418). Examples of network administrative organizations include the United Way and Community Shares. Both of these organizations raise funds and subsequently distribute funds to nonprofit organizations. This often places them at the center of a network of nonprofit organizations.

Provan and Milward’s (2001) work examines the effectiveness of networks between organizations providing public services. They argue that “networks must be evaluated at three levels of analysis: community, network, and organization/participant levels” (p. 414). One point made by Provan and Milward is that the boundaries of a community in a discussion of community-based networks do not necessarily follow geographic boundaries (p. 416).

The discussion of nonprofit organizations in Europe is the basis of Fowler’s 1996 work. This discussion takes into consideration the larger network of “economic, political, social, ecological, and other systems” that NGOs are situated within (p. 60). It is important to understand that nonprofit organizations and NGOs do not create exclusionary networks. They operate within the context of governments, businesses, the general public, and the people they service. Fowler’s analysis shows these as a linear equation. However, the network of nonprofit organizations as shown by Lind (2002) shows that this network is not linear in that the participants and volunteers in many cases overlap to create less of a straight line and more of a circular configuration. It is this overlap that creates the basis for a power structure.

The “dramatic change in the division of responsibility between the state and the private sector for the delivery of public goods and services” (p. 1343) is the focus of Besley and Ghatak’s work (2001). They look at the arrangements between these entities and the need for analysis to discern who should be responsible for the delivery of public goods and services. Besley and Ghatak

go into a detailed mathematical model to determine the value of the investments made in the delivery of public goods and services. They explain as follows:

Any discussion of NGOs is further complicated by the fact that they have not only increased in number and taken on new functions, but they have also forged innovative and increasingly complex and wide-ranging formal and informal linkages with one another, with government agencies, with social movements, with international development agencies, with individual INGOs (international NGOs), and with transnational issue networks. (Besley & Ghatak, 2001, p. 441)

This is another acknowledgment of the network that exists between nonprofit organizations. Fisher (1997) makes a call in this paper for “detailed studies of what is happening in particular places or within specific organization[s]” (as cited in Besley & Ghatak, 2001, p. 441). One caution made by Fisher is that “NGOs are idealized as organizations through which people help others for reasons other than profit and politics” (as cited in Besley & Ghatak, 2001, p. 442). Something that benefits one person or group may have an adverse effect on another person or group.

Power Issues and Ethics

Riner’s (1981) look at the networks created by corporations describes the concept of membership on multiple boards, or connections through directors, as *interlocking*. Riner states, “Interlocking occurs when an individual serves simultaneously as a member of two or more of these boards. Directorate interlocking connects individual decision-making components in a global network which may be considered the core institution of fifth-level organization” (p. 167). The literature suggests that this interlocking is one of the levels, the fifth level, of networking that links organizations to each other by showing the links of key people—volunteers, staff, and board members—in both current and historical positions. Riner also discusses interlocking in relation to what was termed by Pratt in 1905 as a business senate that controls the United States (p. 168). This echoes C. Wright Mills’s (1999) assertion in *The Power Elite* that it is the power elite who are actually in control, rather than the elected government. Mills’s theory states, “They [the power elite] are in positions to make decisions having major consequences” (p. 4). Riner’s work defines and describes interlocking in reference to corporate boards. One of the case studies in the following section applies this concept to the boards of nonprofit organizations to establish the existence of a social network in Cincinnati.

Yeung’s (2005) work looks not at the network itself, but at the meaning of the relationship that forms the network; by looking at only the network without analyzing the meaning of the relationship, the cultural meaning of the relationship is lost (p. 391). Fisher (1997) quotes Milton Friedman as saying that “the power to do good is also the

power to do harm” (p. 442). Something that benefits one person or group may have an adverse effect on another person or group. It is clear that these aforementioned authors have done groundbreaking work on power and power networks. However, power can also be misrepresented in data collected for SNA. A number of research studies have investigated the respondent bias in egocentric analyses (see Romney & Weller, 1984) and have concluded that people often overestimate their centrality when they are asked to self-report their social networks (Johnson & Orbach, 2002, p. 298). Whether by intentional deceit or accidental oversight, researchers have found, people’s responses and their actual behaviors often have little overlap. Researchers also learned that an individual’s response accuracy depends on the frequency of the respondent’s interactions and the long-term behavior patterns the respondent had directly observed in the group. Johnson and Orbach have found that as individuals are more familiar with, and knowledgeable of, their networks, the smaller their “ego bias.” Studies have also concluded that self-reported power relationships may be biased based on the respondent’s centrality, social rank, and reputation in the group (Krackhardt, 1990).

Another danger that appears in SNA is the loss of subject anonymity. Despite the anthropologists’ attempts to conceal the names of their informants, the nature of a social network lends itself to the ability of anyone familiar with the network in question to identify the informants based on their reported connections. This becomes an issue especially in cases of applied anthropologists working in a corporate setting. Many times, corporations use SNA to study the structure and efficiency of their business. Employees may be required to participate in the study by their employer with the understanding that their responses will be kept confidential. However, many times the nature of the answers can be easily attributed to an individual or department. Further, the results of SNA can be used to determine policies that may affect jobs, hiring, and promotions.

Case Studies

Social-network studies are used by many professionals and appear in a wide variety of research journals and publications. This cross-cultural discipline continues to evolve as researchers share and borrow across their respective fields. The following case studies provide a brief glimpse into the ways anthropologists have used SNA methodology to study nonprofit organizations, business, health, kinship, and even primatology.

Nonprofit Social Networks

Anthropologists do not always study the individual, or egocentric networks. The diversity of the field of anthropology results in the ability of anthropologists to study

larger entities, such as organizations, institutions, and even networks of entire countries. In *The Seven Degrees of Cincinnati: Social Networks of Social Services*, Stambaugh (2008) diagrammed the structure of nonprofit organizations to show the connections created through key people: board members, employees, and volunteers. In this study, three groups were charted showing three distinct social-network structures. The first group, civic organizations located in the uptown area of Cincinnati, showed a distinct center of power based on the proportion of connections to other nonprofit organizations. The assumption of power was further confirmed from a financial angle by comparing the annual income of the civic organizations through publicly available tax returns. Additional evidence of the amount of power held by this organization was seen in the organizations it represented. The organization, the Uptown Consortium, was formed by an alliance of the five major employers in uptown, each of which is also a nonprofit organization.

Additional analysis of these organizations shows that they have connections to another 198 organizations through funding or shared real estate. The projects undertaken by the Uptown Consortium benefit the five organizations that formed it, rather than the communities in which they are located. This causes some tension between the community councils that represent each of the seven communities in uptown, and the Uptown Consortium. Essentially, this has created two separate and competing communities in uptown; the daytime community of commuting workers and the nighttime community of residents.

The second case study looks at the relationship between the Cincinnati City Council and the 51 community councils recognized throughout the city. There are 52 communities that make up Cincinnati, each with a distinct personality. What distinguishes this case study from the uptown example is the lack of connections of key people creating centralized power. This example has 23 community councils with connections to other nonprofit organizations, leaving 28 community councils with no apparent interlocks. Also, the nature of a community council requires that the members must live in the community, which precludes membership on more than one community council. With the exception of the community councils located in uptown, there appears to be little linking the community councils to each other apart from some secondary connections. This lack of connections diffuses the potential power of the community councils, leaving it with the city council.

The third case study looks at nonprofit youth organizations located in Cincinnati beginning with the Great Rivers Girl Scout Council and the Boy Scouts of America, where we would expect to find connections to other youth-based organizations. What is striking about this case as opposed to the uptown case is that the youth organizations do not appear to be connected to similar organizations. This creates a network that moves money into these two youth

organizations, but not to other youth-based organizations that could become the basis for a power network.

Social Networks in Business Anthropology

Using SNA in business anthropology tends to be more straightforward than other anthropological uses. In business and organizations, managers and senior leaders are concerned with networks and relationships that affect their employees' workflow. Usually, managers believe they understand such relationships, but they are often not aware of certain informal work relationships. Krackhardt and Hanson (1993) argue that it is these informal networks that have the greatest effect on workflow in organizations. The authors state that in an atmosphere of trust, managers can conduct SNA surveys and glean information on informal networks in their organizations. Generally, SNA questionnaires should address three different types of social networks in the workplace: (1) the advice network, (2) the trust network, and (3) the communication network (p. 105). People also have to feel safe that their responses to the surveys will not be disseminated widely to their colleagues and that they will not be penalized for their responses. If trust is there, then managers can collect SNA data, cross-check the responses for accuracy, and analyze the information statistically or with SNA software (p. 106).

Krackhardt and Hanson (1993) provide a case study that illustrates just how important it is to ask employees questions about all three networks: advice, trust, and communication. The authors conducted SNA for a computer company with a task force that was experiencing difficulty getting work done. The SNA diagram of advice indicated that the project leader was, in fact, the leader in giving work-related, technical advice. However, the trust SNA showed the project leader to be completely outside the network with only a single link indicating trust from one individual. It was clear from looking at these two SNA diagrams that no one on the team trusted the project leader, and this distrust was the main barrier for getting work done (pp. 106–107). Once this information is captured from SNA, it is imperative that managers know what to do with it. All too often, it is concluded that if an individual lies outside an SNA diagram, he or she is expendable. Since there are three types of social networks in business, and since all workers provide a valuable contribution to the organization with their experience, it is not always the case they these outliers need to be fired. The authors state that managers need to use this information to foster relationships between employees within the information networks that will enable them to make contributions to the company (p. 111). In fact, in the case study provided here, the CEO of the computer company chose an individual who was central to the trust SNA diagram to share responsibility with the current project leader. The two coleads were then able to complete the project and no one had to be removed from the project or fired altogether.

SNA has also been used extensively in various studies on the effect of leadership on team performance. Mehra, Smith, Dixon, and Robertson (2006) state that too much literature is devoted to the study of leadership styles and not enough is dedicated to studying group dynamics when teams consist of more than one leader. They reiterate the fact that many groups consist of informal leaders and these networks are best studied through SNA methodology because it is a relational approach allowing for multiple leaders within a group. SNA also models both vertical (i.e., between formal leader and subordinates) and lateral (among subordinates) leadership within a team.

Mehra et al. (2006) collected sociometric data from a sample of 28 field-based sales teams to investigate how the network structure of leadership perceptions by team members related to team satisfaction and performance (pp. 232–233). They collected extensive data from all members of the field teams, between 6 and 22 individuals, who were each headed by a single formal leader. Team members were given a roster of names from the whole team and asked to rate whom they perceived to be leaders on the team. The teams were then classified as either distributed, teams with more than one leader, or leader-centered teams, those consisting of a single leader. The authors report that distributed leadership does not necessarily lead to greater team performance unless the leaders see themselves and each other as leaders and team members work together. Their study divided the distributed leader networks into distributed-coordinated and distributed-fragmented and found that teams with a distributed-coordinated leadership network had significantly higher performance records than single-leader or distributed-fragmented leadership (p. 241).

Studies in marketing, business, and management are greatly benefiting from the increase in SNA studies in recent years. SNA has been able to shed light on formal and informal social networks, different leadership styles, and their effects on satisfaction and performance in the workplace. Many new research possibilities have been opened up by the important work of the small group of social scientists who use SNA for business studies.

SNA Studies of Childhood

Jeffrey Johnson and Marsha Ironsmith (1994) and colleagues (Johnson et al., 1997) have used SNA to study children and childhood. In 1994, Johnson and Ironsmith provided a literature review on the utility of sociometric studies with children. The literature focuses on the development of peer groups, as well as the child's place within one, to understand behaviors associated with the peer group and to identify children at risk for social rejection (1994, p. 36). Social rejection in childhood is often later associated with delinquency, mental illness, and poor academic achievement (Roff, Sells, & Golden, 1972; Wentzel & Asher, 1995).

Johnson and Ironsmith's (1994) work describes issues of reliability, validity, and analyzing group structure and

networks over time when utilizing SNA with children. The authors argue that previous sociometric studies with children were largely inadequate because they ignored group structure. Johnson and Ironsmith state that SNA provides a unique opportunity to study the complex social structures and development of young children. SNA has also allowed researchers to identify the influence of cliques and subgroups on the acceptance or rejection of children in their social networks (p. 45). Additionally, Johnson and Ironsmith argue that SNA is useful for measuring changes in the social structure over time.

Johnson et al. (1997) conducted a study with 65 children in a child care center over the course of 3 years. Their methods included sociometric interviews and behavioral observations of the 3- and 4-year-old children. The authors trained the preschool children to use a 3-point "happy face Likert scale" where they were asked how much they like to play with each of the other children. The researchers then read the children a story or gave a short analogies test in order to minimize the chance that the children would discuss the interview with the others. The authors further controlled the validity and reliability of their study by utilizing undergraduate research assistants who were unaware of the hypotheses being tested to conduct the observations. This study found that as children get older, their play preferences are more likely to match their social interactions (p. 402). Johnson et al. also concluded that three of the four cohorts studied had a close correspondence between the results of the interviews and the behavioral observations. Last, the researchers argued that by age 4, the children had stable, organized social networks. Because of this, age 3 is stated to be the ideal time for interventions to minimize the negative effects of social rejection.

Social Networks in Medical Anthropology

Medical anthropologists can use SNA in a variety of ways, such as to evaluate how change happens, to understand why knowledge or meaning is created and its flow (Introcaso, 2005, p. 95), and the key individuals in the complex webs of communities. It is known in psychological, medical, and some SNA research that people are healthier when they experience social relationships with others. It is not just mental health that is better when individuals are connected to others; social support networks improve people's general health. People encourage each other to engage in preventative health behaviors and provide support for each other when they are ill. In fact, studies have shown that individuals without many social relationships had a death rate 2 to 5 times higher than the individuals who had many social connections (Berkman & Syme, 1979). In addition, social networks contain many important features for medical anthropologists to capture because much initial diagnosis and healing is done in the

home or among close friends and community networks. People tend to act as sources of health advice in a number of instances, as described in the following roles:

1. People who have long experiences with a particular illness or treatment
2. Individuals who have extensive experience of certain life events
3. Medical and paramedical professionals and occasionally their spouses
4. Organizers of self-help groups
5. Clergy members (Helman, 1994, p. 66)

Social networks are important for medical anthropologists to understand because it is often the untrained individuals closest to the patient who are consulted for initial health advice. Pescosolido, Wright, Alegria, and Vera (1998) used SNA to identify patterns of use of mental health services in Puerto Rico. The authors state that a greater emphasis has been placed on the community for developing and supporting mental health initiatives as healthcare reform aims to reduce the levels and duration of care in managed-care settings. Despite this major shift from admittance in a long-term care facility to long-term, community-based care centers, there has been little research conducted to evaluate the effectiveness of this shift (p. 1058). SNA can help understand how the community influences usage of mental health care centers and clinics in Puerto Rico and elsewhere.

Stating that ethnic groups of low socioeconomic status have low rates of mental health care utilization, Pescosolido and colleagues chose to study the relationships of this community in Puerto Rico. The researchers found six main patterns of use in mental health care. This information can be used to identify key players in the community. Armed with this knowledge, agencies can increase education and resources for these key community individuals to help increase mental health care usage, because "knowledge always inextricably combines with action, interactions, and relationships of practice" (Introcaso, 2005, p. 97).

Identifying key players in social networks can also be used for epidemiological studies. Most notable examples of the impact of social relationships and the spread of disease include the black plague in Europe and the spread of smallpox and other European diseases to the Americas (McNeill, 1976). Morris (1994) states that there are three main social systems to investigate with the spread of disease. First, mobile vectors such as rats can spread disease. This allows for widespread infection in a short period of time. Second, there are diseases that require casual or indirect contact, like the measles, that have a relatively short infectious period. Last, there are diseases that are only spread through intimate contact, such as sexually transmitted diseases, that "travel along the most selective forms of social networks" (p. 27). Anthropologists and epidemiologists are beginning to use SNA to identify vectors and new potential victims of sexually transmitted

diseases because traditional epidemiological-projection models have proven insufficient.

Network Analyses in Primatology

Social network analysis has not been utilized to its fullest potential with nonhuman primates until relatively recently. Nonhuman primates provide excellent conditions for SNA because they do not have the same symbolic interactions as humans. This makes them a simpler example of social groups that can be studied with SNA (Sade & Dow, 1994, p. 152). Although they may not have the same complexity of symbolic interactions, primates do acquire roles. Primatologists are concerned with understanding these roles, how they are acquired, and their interactions. Roles arise from continual relations of individuals based on age, sex, and dominance—all integral to developing the group's social structure.

Much pioneering work on understanding nonhuman primate social networks was done by Jane Goodall and Dian Fossey. With this as a foundation, sociograms have been employed in primate studies since the 1960s as anthropologists and primatologists used them as simplified kinship diagrams. Sade (1965) began to utilize sociograms for showing how nonrelated rhesus monkeys form social networks based on grooming behavior. These relational sociograms showed that grooming behavior was much more pronounced among related members of the group than nonrelatives. This research also enabled Sade to recognize how social relationships formed in rhesus groups. Sociograms were also useful for Clark (1985), who published research on the galago contradicting the previous literature, which characterized them as solitary primates. Clark used sociograms to show that while galagos may forage alone, they in fact had social networks that linked individuals of all age and sex classes. Chepko-Sade, Reitz, and Sade later (1989) went beyond the use of sociograms and made predictive models with hierarchical cluster analysis to determine the outcome of a fissioning group of rhesus monkeys. Relationships the researchers defined as weak had broken completely a year later, resulting in the fissioning of the entire group.

Despite the fact that there is utility in SNA for primatology, Sade and Dow (1994) argue that information is not passed from one individual to a second and to a third, the way information is passed through human groups. However, aggression can be passed down the hierarchy and SNA can identify what that chain will be. Previously, primatologists believed the strongest individuals would “win” these aggression displays. However, SNA has cast doubt on this assumption. Further analysis in the 1970s has shown that the dominance hierarchy plays a more important role in aggression displays than does physical strength (Chase, 1974).

Additionally, primatologists can study social networks not only to understand group structure, but also to appreciate brain research. The neocortex is the outer layer of the cerebral hemispheres that are part of the cerebral cortex. This region of the brain is associated with higher functions such as sensory perception, generation of motor commands, spatial reasoning, conscious thought, and, in humans, language. Neocortex size and group size are strongly correlated in primates because the information-processing capabilities of the neocortex constrain the number of individuals that can coexist (Kudo & Dunbar, 2001). In other words, some primates have a limited ability to store, understand, and process complex social relationships of the group members, resulting in smaller group sizes. Additionally, primates form coalitions, or alliances, that are particularly important and complex features of group dynamics.

Kudo and Dunbar (2001) studied the relationship between coalition size, group size, and neocortex size in 32 species of primates. Their sample included species of prosimians, monkeys, and apes, including humans. The authors used SNA methods and sociograms to identify primary relationships and the total number of relationships in groups. Relationships were defined as grooming partners because all nonhuman primate species engage in this activity to some degree and there is reliable, consistent data collected on grooming patterns for many primate species. Conversational groups were used for the human analysis.

Kudo and Dunbar found that for the majority of species sampled, the mean size of networks is around 75% of the total group size. This means that the majority of individuals are linked together in a single network by a continuous chain of relationships, with a small number of individuals on the periphery. Additionally, the authors state that neocortex size does correlate with the size of grooming cliques, as well as with total group size in many primate species (p. 719). Kudo and Dunbar assert that neocortex size appears to limit group size. The neocortex size may constrain the size of coalitions, or cliques, that animals can maintain for cohesive relationships. Group size seems to be mainly determined by the number of animals that can be incorporated into a single network.

Conclusion

The complex, and often symbolic, interactions between people are what make us distinctly human. As has been shown in the SNA case studies of primate social groups, the nonhuman primates do not even approach the information-sharing social support networks that humans possess. People place much importance on their social relationships, often seeking primary assistance and advice from their social support networks before seeking out professionals. Social scientists recognize the pivotal and central role social relationships play in our daily lives and have developed advanced methods to study these relationships.

Social network analysis is a research methodology developed by social scientists from such diverse fields as psychology, anthropology, and mathematics. The development of SNA took many twists and turns on its long journey to become the methodology that we recognize today. Historically, theoretical frameworks have been attached to SNA, but it is now largely recognized as a set of methods that many researchers and professionals can utilize. This chapter discussed the utility of studying social relationships through SNA, as well as the history and major current uses of SNA in anthropological research. Additional attention has been given to the unique problem of ethical and power issues of SNA research and respondent bias. Last, we concluded with a discussion of diverse anthropological case studies that utilized SNA methodology, such as for nonprofit organizations, childhood social development, medical anthropology, business anthropology, and even primatology.

Of course, there are many other ways in which anthropologists and researchers can utilize SNA. There are also many other methodologies with which to study social relationships. This chapter focused on SNA because of its growing popularity, broad range of utility, and opportunities for development in new directions by anthropologists and social scientists alike.

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RANK, STATUS, AND ROLE

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Human beings belong to a social species that has evolved to exist in dependence with other human beings. Accordingly, humans survive with others in society and cannot exist as lone individuals. In anthropology, a human society is a group of human beings who live together. Their interactions are patterned in regular and sometimes predictable manners. The society in which one lives is identified by its common language, customs, and geography. Anthropology and other social sciences assist in studying, understanding, and explaining the orderly interdependence of human society. Individual interactions with society are not independent because interactions occur among people who hold recognized positions in society. The concepts of rank, status, and role are indicators of recognized positions in social systems.

Principles of rank, status, and role can be examined within the context of individual social systems. *Rank* most commonly refers to a type of society in which people have varying degrees of access to resources, power, and status. These rank societies contain social groups with various degrees of prestige. In turn, this creates stratification. Rank can also represent one's position within a social scheme, system, or network.

A *status* is the social position a person occupies within a social network. For example, husband and wife are statuses. All individuals within a society may hold a range of statuses in their lifetime because they will partake in many different types of social interactions.

Each status is then accompanied by a corresponding *role*. A role is the set of expected behaviors specific to a status. When a role is not fulfilled effectively, the other members of society will show disapproval. People will behave in their individual roles according to this combined set of rights and obligations. It is the expected set of actions, for example, to be a loving and affectionate spouse. Kinship status is a good example of the relationships between status and role. The status of parents will include the right to discipline their children. It is also their role to feed and educate them. The relationships an individual has with family, friends, coworkers, neighbors, and other people who are in the groups to which the individual belongs form a social network. Recreation, politics, and religion are examples of social-networking groups.

Social stratification is the process by which the members of a society are arranged into a pattern of superior and inferior ranks. It is a structural hierarchy of social inequality. These hierarchies may contain ranks, statuses, and classes, to which certain role behaviors will be assigned. Anthropologists consider social stratification a recent historical development because archaeological evidence from about 7,500 years ago shows distinct equalities in housing and burial sites. Anthropologists believe that members of those societies had similar access to resources and privileges. Recent industrial and postindustrial societies are considered socially stratified. These societies have families, social classes, and ethnic groups that have unequal access

to economic resources, power, and prestige. Differences exist at more defined levels such as age, skill, gender, and education. For example, adults have greater status than children, and in many societies, men still have greater status than women. Those with special skills, technical training, or other advanced education may also have greater status and prestige.

Social stratification is related to the manner in which economic resources are divided. In separate studies anthropologists Gerhard Lenski (1966) and Marshall Sahlins (1958) found that the production of surplus stimulates the development of stratification. Lenski also felt that conflict arises over the control of the surplus and that the manner of distribution determines the basis of power. Inequalities in power create inequalities in access to economic resources and prestige.

Some theories state that social stratification is the result of production that creates surplus. Other theories stress that stratification exists in rank societies when there is pressure to consume, possess, and control available resources. If all people have the same access to economic resources or to society's division of labor in creating goods and services, then it would follow that there would be greater societal equality. However, social stratification is not merely a matter of economics.

Economic resources are items of value, including land, goods, money, tools, and technology. Power is the influence or ability to force others to do what they may not otherwise want to do. In societies with unequal access to resources, it naturally follows that those with more economic resources will have greater power or influence. Political affiliations, for example, can bring power or influence to the general group. Prestige connotes a sense of honor for individual or group members.

Types of Societies

Anthropologists introduced concepts to highlight distinctions in the ways societies are organized. A fourfold classification of societies based on political organizations includes bands, tribes, chiefdoms, and states. A *band* is a small group with a simple social structure. It has no complex differentiated political institutions or social institutions. A *tribe* is a pastoral or horticultural society that primarily relies on the land for all of its subsistence. A *chiefdom* has patterns of social stratification and an economic system of redistribution of goods. A *state* is the overall territory and social system that is ruled by a particular governing agency. An essential requirement for and consequence of a state society is that the society's economic surplus be centrally appropriated and that the society be socially stratified. Evolutionary anthropological experts in the United States say these systems developed organically. Chiefdoms developed from the tribal systems and existed before the state.

Classification systems based on subsistence strategies include hunter-gatherers (foragers), pastoralists, horticulturalists, and agriculturalists. A fourfold classification of societies based on economic conditions are forager, herder, and extensive and intensive agriculturalists. Foragers are also called food collectors or hunter-gatherers. These societies do not own individual land. Instead, hunter-gatherers value the wild game and the plant life that live upon the land. Individuals from food-collecting societies do not maintain exclusive rights to the land where they hunt. Everyone in the society can hunt, gather, and draw water.

If the food supplies run low because the game migrates or the plant life dries out, then the land loses value. In these cases, communal ownership of the land is more practical. Territoriality tends to develop in areas where the land resources and access to water and game are abundant. In this situation, a group may become more sedentary and reluctant to let members of other groups travel onto their land. Territoriality is minimal in areas where plant and animal resources are unpredictable.

Like food-collecting societies, horticulturalists do not individually or as a family own the land. However, plots of land may be allocated to families for their own use. After their herds graze an area low, horticulturalists move to new land, allowing the land they used to lie fallow and replenish. Horticulturalists are generally more self-sufficient than pastoralists. They make their own tools, but are obliged to communally share their tools and other weapons. For example, in the Truk society, if a canoe is needed for fishing, it may be taken from a close kinsman, without asking permission. If the canoe belongs to a distant kinsman, one must first ask permission, but the canoe owner is obliged to loan it.

In intensive agriculturalist societies, land is individually owned. Owners have the rights to use the resources and sell or give the land away as they choose. Occupying and cultivating the land increases its wealth and long-term usability. In industrial societies where intensive agriculturalists exist, individual landowners have absolute control of the land. In this absolute ownership, they are also subject to absolute loss due to natural disasters, national economic crisis, or catastrophic climate changes.

Lewis Henry Morgan (1877) was a pioneer in the study of human societies, concluding that cultural evolution was ranked on subsistence patterns and depended on technological complexity. His final scheme contained three ethnic periods: (1) savagery, (2) barbarism, and (3) civilization. He believed that every society would pass through these as they evolved to a higher form. Morgan ranked each group into lower, middle, and upper categories, based on the complexity of their tools. Savages may never have domesticated plants or animals for subsistence. Furthermore, an upper savage may have used fire and fished, but not used a bow or arrow. Barbarians may have domesticated animals and plants for subsistence. They also may have invented new tools and techniques. Morgan believed civilization

was the next ethnic period to evolve from savages and barbarians. Although anthropologists have stopped using such terms as savage and barbarian, they do recognize the value in his classifications. He studied a variety of societies, concluded that subsistence was systematic, and correlated technological developments with forms of social organizations.

Anthropologists have continued to further classify societies as either egalitarian or stratified. In egalitarian societies, members or member groups have primarily equal access to the same degree of wealth, power, and prestige. In stratified societies, members or member groups have different levels of access to these resources. Egalitarian societies are often seen in smaller and less technologically developed communities like bands and tribes. Stratified societies are seen in larger, more complex, bureaucratic, or advanced societies like chiefdoms and states. Rank societies may lie somewhere in between these two.

Egalitarian Society

Egalitarian societies believe in the importance of human equality in social, political, and economic affairs. Members in egalitarian societies communally share economic resources such as food, tools, and weapons. The practice of sharing maintains equal access to these resources.

In egalitarian societies, there are few or no formal methods to give authority or power to certain individuals or groups. There is no hereditary right or position to power or authority. In most cases, egalitarian means that every man has equal say in what affects the tribe or clan. In some societies, this equality extends to women. Egalitarianism performs well in small band societies like hunter-gather, horticultural, and pastoral cultures. Most of these food-gathering societies live in family units that manage subsistence activities by consensus.

Members of these societies have primarily similar access to all economic resources and advantages. No social groups within these societies have greater or lesser access to resources or advantages. Morgan Fried (1967) defined egalitarian society as a society containing as many positions of prestige as there are members. Valued statuses are adjusted to meet the number of persons who are skilled to fill the positions. Egalitarian societies cannot fix or limit the number of persons who are capable of exerting power.

Rank Society

Rank refers to the social positions within societies that recognize social hierarchies. A rank society is one with equal access to economic resources or power. Within smaller social groups in a rank society, there is unequal access to status and prestige. Ranking is often practiced in agricultural or herding groups. Rank may be ascribed or it may be achieved. For example, ascribed rank is assigned at birth. If a child who is born to a great hunter or artisan is

automatically assumed to be a great hunter or artisan, he has been given an ascribed rank and the accompanying status or prestige. However, people who possess different physical skills, levels of intelligence, and other abilities may achieve a rank through their actions or achievement.

A tribal chief is another example of an ascribed ranked position that is hereditary or genealogical. The rank of a tribal chief is given to the oldest son of a reigning tribal chief. The son succeeds his father in that rank. A chief will receive special honor and be shown greater respect by lower ranked citizens. People of lower rank must always keep their head bowed lower than the heads of those with higher rank. They will bow their heads lower than a chief who is sitting and bend low before a chief who is standing.

Fried describes rank societies as those that limit positions of status. Not all of the people qualified for such a rank position may occupy such a position. These rank societies exhibit varying degrees of stratification. In rank societies, individuals are placed in labor tasks or occupations that are suitable for their age, gender, and ability. However, Fried argues that in the rank societies, no political power derives from these specializations. Specializations in craftsmanship developed from a natural division of interest. The consensus among anthropologists is that fully stratified societies emerged from rank societies; the manner in which the transitions occurred is still debated.

Some controversy does exist in the belief that members of rank societies have equal access to economic resources and power. Material advantages exist for a chief, who maintains a storehouse and receives gifts from the commoners. Sahlins (1958) argues that although these benefits exist, the chief has no power to demand gifts and that the storehouses are only used to keep what will be consumed during feasts or later redistributed to the tribe.

Other studies show that food sharing and divisions of labor are not equal in rank societies. In collective meal preparations, for example, the chiefs are served first, and as tradition, the women bow in reverence. In tribes where the chiefs own the fishing areas, it was found that their households received twice as much fish per person as the rest of the tribal families. It was widely believed that principles of generosity would balance out the distribution of resources. However, recent studies by Laura Betzig (1988) show that gifts from all families to the chiefs did not equal the gifts from chiefs to other families. She found that in the small atoll of the western Carolines, even though all tribal households gave gifts to the Ifaluk chiefs, the chiefs most often only gave gifts to their own families.

Stratified Society

In stratified societies, members or member groups have greater and sometimes permanent access to wealth, power, and prestige. Anthropologists traditionally describe stratified societies as class systems or caste systems. These societies often exist in chiefdoms and states. The two forms

of stratified societies are internally divided into hierarchical groups. These societies, class or caste, are fully stratified and have unequal access to economic resources, power, and prestige.

Caste

Some stratified societies have a closed class system called a *caste* system. Although the first prototype of a caste system originated in India, anthropologists use the term to define other similarly arranged societies. A caste system is a ranked group system in which there is no social mobility. Many people believe that a caste is determined by one's occupation, but that is not entirely true. Membership within a caste rank is determined at birth, and caste systems practice endogamy. Marriage is legally restricted so that caste members must marry within their same caste group.

Castes can be identified by traditional occupation and are ranked on a scale of purity. In India, villagers have been stratified from the upper elite to the lowest caste members who perform street sweeping and other menial labor. Higher caste members, such as Brahmin priests, are obligated to hold strict dietary restrictions and are subject to other taboos to maintain their caste purity. On the other end of the spectrum are the outcastes or the untouchables whose occupations bring them into close and regular contact with animal skin, meat, and excrement. Between these two extremes are thousands of castes and subcastes.

Members of a lower caste can sometimes obtain a better wage-paying job and this can increase their social standing. In fact, the economic basis of the caste system has changed since World War II because many occupations have shifted from a barter or exchange system to a pay-for-service model. In this, a son born to the barber caste can become a wage-earning teacher during the week and cut hair on the weekends. Although the system allows him the benefits of having a teacher's salary, it does not change his caste. He is and always will be in the barber caste, as his father was.

In a caste system, membership is ascribed and set for life. One mechanism to maintain caste immobility is to legally restrict marriage within castes. Because one cannot marry into a higher caste, it is impossible to achieve social mobility. Because the caste system gives advantages to the higher castes, it has caused resentment and hostility that has led to some economic and practical uprisings.

Class

A social *class* system is comprised of ranked subgroups in a stratified society. Membership in a social class is determined by economic criteria, such as income, property ownership, or educational levels. A class is also a category or group of similar occupational types that has similar opportunities in terms of economic resources, power, and prestige. Not every class has the same access to land, livestock, money, food, and other significant resources. In

class societies, people can achieve different status or prestige through occupation, education, and achieved or inherited wealth. A class system is different from a caste system because the class system is open. Laws or other social norms do not strictly prohibit social mobility.

Class boundaries may have been formed by customs and traditions. According to the studies of Michael Argyle (1994), people identify with a social class very early in life. Differences in many different social indicators go beyond the basics of occupation, wealth, and prestige. People in different social classes relate to others of similar religious affiliation, family upbringing, child-rearing practices, activities of leisure, social manners, and social graces. People are comfortable with other people of the same class because they share many commonalities. People generally stay within and marry within the class to which they were born.

The class to which one belongs throughout one's lifetime is neither fully determined at birth nor fixed throughout an entire lifetime. The American society is generally an open class system. It is possible to move from one class to another through educational attainment, by marriage into a higher class, or by developing a highly valued skill that makes one marketable and well compensated. In addition to occupation, other class indicators include religion, family tradition, leisure, and quality or quantity of possessions. In an open class system, it is believed that dedication and a strong work ethic, along with great effort, can lead to greater social mobility.

Status

Status is the position one holds in a social system. As members of a status group, people have rights, duties, and lifestyle benefits or burdens. Statuses exist in societies that contain a hierarchy for power and prestige. Status has its own stratification. Those with higher status can influence, through the use of their power or prestige, the actions or conduct of other people. Status is related to role, or an expected social behavior. A person occupying a specific social position or status has various roles or behaviors, such as actions and qualities, to fill. In Western industrial societies, having a respected occupation, owning and/or consuming material goods, and even appearance, etiquette, manners, and morality have become more important than lineage as status indicators.

Occupations in these societies are stratified so that achieved occupational promotion can enhance the social status of individuals and their immediate families. Social scientists have defined two basic kinds of social status: ascribed and achieved. Either one is assigned to a status group at birth, or one achieves status through educational, occupational, or skill-level accomplishments. In ascribed status, one is either born into or grows into the status. When status is assigned at birth, little knowledge exists of the person's individual skills or predominant traits. It is

assigned based on birthrights, gender, family relations, ethnicity, and age. Membership in an ascribed status group is most often nonvoluntary, and ascribed status cannot be discarded. People qualifying for a status are expected to fulfill all role obligations assigned to that status by general society and those determined within the status group.

The kinship system can best illustrate ascribed status. Anthropologists say that when people are born, they automatically become a child, either a son or daughter, to the parent. When they grow older and have their own child, they automatically become a parent, either a mother or father, to the child. Individuals within a status group are not ranked of their own accord. It is the status group as a whole that is ranked.

Concomitantly, an achieved status is one that is earned after fulfilling certain criteria. An achieved status is based on efforts and it includes accomplishments. In open class societies with mobility, individuals may increase their social status by achieving a higher education or an advanced degree, working toward a professional occupation, or making significant accomplishments in their personal, professional, or community life. Graduating from college is one such example of achieved status. In addition to requiring dedication and effort, it oftentimes also requires the financial resources to pay school tuition and living expenses while one pursues a degree. In open societies, a higher status can also be achieved by marrying into a different social class.

Social stratification that is based only on status is a pre-modern societal structure, in which members of each status group interacted only with other members of their group. In other societies, clan or lineage are ranked as either aristocratic or common, with some clans being stigmatized.

Role

People take on a variety of social interactions based on the status they occupy at that moment. They know how to interact, or what behaviors to exhibit, because each status is associated with corresponding roles. A role is a collection of obligations and responsibilities for the occupants of a status. In sociological theory, a role is a behavior that is determined by what is expected of that position. Roles are socially defined attributes and are not related to individual characteristics or personalities.

Social relationships provide a structure for patterned or predictable social behaviors. Status and role are linked together in complementary pairs. Status is not independent of role and role is not independent of status. For example, parent and child are complementary roles because the parent has a role responsibility to discipline the child and the child is expected to obey the parent. When people within their status fail to act effectively in their role, other members of the society will show disapproval.

When a role is socially recognized, it helps people in a society create a strategy to deal with recurrent social situations, and to cope with the roles that others play. People create the expectations for the roles that they and others

will perform. Clusters of statuses and their complementary roles create the core of enduring social relationships. The existence of these clusters then provides regular and predictable patterns of behavior, or social structures, that can be reviewed for appropriateness and changed as needed.

Role confusion occurs when people experience difficulty knowing which role needs to be filled within their current status. Similarly, role strain and role conflict may develop. Role strain is the tension between the many roles one is expected to fill and pressure to choose a focus for one or more roles. For example, a parent may feel conflicted over her obligations to act as a parent who teaches manners, arithmetic, and moral behavior while also meeting the rigors of being a professor who lectures at a university. As such, she may also feel conflicted over being an adviser to students while also working as a tenured faculty member who is required to advocate for faculty rights on campus.

Contemporary Theories of Social Organization

Most societies create status sets particular to social groups. Religion, gender, family, clan, occupation, and political affiliations define these sets. Highly structured social groups sharing a common focus or mission are called institutions, and these social organizations consist of interlocking role relationships. These relationships become active when status positions are filled and social groups have members.

French sociologist Émile Durkheim (1858/1984), considered the founder of both modern sociology and anthropology, studied societal adherence, contrasting mechanical solidarity to organic solidarity. In mechanical solidarity, small-scale, kinship-based societies were held together by the efforts of their family members. The members of these small groups performed all survival tasks. These societies stayed together because they had a strong sense of commonality or likeness, which occurs when groups share the same language and customs. Because these groups are kinship based and can meet their own survival needs, smaller groups could break from the whole and the smaller groups would still survive. Organic solidarity exists in larger-scale societies like nation-states. In these societies, specialists in subgroups handle survival tasks, and the division of labor is complex. The occupational groups are dependent on other occupational groups and cannot exist if they break off into smaller groups. For example, tradesmen like metal workers and pot makers do not also produce their own clothing. In these larger societies, each occupational group depends on the work produced by other occupations.

Contemporary Theories of Social Class

Although the term *social class* most often refers to modern-day industrial societies, it has also described various groups from city-state, empire, caste, and feudal societies.

During the feudal, industrial, and political revolutions of the 18th and early 19th centuries, the terms *rank* and *order* were challenged. The term *social class* became the popular hierarchical determinant in society as feudal distinctions of rank became less important. New social groups emerged as a new commercial, industrial, and capitalistic society replaced the feudal societies. An urban class of factory workers subsequently developed, and a wage-labor economy with capitalistic property owners developed. Therefore, new economic conditions emerged.

Early scholars in the concepts of social class developed their theories in the social sciences. Political philosophers of the 14th to the 18th centuries, such as Jean-Jacques Rousseau, John Locke, and Thomas Hobbes, began writing about and discussing social stratification. When 19th-century French social theorist Henri de Saint-Simon argued that the type of governmental body was directly related to the mode of economic production, he opened the door for the development of our most predominant theoretical traditions of social class and class conflict.

While social status is directly related to achieved honor, occupational standing, cultural delineations, and birthrights, social class originally related directly to the economic interests of its membership. The theories of Karl Marx (1872/1988) and Max Weber (1968) defined class in economic terms, even though the determinants in their theories varied. Marx classified societies by their modes of production. He believed that capitalist societies had two social classes: those who owned property and those who did not. Property owners in his capitalistic society were called the bourgeoisie. The remainders were the proletariat. When class is determined by ownership of capital, one class has privileged access to necessary material resources and that creates a class system where one class controls the other. The more powerful class uses these privileges to dominate the less fortunate. While the dominant bourgeois class owned the capital, the proletariat was the exploited working class. Members of the proletariat provide the services or the manual labor required for the bourgeoisie to remain in business.

The relationship between the two would forever be in conflict, according to Marx, because they disagree over who shall control the means of production. They will continue to disagree until the powers of those controlling the economy are overthrown. In addition to controlling the material production, the work conditions, and the earning power of the proletariat, Marx also felt that the bourgeoisie controlled the production of ideas, cultural styles, and political doctrine. They established the governmental structure, political climate, and major structural changes in society. Although Marx recognized that postindustrial society contained social groups outside of the bourgeoisie and the proletariat, such as peasant farmers and small shop owners, he firmly believed that the industrial revolution would eventually eliminate such economic class nuances. These classes were the residual effect of precapitalist societies and would disappear as capitalist systems matured, he said.

Marx argued that an uprising was necessary and inevitable because of class antagonism and class conflict that drives critical social change. In *The Communist Manifesto*, Marx wrote that when private property disappeared, then the class system that originates in the division of labor would disappear. Marx also theorized that an increased ability to obtain an education would enable society's younger generations to quickly learn the whole system of production, freeing them from the present-day division of labor. Equality would eventually diminish the need for class separation. Furthermore, Marx said that communist society would be incompatible with the existence of class. The difference between this communist system and socialism is that in socialist societies, the means of production are publically owned and managed. Communist society would produce a sufficient mass of products to satisfy the needs of everyone.

Scholars and philosophers since Marx have dedicated their intellectual pursuits to provide alternative theories to communism. German sociologist Max Weber (1968) said that the development of a social class structure in a modern society was based on more than economics. Weber believed societal variables, such as capital, education, and workforce skills, also affected life chances in the social class system. Having a special trade, sought-after skills, or educational achievements would help those with less property achieve placement in a more desirable social class.

Unlike Marx, whose social structure contained only the bourgeoisie and the proletariat, Weber contended that four social classes existed. The highest class contained the upper ranked property owners. The next level consisted of intellectuals, scholars, managers, and skilled administrators. Additionally, Weber's system contained a traditional petit bourgeois class of smaller shop owners and businessmen. The lowest class in his four-class system contained the traditional working class. While he maintained property ownership as a class, he recognized that those with high-demand special skills formed another social class grouping. He believed that class conflict would exist, but only within those classes in direct opposition, such as the worker and the worker's manager.

Weber wrote that power is distributed according to status, classes, and parties. His insights expanded also upon theories of social stratification, where social honor and status impacted, but was different than, social class. He wrote that power is generally the chance that is taken against the will of the larger group. Although power is alluring in itself, the quest for power contains social honor. Achieving social honor or prestige is the foundation of political or economic power. He distinguished class from social status and the pure economic indicators used in the past. Social order is a manner in which social honor is distributed, Weber said. Economic order determines the distribution of goods and services and social order depends on economic order. However, class is not based on economics alone. It is also based on power and prestige. Class refers to any group of people with the same class situations.

Future Directions

Social Stratification: Class

Contemporary capitalistic societies have lost some of their class distinctions. Social and economic statuses are continually transformed, overstepping the traditional boundaries in which they were defined. Modern class theories, although reflective of Marx and Weber, have moved from these models, partly because modern theorists believe that individuals are ranked on a variety of indicators, often unrelated to economics. They took Weber's notions of status and created a more multidimensional approach to social status, including occupation, religion, gender, education, and ethnicity. In post-World War II America, prestige and social status challenged a traditionally and economically stratified class system. The post-World War II era brought—across the board—a raise in living standards, greater social mobility, and a redistribution of economic resources.

Recent research conducted by Marshall and Swift (1999) used an odds-ratio methodology to consider equality and inequality and chances for social mobility. Comparatively, and often argumentatively, sociologist Ottar Hellevik (1997) prefers to use the Lorenz curve and the Gini coefficient to measure the existence of societal inequalities. Prior to Hellevik's assertion of this stance, Gordon Marshall (1996) examined whether communism had in practice increased equality in East Germany. Marshall believed the German experience with communism offered an unusual research opportunity in social stratification. Following World War II, West Germany followed a capitalistic path to economic growth. East Germany chose communist structure in an attempt to increase social and economic equality. Marshall concluded that communism did little to help the citizens of East Germany achieve social equality.

Despite decades of disagreement over class structures and social status boundaries, social scientists have generally agreed that class is divided into three main categories: upper class, middle class, and lower or working class. The upper class in modern society exists through its largely inherited wealth. They are the owners of large properties from which their current income is derived. They enjoy many benefits in their membership in the upper class, including influence on the governing economic and political policies of their society. Through the privilege of membership in this class, they have access to better educational and economic opportunities that also enhance the wealth of their families, for generations to come.

The middle class is the socioeconomic class that includes those in professional, highly skilled labor, and middle- to lower-management occupations. It is a tiered middle class, with wealth professionals and managers at the top, and clerical, transportation, and distribution workers near the bottom.

In contrast, modern capital societies with a three-class system have a lower or working class. They are often in the

lowest-paid, lowest-skilled jobs in the economic structure. These workers are nonunionized and often work in the service or retail industries. Their living conditions have the lowest standards, with restricted access to education and almost nonexistent power to make policy decisions in the political and economic arenas.

Social Stratification: Caste

During the 20th century, relationships between and among castes in India have changed. Some similarly ranked castes have worked together to form political alliances. In the lower castes, members have been striving for a higher status and attempting to escape the permanent position in which they are placed at the bottom of the closed caste system. In other cases, the members of the same caste have worked together to implement increased national solidarity.

Since World War II, the caste system in India has changed due to the growing trends in a global economy and trends in earning cash payment for services. For example, in addition to working in one's caste profession, one may also improve his social standing by obtaining a better education or wage-paying job. However, marriage is still restricted to within one's caste. According to research done by Fuller and Narasimhan (2008), the rate of child marriages has significantly declined and the rules of endogamy have lessened. Individual qualifications and personal characteristics are now vital to marriage in India, and education is now a key rank indicator. In fact, having a college or university degree is sometimes considered more attractive than being a very successful farmer or landlord. Additionally, these preferences exist across genders. Fuller and Narasimhan found that educated husbands prefer educated wives, even if the wives plan to work within the home. However, despite these more lenient marriage practices, ancestral status is still considered a marital asset.

Rank and Status

Anthropologists have shown increased interest in status and rank research. Steffen Daisgaard (2008) found a current tendency for people using social-networking Web sites to post individual information on the Internet, publicly ranking themselves and their personal relationships. They also publicly display status information. With the use of current social-network sites, people may present their preferences in art, music, literature, and social events. They may also publically post photographs and videos of themselves, their significant others, and significant events. More important, social-network users can show lists of their "friends" or other recognized social relations. Similar processes of social identity formation, Daisgaard said, have been discussed since the early 1980s. People would dress in a particular style so that they would be identified with others who dressed in that manner.

Facebook and MySpace are the most commonly used social-network sites. In posting a "virtual self," people

become the center of their social universe. These social-networking sites, Daisgaard also pointed out, involve systems of ranking and hierarchical structures. MySpace has a “Top 8” feature in which the social self may rank their top eight friends. Other Internet rankings are seen daily in more nondescriptive manners. For example, Daisgaard said that Google search results are ranked according to relevance. One might think this means that Google results are ranked according to their relevance to the person who inquired, but it is not so. Relevance is ranked according to Google’s sponsors or according to popularity that is determined by hit counters (Daisgaard, 2008).

Other recent studies in ranking systems outlined the current practices used in colleges and universities in Canada and the United States. Research by M. Reza Nakhaie (2004) showed that preestablished universal and impersonal criteria are the determinants for employment rank and status. To maintain an atmosphere of progressive collegiality, personal and social attributes are not considered when a faculty member is reviewed for rank and status promotions. Rank promotion may also be based on seniority. Nakhaie noted that this universalistic approach relies on the belief that opportunity for social or professional mobility is the foundation of legitimate power. In this environment, rank is achieved.

Conclusion

Members of a human society are interdependent beings who behave in patterned and predictable ways because of their social positions. Rank, status, and role are indicators of these positions and the social structure in which one lives. Examining egalitarian societies, rank societies, and the variety of social stratification systems assists in understanding the ranks, statuses, and roles that people maintain. Simple societies practice egalitarianism, in which resources for subsistence are communally shared. Rank societies also communally share resources, but rank members may be privileged to power or prestige. More complex societies may be stratified, and often have unequal access to resources, power, and prestige. No matter which system, its members have rank, status, and role considerations to maintain. These criteria are understood and adhered to by its members. In addition, societal structures are impacted by changes in economic structures and technological advances. As such, corresponding systems of rank, status, and role continually evolve.

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CEREMONIES

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Life is nothing but a process beginning with acts, rather than with thoughts. In the journey of life, every moment brings necessitation, which humans try to satisfy in their own way. Need was the first experience and efforts were there to satisfy the need. It is a general assumption that there are certain inherited tendencies—instincts—that humans acquired from their ancestors. When these inherited acts are repeated, they became customs in the same way; acted up individually, if repeated, they then became habits.

Customs are social habits forming the basis of an order of social behavior. There are various names for customs depending upon the situation. *Ceremonies* are customs signaling important events with the observance of some formal act or series of acts in the manner prescribed by custom. For example, there is a custom of giving the bride a ring at the wedding ceremony. Ceremonies, then, resemble the results of natural forces, unconsciously put into operation, or they can be equated to the instinctive behavior of animals, which is developed out of experience. These ceremonies are passed on by tradition and generally allow no exceptions. However, in the course of time, with new environmental conditions, the ceremonies become modified. So, it may be said that the life of human beings, in all ages and stages of culture, is primarily controlled by these forms of ceremonies. These ceremonies regulate the whole of human actions. From cradle to grave, human beings are the slaves of the various ceremonies.

Nature of Ceremony

Ceremony is a kind of social control that creates order for particular parts of life. It belongs to the structuring aspect of the cultural process. As a way of control, the ceremony has both subjective and objective aspects. As a social control, there is always explicit or implicit reference to other selves, be they real or imaginary. In ceremonial practices, attitudes, ideas, and emotions all reflect multitudinous form—and in the most diverse ways. According to Herbert Spencer (1974), social control is a modified form of action. Ceremonies are spontaneous responses of one individual to the presence of another. Later, these ceremonies are fixed and conventionalized. Ceremonies control behavior by defining social roles. These roles, assigned to individuals according to some principle of attribution, demand that the persons identify their personal identities to the social roles and encourage others to identify and treat the persons as constituted by the role.

Because they shape identity, ceremonies transform people. If they are successful, ceremonies produce not just a temporary emotion, but rather a permanent change in identity conforming to the society's expectations of right conduct. Because ceremony exercises a powerful influence over behavior, it is appropriately conceived as a form of social control. Ceremonies are repeatable events—people can perform them for the same purposes, in the same orderly manner, and sometimes also with the expectation

of the same result. They are expressions of shared feelings and attitudes through more or less formally ordered actions; these actions hold an essentially symbolic nature performed on appropriate occasions. A ceremony sometimes involves stereotyped bodily movements, often in relation to objects possessing symbolic meaning. For example, people bow, exchange greetings, and perform a myriad of other forms of action.

From the anthropological perspective, ceremonies express, perpetuate, and transmit elements of a culture's values, and aim to preserve such values, while inhibiting sentiments of doubt and opposition. Moreover, they intensify the solidarity of the participants. The study of ceremony from the anthropological point of view has been confined mainly to the analysis of religions and magical procedures. The works of Tylor (1871/1958), Weber (1922/1993), Durkheim (1912/2001), and Frazer (1890/1959), in particular, draw the association between the ritual ceremonies and their religious or magical purposes. The reason behind this association is that anthropologists have often dealt with societies in which everything has a religious wrapping, or in other words, all of daily dealings are imbued with the sacred.

But this is not to say that there are only religious or sacred ceremonies. On the contrary, there are secular ceremonies. Ceremony and rituals are also used in the secular affairs of modern life. Secular ceremony extends authority and legitimacy to the positions of particular persons, organizations, moral values, and the like. Here, ceremonies are employed to analyze particular interpretations of social reality in a way that bestows them legitimacy. Ceremony not only belongs to the structured part of social behaviors; it also can be construed as an attempt to structure the way people think about social life. Ceremonies mirror existing social relationships and existing modes of thought.

MacIver and Page (1988) noted sociologists bring out three main factors to reveal the importance of ceremony in human affairs. The first is the character of *impersonality*. Any formal event wears an impersonal look, though it is the individual who plays the lead role. This feature is noticeable in the field of military personnel when they bow toward the uniform or rank, not toward the individual. Here, this bowing-down ceremony clearly transforms the ritual to impersonal.

Myth, the second factor, plays a great role in shaping any stable life. Since social life moves continuously with some order, its movement requires a system of myths like the myth of law, power, freedom, and so forth. These myths are value-loaded terms where ritual plays an important role. With this, ritual and ceremony convey a feeling of broader realities of faith, and social establishment never fully comprehended by the individual. Certain concepts like "the church" and "the state," which are abstract in nature, find concrete expressions through the rites of the church or the inauguration of the president.

The third factor is *utility*. Clear from the earlier discussion, there are certain compulsive and emotional parts of ceremony, but along with this, there are certain everyday assignments that need to be worked out. In a society, there are various functions that must be performed in a right way—how to behave in a particular occasion, like when a soldier performs well in protecting his country, or what to do when one's daughter gets married. There are countless occasions like this when ceremony supplies the answer. As social beings, it is not possible to be aloof from such events, and these functions reflect the social life that one leads in a particular community.

Classification of Ceremonies

Let us first discuss some ritual ceremonies and their religious purposes. Herbert Spencer (1974) showed how, in the course of evolution, certain conduct first treated as daily ritual ceremonies converted into religious ones. For example, fasting as a functional rite gave origin to religious fasting and the prayers that were offered to the deceased grew into religious praises and prayers.

In almost every society, religious rites connect to the act of daily living. Through the prayer ceremony, divine grace is sought; this attitude reflects human beings' craving for the supernatural. Ceremonies sometimes play three kinds of control—political, religious, and social (Spencer, 1974). The accession ceremony of the Chinese emperor explains this point.

The emperor kneels thrice and bows nine times before the altar of his father, and repeats the same ceremony before the throne on which the empress dowager sits during the accession ceremony. Then, after he ascends the throne, the officers line to their ranks, kneel, and bow nine times. Not only the Chinese, the Japanese too follow the same line. Starting from the emperor, down to the lowest subject, there is a constant succession of prostrations. The emperor bows to the divine, showing his religious attitude. The officers bow toward the emperor, showing their political subordination, while also showing the common people their social subordination. So, they express the same form of behavior—religious, political, and social subordination.

Tylor (1871/1958), a noted anthropologist, showed that in the science of religion, the study of ceremony occupies a major role. There are certain ceremonies that show marvels of permanence and hold the same form and meaning throughout ages. From the anthropological point of view, the performance of certain sacred rites express these ceremonies. Tylor has shown that there are rites of prayer, sacrifice, fasting, and expressions of artificial ecstasy, orientation, and lustration; these all have their unique place in any ceremonial performances. Though these rites were in practice among the primitive culture, they are still in vogue now among the different cultures in some revised form or other.

What is a prayer? Prayer is a kind of desire, uttered or unexpressed, addressed to disembodied or deified human souls. In almost every culture, the harvesting ceremony, which is celebrated periodically, offers prayers to the earth. This ensures that the crops come out in full strength and the plantation may be saved from evil eyes. During the harvesting ceremony, sowing, plowing, and reaping special rites are performed to control the processes of vegetation. Prayers, then, are a type of request to appease the unforeseen situations.

In some parts of the world, this prayer is a kind of sacred utterance where repetition requires verbal accuracy. In the course of time, it works like traditional formula. In Buddhism, the chanting of *om mani padme hum* evokes a kind of sacredness, and creates a kind of devotional atmosphere. This line is written on the prayer mill and these prayer mills vary in size. It may be little wooden toys held in the hand or big drums tuned by wind power with the devotee repeating the sentences. The use of the rosary among the Mohammedan and Christian religions are the outcome of this Buddhist tradition. Therefore, prayer of any form is a means of strengthening emotion, courage, and hope. It also sometimes serves as a source of motive or power behind the action performed by the individual.

Like prayer, sacrifice is an offering toward the deity to receive a favor. Generally, food and valuables are offered and there is custom in some parts of India to sacrifice an animal. The blood of the animal is then offered for the deity and the devotee retains the meat. In the temples, incense sticks are offered before the images of the gods during the sacrificial ceremony. The sacrifice by fire is well-known to almost all the religious ceremonies of the world. These rites, connected historically with different ceremonies, remain more or less unchanged in this modern world. The devotee who bows before the deity seeks her favor in all spheres of her action. In fact, the primitive people offered food and valuables to the gods in a large scale, for they did not know much about the mysteries of nature. With these offerings, they aspired to appease the supernatural powers. Almost everywhere in the world, it is the priest who acts as guardian of the deities and has the maximum share of the offerings. The priest is supposed to intake the food as representative of divinity. In India, during the yearly Mother Goddess Durga festival, there are offerings in front of the deity, such as fruits, sweets, vegetables, and clothes. After the sacred ceremonies are over, the priest takes the offerings along with him.

Taylor (1871/1958), while discussing these rites of sacrifice, distinguished the ideas as the gift theory, the homage theory, and the abnegation theory. In all three aspects of sacrifice, the ritualistic change may be traced from practical reality to formal ceremony. As mentioned, the gifts consist of foods and valuables and generally the priest is in charge of the gifts. There is also a ceremonial

make-believe to feed the idol. In ancient times, it was a belief that the deity devoured the meals.

One of the most remarkable sacrificial rites of the world is that of offering by fire. This ranges from the classic Greek to the ancient Chinese, and it is a peasant custom still prevailing in Europe. But whatever may be the real intention of the sacrifice, afterwards, it becomes a feast. Public banquets are arranged in the name of the sacred deity and the whole event transforms into sacrificial feast.

Along with the gift theory and homage theory, there is another sacrificial rite, known as sacrificial abnegation. There is a sect of Buddhists who offer boiled rice, sweet meats, and coconut fried in oil to the temples; crows and dogs devour these offerings. The Muslims, on their return from Mecca, sacrifice sheep, oxen, and camels in the valley of Muna. They consider this a meritorious act and come back without eating anything of it. Similar customs exist in the Buddhist sect, and Buddhists explain this behavior as the sinful men coming back in the form of demons. These demons in turn may receive offerings of food and drink from their relatives who can further benefit them by good acts done in their name, such as offering food to priests. Even if it is held that this type of act does not benefit the spirits whom it is addressed to, it does benefit the person who performs it. Fasting as a rite is also part of many religious ceremonies. Through fasting, a kind of purification of the body results, which helps to feel good. It is a kind of penance coming from the abstinence from food.

There are also a group of ceremonies dealing with symbolism. Here "sun myth" plays an important role. While discussing the role of sun, Tylor (1871/1958) showed that from ancient times to this day, the east side associates with light and warmth, life, happiness and glory, while the west associates with darkness, death, and decay. This symbolism of east and west gives rise to a series of practices associated with the various ceremonies of the temples and the position of the dead in their graves. Sun always brings warmth and enjoyment in every aspect of our lives. It is common belief that the rising sun symbolizes new life, and setting sun symbolizes the concept of death. It is a well-known story that the body of the Christ was laid with the head toward the west, thus seeing toward the east. From that time onward, it is a custom among Christians to dig graves east and west.

Along with relating to the burial of the dead, this sun worship found a place in temple worship. The famous sun temple of Konark in Orissa, India was one of the remarkable places of sun worship. It is a remnant of an old solar rite. In other parts of the world, such as ancient Mexico, sun worship was one of the central parts of religious ceremonies, when people used to kneel in prayer toward the east and the doors of the sanctuaries viewed westward. In addition, in Peru, the villages were built on the slopes toward the east, so that people might view and receive the sun's first rays at its rising.

In Asia, especially in India, sun worship is a regular ceremony that the Brahmins must perform daily. In the temple, before any ceremony, the Brahmins still pay tribute by mantra (sacred word) to the sun. These solar rites are found in other countries as well. In the Jewish tradition, the front door of the Jewish temple is toward the east and the sanctuary is toward the west.

Tylor's (1871/1958) research allows for various and extended explanations for sun worship: On the one hand, there is Asiatic sun worship, which has its origin to the veneration of the rising sun in old Persian religion and, on the other hand, this orientation ceremony is recognized in classic Greek religion as a principle. Thus, in Athenian tradition, the temples have their entrances toward the east, looking out through which the divine image is welcoming the rising sun. It then became an accepted custom to turn toward the east during prayer, facing the region of the "light of the world" or "the sun of righteousness."

This orientation ceremony finds its full narration in the rite of baptism among Christians. In this ceremony, turning toward the west shows abhorrence to Satan while turning to the east shows reverence. These acts are common to both Latin and Greek ritual.

There is another ceremony, known as purification of lustration, that involves both the clearing of bodily impurity and also mental purification. In Peru, this lustration ceremony connects to childbirth. There is a ceremonial washing of the child, and through this act, it is believed that evil influences wash away. After the baptism, there is a custom to cut off a lock of the child's hair. The same ceremony was performed in old Mexico. In the name of the water goddess, the nurse washed the infant. This washing helped the child to discard the impurity of his birth, cleanse his heart, and also offer the child a good and perfect life. With the washing, there was a prayer toward the invisible deity to cleanse the child from sin and foulness, and to protect him from misfortune.

In other parts of Asia, like Japan and China, this lustration ceremony is well-known. In Japan, the sprinkling and naming of the child and other lustrations connected with worship are prevalent. In China too, sprinkling holy water over sacrifices is common, and after funerals, holy water is often dispersed throughout rooms and on the mourners.

This ceremony is even more famous in both Hindu and Muslim traditions, where bathing is a main part of daily worship. It may be said from the very first day of life until the last day, ceremonial purification by holy water is a must in every household. Even in this technologically advanced world, this cleaning and purification form a necessary part of life for the youth and the old. This sprinkling of holy water is always part of special ceremonies such as the naming of a newborn child, placement of the sacred cord over the neck, and the purification of the mother after childbirth. In the laws of Islam, it is necessary to wash

hands and feet before the prayer. For this reason, to remove the impurities, a person washes five times before uttering the holy prayer in the name of Allah. In Greek and Roman churches, holy water is also used. As one enters the church, the individual is blessed with the sprinkling of holy water. It may be said, then, that this concept of lustration is well-known in almost every culture of the world. It is a faith of the invisible.

Arnold Van Gennep (2004), one of the most well-known anthropologists, coined the term *rites of passage* while studying the significance of the ceremonies in connection to the transitional stages of human life. He, in opposition to Émile Durkheim (1912/2001), argued that society is composed of individuals, and so it is possible for individuals to change the whole. This is contrary to Durkheim's view that individuals cannot go against the collective will of the society. It is Van Gennep who noted first that the ritual ceremonies that accompany the transitional stages of human life may differ in detail from one culture to another, but they are, in essence, universal.

What, then, are rites of passage? From the anthropological point of view, a rite of passage is a ritual that marks a change in a person's social status. It is a universal phenomenon through which the social hierarchies, values, and beliefs of a specific culture are revealed. There are ceremonies surrounding events such as birth, initiation, puberty, adulthood, marriage, and death. These are the phases of life through which the individual passes from one defined position to another. Van Gennep (2004) considered these ceremonies sociocultural rather than biological. A. M. Hocart (1954), British anthropologist, viewed the transition from one stage to another as the result, rather than the cause, of ceremonies. These phases are composed of three parts: separation, transition, and incorporation.

In the first stage, separation, participants disassociate from their social state. This separation makes them unique, as they are the special persons for whom the ceremonies are organized. For example, the wedding ceremony is a special social ceremony. There are variations in different cultures, but the point is to prepare the couple for the auspicious wedding day.

The second stage is the vital transitional stage. During this stage, participants almost remodel the past social status. New values in the form of sacred rites and objects are calculated. The changed perspectives are the seedbeds of cultural creativity and give rise to new ideas and paradigms. This transition may be symbolized by the act of transformation, for example, through a change of clothing or a special incantation. In the wedding ceremony, the couple is granted some privileged rights within the community.

The third stage, incorporation, welcomes the participants back into the community. In marriage, the couple merges back into the culture with the rights and privileges of their new role.

These ceremonial enactments possess a primordial and vital role by appealing to the place within human beings where culture is created and recreated by human behavior. From the anthropological point of view, ceremonies are more than social glue holding society together. Ceremonies instead happen to mirror the spiritual, religious, and emotional nature of human beings. In other words, ceremonies reflect how people build, learn, and transform culture in ways that infuse meaning and give definition to their existence.

Life Ceremonies

Ceremonies to celebrate the life cycle are universal and are found in all societies, although the rites vary. The ritual part of these ceremonies includes various kinds of rites, such as celebrating childbirth, as exemplified by baptism in Christian society. In other societies, for example in Hindu society, there are certain elaborate ceremonies performed by mothers before the childbirth. After the birth of the child, the mother observes certain restrictions regarding her food and way of living to ensure the well-being of the child. The child and the mother are kept in seclusion for at least 21 days, and after performing certain rites, they both are included within the family. Both mother and child are often regarded as defenseless at this time, and ritual acts are performed in order to protect them from harmful supernatural forces.

In all societies, some ritual observances surround childbirth, marriage, and death, although the degree of elaboration of the rites varies from one culture to another. In Southeast Asia and Indonesia, a practice called mother roasting, requiring that the mother be placed for some days near the fire, appears once to have had the goal of protecting the mother from such evil influences. This practice survives even today in altered form in the rural Philippines, where it is regarded as having therapeutic value. From an anthropological perspective, all these ceremonies are ways to reinforce familial ties. In addition to serving as a means of bond between husband and wife, these practices promote familial and societal solidarity.

Functions

The rites performed in functional ceremonies bear positive values for the individual in relieving stress at times when certain life adjustments occur, such as puberty and marriage. The rites are also viewed as socially supporting, such as to prevent social disruption by relieving the psychological stress of the individual. This prevention comes in the form of instructing all members of societies to continue life in a normal way with the new social role. New social and moral values emerge with this new role as they become part of the ceremonies, and life moves on as usual.

Entertainment is one of the primary functions of social rites. Centering these events, pleasurable activities follow in the society and find expression through art, music, dance, song, and other ceremonies. Performance of various ceremonies protects the sociocultural unity of society. They are a means to gain livelihood and sometimes they also act as incentive to keep unity of the group.

In ancient times, most of the ceremonies were religious events; that is, they were performed in a religious framework and regarded as religious acts. But more recently, from the viewpoint of social science, these events are considered secular. The primary significance of most rites reflects a change in the sociological structure of society. Modern life is viewed as dominated by a rational culture in which human responses are governed by selective choices. In other words, it is a disenchanting, nonmagical rationalized world, as Max Weber (1922/1993) has noted. In fact, anthropologists differ regarding the issue of the similarities between the primitive and modern cultures. In primitive and tribal culture, objects like plants and animals were worshipped. Even wind, sun, and water were treated as sacred. The real end behind this ceremonial worship was to increase the food supply and receive protection from natural disaster. But, as the modern culture advanced, this ceremonial behavior changed. It may be said that instead of religious wrapping, the tendency of recent times views the events as secular.

In today's globalized world, most of the rites are viewed on the basis of their sociocultural context. The inventive and symbolic capabilities of human beings are treated as a constant factor, and attention is given to differences and similarities in the sociocultural traditions in which the ceremonies are performed. For instance, in attempting to understand why the marriage ceremony is an elaborate rite in one society and simple in another society, researchers have looked to the social order and manner of gaining a livelihood to judge the relative importance of the enduring union of the spouses. Since culture includes the social order, and composes a coherent inclusive system, scholars have interpreted the ceremonies in terms of their functional significance in the social system. In this way, scholars have broadened their investigations from observations of the symbolism of rites to include all the behavioral actions during the rites and their social contexts—uncovering the social identities of the performers and their relationships to other performers and the entire society.

Social Significance of the Rites of Passage

From ancient times to this technologically improved century, the rites of passage help to maintain society as a system of congruent parts. To operate any system coherently and effectively, it is necessary that the elements are mutually supportive or congruous. These rites

help to keep society in a state of equilibrium. Social systems include a fixed number of people with a fixed number of roles. Any change disrupts social equilibrium. For example, when a child is born, a new member is added to the society and accordingly, due to changes in the social behavior and statuses of the parents, other members of the society are affected. In fact, rites of passages help to foster the development of a new state of equilibrium in adjustment to the social changes upon which the rites focus. The rites act as threads through which the members of society are informed of the new social development and, at the same time, permit social approval. The ceremonial observances also offer psychological assurances to the members of the society. The members are instructed, by the ceremonial enactment, to return to normal behavior as the situation demands. This kind of reasoning is not only applicable to social ceremonies but also to religious ceremonies. Anthropologists interpret these social rites, and others, as rites of intensification. The social rites reinforce or intensify the existing habitual relations, and thus serve to maintain their conditioned response. In other words, the performance of these rites prevents the extinction of habits to which the person has been trained.

From the anthropological perspective, besides balancing social equilibrium, there are a group of additional functions—some of which apply first to the individual whose positions change and then to the behavior of the entire social group. Other functional effects directly apply to the whole society. Whenever the individual faces any anxiety or stress, the functional effects of the rites prevent social disruption. For example, with funerals, the anxiety and stress caused by death and the grief of the bereaved are held in check. Funeral rites and ceremonies are held in every society, but then, in order to keep social harmony, the bereaved still must regain normal behavior after a certain period.

There is another implicit way that the rites are socially supporting. The shared rites are dramatization, with supernatural sanction of the social order of society. Relatives have a special role to play and the entire social hierarchy may be on display during the ceremonial rites through the assignment of ritual roles. Thus, statuses of kinship, caste, social equality, and hierarchy are all reimplemented by their dramatic presentation.

Accepting the social significance of these rites of passage, anthropologists have also offered explanations for the variations in behavior among societies of the world. A fundamental assumption is the idea that the greater the importance of a social change, the greater the ritual attention will be. It is an accepted fact that the birth, marriage, and death of a ruler obviously is more important to the entire society than these events in the life of a common person. Rites of marriage ceremony, for example, may be very simple or very elaborate in different societies of the same economic base and comparable levels of cultural

development. The differences happen due to different structures of society. For example, marriage ceremonies in matrilineal societies—organized into subgroups primarily upon a principle of descent through female lines—only tend to be simple and divorce in these societies is also simple. Marriage ceremony in patrilineal societies, on the other hand, tends to be elaborate and divorce initiated by females is difficult. But whatever the case may be, in patrilineal societies, the role of the mother is vital for the birth and rearing of the children. In some societies (e.g., in some African societies), marriage ceremonies are elaborate and often involve the transfer of property, known as marriage suits. If the marriage fails, then the property must be returned.

Among almost all societies of the world, marriage ceremonies divide into three parts: premarriage ceremony, the main-day function, and postmarriage ceremonies. All three parts are performed for the well-being of the couple; the bride and the groom have undergone the whole series of rituals, from engagement parties to the religious ceremony, and may reasonably be seen as more firmly married than couples united by a simple civil ceremony. Anthropologists view marriage as one of the earliest social institutions. Marriage ceremonies have often included clearly visible signs of the new social status, in such forms as wedding rings, distinctive hair dress, new garments, and decorative ornaments. Traditionally, preliminary ceremonies have often provided instruction in the wifely role. Such instruction might be formal or conducted through mimicry, dancing, and other symbolic acts that dramatically depict the woman's role in society, expressing her economic and social obligations with reference to her husband and other members of the family. Overall, the prime significance of marriage ceremonies may be seen to especially stress the social bonds between husband and wife and their relatives.

Government Ceremonies

Besides the rites of passage, there are government ceremonies, or celebrations of events that also play an important role in society. Sometimes, a ceremony may only be performed by a person with certain authority, such as the presidential oath in the United States. Here also the three stages of separation, transition, and incorporation apply. The particular person is being separated from the mass and offered a unique place. The point is to honor the person in the new role.

In the second stage, the participant acquires a new social status with other values. For the U.S. presidency, the transition is symbolized by the act of taking sacred oath to stand by the country and protect from all odds. The final stage follows, where the community welcomes the participant as one of the members of the mass with a special position.

There are also certain ceremonies, such as British coronations, that show a symbol of moral values to unite the British people and provide a consensus underlying political differences. This type of ceremony promotes the authoritative, official, and public image of the society. There emerges a sense of individuality and of collective membership.

Dancing Ceremonies

Physical display, such as dancing in a procession or the laying of hands, is an outstanding feature in ceremonial observances often accompanied by singing and clapping. In fact, songs and dances are so closely interwoven that the one cannot be separated from the other in any performances. These ceremonies have occupied a rightful place in all the principle celebrations in the cycle of human life (initiation, puberty, marriage) and of the seasons (planting, sowing, and harvesting).

These dances promote solidarity and mutual goodwill among the people dancing. In the tribal sort, the mimic aspect comes to the forefront with the behavior of animals' fertility processes; natural phenomena are represented in a realistic manner in order to obtain control over the supernatural powers governing the objects and events portrayed. Dancing ceremonies are a way to appease the supernatural powers among tribal people, but among more sophisticated groups, communal dances afford an opportunity for social mingling, fringing people together for fun besides the ritual observances.

Religious Ceremonies

In all traditions and cultures, spiritual ceremonies and rituals play a central role. The very act of dancing, music, chanting, singing, and other ceremonial expressions bounds a community and also serves the purpose of connecting to the higher spiritual forces. The expressions in various communities are different, but the goal is the same—to stimulate the connectedness, communion, and spiritual experience of a group or an individual. In almost every religion, there is certain external ritual to help people unite with the divine. To develop this point, two types of ceremony are discussed: the Eucharist ceremony in Christianity, and the ritual of the Puja in Hinduism.

The Eucharist and Puja Ceremonies

The idea of unification with the divine is known as the *Eucharist ceremony*. These ceremonies fulfill the psychological need to find a place in this vast and ever-changing universe. The urge for divinity finds satisfaction through the observation of these types of ceremonies. Within this framework, the Eucharist ceremony

is the ritual observed by the Christians through which direct unity with God is invoked. *Eucharist* is a biblical term that also means communion with God. The ceremony is observed by the congregants who gather together in their church. After the pastor reads and recites a specific holy passage, the participants are presented with a small amount of wine and a little piece of bread, and they eat in unison or one by one. The actual ceremony varies within the different sects of Christianity, but the aim remains the same—to invoke communion with God. The Eucharist is a moral and spiritual union with Christ through the bond of love. The spiritual part of this ceremony is revealed in the reference of the “Lord’s supper.” There are mainly five parts of this ceremony: (1) thanksgiving, (2) memorial of Christ’s death and resurrection, (3) invocation of the spirit, (4) communion of the faithful, and (5) feast of the future fulfillment of God’s reign. Before highlighting the anthropological significance of this ceremony, let us also discuss the rituals that are associated with Puja ceremony of Hinduism.

In Hinduism, Puja is a comparable ceremony to the Eucharist, performed to establish communication with a deity. During the Puja, the deity is treated as a guest. Similar to the Eucharist, the priest welcomes the deity during Puja. There are 16 steps of this ceremony performed during the deity worship, normally occurring in a temple (though a devotee can also perform the ceremony in a simplified manner): (1) invocation of the deity; (2) offering of the seat; (3) offering of water for washing the feet of the deity; (4) offering of sacred water; (5) a process for rinsing the mouth; (6) bathing; (7) clothing ceremony; (8) offering of the upper clothing; (9) offering of fragrant materials, like (10) flowers and (11) incense; (12) offering of the lamp along with the fragrant materials; (13) offering of food; (14) performing the puja by going around the image of the deity clockwise; (15) salutation; and finally (16) offering of flowers with the recitation of *mantra* (sacred words). In the end, blessings are sought from the deity. In either case, the main purpose is to procure happiness and sometimes there is a specific request that the devotee wants to achieve.

From an anthropological perspective, both the Eucharist and the Puja fill a deep void. There is an attempt to justify the loneliness of human beings in the vast world. An act of unity with divinity results through the partaking of food and drink during the worship. As a large number of people are present both during the Puja or Eucharist, a sense of intimacy develops by eating and serving food to each other. By eating together, people regard themselves as identifiable groups, representing themselves to each other as such and expressing their connectedness. A sense of unity therefore develops among the groups. It is not that always after performing all these rituals participants will be able to get whatever they want, but this is a kind of self-purification through which they can feel refreshed and encouraged. It may be

said that there is an emotional effect, which helps people to start any work with more energy.

Celebration of Religious Events

Celebrated among different communities, there are certain annual, seasonal, or recurrent ceremonies like weekly Sabbath day or feasts held in honor of the saints. In some Asian cultures, tea ceremony plays an important role. Another important ceremony is the purification of the Virgin Mary, commonly known as Candlemas; it is of eastern origin, and symbolizes the meeting of the Christ with Simeon and Anna. However, in the West, it is the purification of Mary according to Jewish custom.

According to E. O. James (1961), the purification or Candlemas ceremony traces to the symbolism of the Feast of Lights and the ancient perambulations associated with the return of the goddess from the underworld and the rebirth of nature in the spring. Here, candles are emblems of the divine vitalizing power of the sun and work as a protection against plague, famine, and earthquake. Fire also symbolizes the emergence of the sun from the darkness of winter. In Christianity, Mary came into great prominence as the light bearer, since the sacred light became a symbol of the Holy Child who was declared to be the light to lighten the glory of human kind.

In Japanese, the Asian tea ceremony is called *Chanoyu*, which literally means “tea-hot-water.” It is a multipurpose traditional activity influenced by Zen Buddhism, in which powdered green tea is ceremonially prepared and served to others. Not only in Japan, the custom of drinking tea, first for medicinal and then for pleasurable reasons, is also widespread throughout China. This ceremony has its own aesthetic sense. Through the observation of this tea ceremony, a sense of harmony, respect, purity, and tranquility develop. In this framework, one of the essential constituents of society is ceremony. Ceremonies help to draw people’s attention to something that is extraordinary and worth mentioning in some way.

Another famous ceremony occurs in Rajasthan, India in the city of Puskar, where a fair is organized every year in November. Puskar is famous, as it is believed that Brahma, the creator of the world, resides here. The place is also known for its natural beauty with hills on three sides, with the 14th-century temple of Brahma in the center. Hindu mythology narrates that the gods created a swan with a lotus in its beak and let it fall on earth where Brahma would perform a *yagna*, that is, sacrificial fire. There is a sacred pond, known as *Brahma kund*, where people used to bathe. It is a belief that by the healing touch of this water, one may recover from all ills. So, bathing ceremonies are the top attraction and give people a new strength of life. It is also believed, even in this 21st century, that after bathing in this sacred water, it is possible to begin a new cycle of life.

There is a market around the temple of Brahma where local people sell handicraft works. In fact, this yearly Brahma ceremony allows the local people to earn their livelihood, and the fair also reflects the rural lifestyle. In addition, there is propagation of ecotourism through the village-type resorts. From an anthropological perspective, these types of ceremonies, which are abundant throughout India, help to foster not only earnings, they are also a way of knowing each other’s culture through the colorful lens of local handicrafts.

Conclusion

Ceremonies are reflections of culture. This may vary from country to country, but the focal point of the ceremony always remains the same—the reflection of culture. Culture is a blank sheet, an empty pigeonhole where forms of life are expressed through the actions and words of community members. Since every society is dynamic, complex, and ever changing, ceremonies play a central role in the cultural work of human activities.

Ceremonies work as a tapestry of patterns of culture and they create a backdrop against which individual behavior can be viewed in the context of past, present, and future activities. As such, the ceremonies serve as social glue that binds the whole community together.

From an anthropological perspective, it may be said that human beings, through agency and free choice, continuously make and remake their existence. This is possible because while culture provides the script for ceremonies, rituals, and other culture-building activities, humans are free to change that script according to their choices within the norms of the society. The result is complexity, and a dynamism that provides scope for cultural change and transformation.

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FESTIVALS AND RITUALS

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Festivals and rituals have played an important role in developing an understanding of the social network of societies. They have existed since the dawn of humankind and remain vital to civilization today. Their role is recognized by anthropologists as central to the understanding of human culture, customs, and beliefs; as such, anthropologists have studied festivals and rituals ever since anthropology emerged and developed as a scientific field of study in the second half of the 19th century. There is an extensive body of literature and much anthropological debate on how festivals and rituals should best be defined, why they are important, and what kinds of events they may include. The study of the nature, origin, and purpose of festivals and rituals has closely followed the anthropology of religion and the history of the field of anthropology. Reviewing past practices and examining current trends in the study of festivals and rituals will help anticipate the next stage in anthropological research.

Anthropologists have approached the study of festivals and rituals from many and varying viewpoints. These perspectives have changed with time but can generally be broken down into five major categories including (1) evolutionary (origin), (2) functional (purpose), (3) structural (framework), (4) symbolic (symbols), and (5) modern (contemporary). Two broad classifications of ritual often studied within these various approaches are rites relating to the human life cycle and periodic events. These two classifications may be broken down further into a number of ritual types.

Although individuals create routine periodic behaviors, such as washing hands before and after each meal, it is the established, publicly organized rituals that generally interest anthropologists. Single social actions, such as greeting handshakes, have not traditionally been the basis for this examination either. It is the interplay between the individual and the larger society and with the greater powers of being, and the result of this series of actions, that is studied in this chapter. When people come together for festivals and voluntarily communicate through verbal and nonverbal actions, their participation exudes deeper meaning. Human responses to ritual stimuli remain a fascinating aspect of anthropological research to this day. The evolution of festivals and rituals and their existence in primal and modern society has been the focus of hundreds of research studies, but there remains much more to learn.

In this chapter, first the history of the anthropological study of festivals and rituals is reviewed and summarized. Second, common reoccurring descriptive terms used to express the definition of *festivals* and *rituals* as used in the field of anthropology are discussed. Third, significant theories in the history of the research on festivals and rituals, along with major contributors to the discipline, are reviewed. Fourth, a brief summary of the research methods applied by researchers in the field follows. This chapter then contains a brief overview of some of the major types of festivals and rituals. Recent application of festival and ritual studies in the study of arts and communication follows. In conclusion, the final section suggests future directions for

anthropological research on festivals and rituals. Over time, the study of festivals and rituals has changed from observation of religious rites of the sacred to now include embracement of secular and profane study.

Overview

Anthropologists study human origins, patterns and variations of human behavior, and physical and social development in different cultures. They then compare and contrast their findings to learn what values and beliefs have been established as vital components of human society as a whole and also as important elements within specific cultures. In this research, anthropologists have found religion to be an important lens through which to understand culture. The observation of a society's religious underpinnings provides anthropologists with information on the faiths, values, and beliefs of the society's members, and also on how members interact with one another and their cosmic forces.

The study of festivals and rituals was initially undertaken by anthropologists who saw them as keys to understanding their places in religion and their roots in tribal societies. In examining tribal societies, anthropologists realized that ancient peoples had basic needs that required humans to unite in order to obtain food, water, shelter, and clothing. As they observed these processes, anthropologists understood that satisfying and stabilizing immediate requirements allowed the participants to focus their attentions on acknowledging their fortunes and celebrating the mysteries of life. The animal that was sacrificed or the god that provided the sustenance was given thanks and appreciation. The divine powers and the spirit of the dead animal had to be appeased and blessed, not only to give thanks for the bounty but also in hopes of future good fortune. As these feasts emerged as regular practices, they developed into intricate festivals that became central to societies. As time passed, specific rituals became associated with these and other events. Festivals and rituals and their history, function, structure, performance, symbolism, and efficacy are inherent components of anthropological research.

Defining Festivals and Rituals

Anthropologists usually identify what festivals and rituals are and can describe their general characteristics; but they have not agreed to apply specific narrowly prescribed definitions for the terms.

Traditionally the term *festival* has been used as an adjective meaning "regarding a day of feasting" and as a noun denoting "a time for feasting." As an adjective, festival also came to be used to mean "joy, glee, or merriment." When anthropologists began describing festivals in the late 1800s, they were usually reporting accounts of religious events, seasonal celebrations, or other practices involving

major events in human life. Their reports generally referred to festivals as periodic celebrations or times set apart from the ordinary or everyday. At this time, anthropologists distinguished festivals as episodic events that were not commonplace routines. In other words, they were special. As per their observations, most of these festivals pertained to a holiday, a "holy day," or day of religious feasting. Most of these interpretations were based on statements gleaned from observations of what were believed to be religious events. Ethnographers, sociologists, and anthropologists documented intricate performances that took place within tribal communities. Feasting was a major component of these practices: In some cases, special foods were prepared following closely scrutinized customs, while in other situations, specific items were restricted from the diet.

During these formative years in the field of anthropology, the general public began using the word *festival* to include artistic performances also. This new definition became more prominent and had wide-ranging effects on future research. Numerous modern anthropologists now adopt a wider interpretation and identify political, national, sports, and mass communication events, art exhibits, and intense film series as festivals, too. The broader view of festivals allows some anthropologists to interpret festival as including nearly every cultural event. This leaves wide-ranging research opportunities for anthropologists who study festivals, but not everyone agrees on the broader view. Although clear-cut definitions and specific applications have not been determined, festivals, as explained by anthropologists, usually include feasting and rituals.

Like *festival*, the term *ritual* has also had many and varying definitions throughout history. The earliest and most basic dictionary entries refer to ritual as "relating to rites or ceremonies." Further depiction of rituals often described them as established or orderly actions or performances. Application of this secondary level of meaning may be limited to religious events, but it may also be applied broadly to pertain to nearly any living species. The migration of birds, the flight of bumblebees, and the feeding patterns of animals are all examples of actions that fall under the more general rubric. Another narrowly described, but still widely used, definition for ritual is formal, repetitive actions. Sequential, reenacted, redundant, repetitive, predictable, stereotypic, and reiterated are just a few variations that have been used to describe this phenomenon. Another variation of rituals as repetitive actions more specifically considers them beliefs in action. By adding beliefs to the explanation, the focus of the term becomes more expressly centered on human endeavors.

Since anthropologists study the science of humans, their definition of ritual has centered on actions of people, but this is not true for all social scientists. Traditionally, anthropologists have understood rituals as actions that are different from everyday events. This implies that they are

not used for ordinary events but for a unique purpose. Further elaboration for some anthropologists has included delineation of the more specific traits of formality and prescription. These added details imply a need for procedure, instruction, or some form of direction for participants to follow. This definition also implies that rituals are not arbitrary phenomena, but ones that require skill or previous training to perform.

Some anthropologists include symbolic objects or words as necessary components of a ritual. Adding symbolism as part of the definition leads anthropologists to further emphasize meaning and emotion. Thinking about the meaning behind ritual objects, words, and behaviors has led some researchers to consider questions that relate to their expression, interpretation, and efficacy. How do the activities transcend the actions themselves? It is this underlying meaning that many anthropologists have found to be the most valuable part of studying rituals. The actions within the performance of rituals are interesting, but the significance of the ritual for the participants, the shared experience for the community, and the connections they make to the divine are often the focal points for anthropologists. The effects of ritual on the participants and the community often surpass understanding. Anthropologists have used function, purpose, and meaning as methods for investigating these intriguing happenings.

The lack of specific definitions for festivals and rituals has, at times, led to ambiguity in determining what can be classified as ritual. This has also resulted in various interpretations as to what actually constitutes a festival or ritual. This vagueness leaves the field open to both broad and narrow interpretations of what should be included in the study. While there is now a vast array of literature on festivals and rituals in both primitive and contemporary societies, their study is still in its infancy.

In their research, anthropologists have observed that festivals and rituals often occur around the major events of the human life cycle. Fertility, childbirth, naming, healing, initiation, adulthood, marriage, death, and funeral rites are just a few examples of this phenomenon. Hunting, planting, gathering, and other agricultural and seasonal events are cyclic events that are also examined. In their observation of ritualistic activities, anthropologists have noticed that a sense of unity develops among the participants. The rest of this chapter will generally focus on the group dynamics and the interplay that occurs during festivals and rituals.

Theoretical Approaches to the Study of Festivals and Rituals

Evolutionary Approach

Many late 19th- and early 20th-century anthropologists studied festivals and rituals by seeking their roots in primitive

cultures. They recorded other people's accounts of witnessed events and also directly observed actions in tribal societies in order to gain insight on their existence in primal lives and in their own civilization. Numerous ethnographers, sociologists, and anthropologists of the day adhered to an evolutionary approach to understanding why feasts, festivals, ceremonies, holidays, rituals, and rites exist. These early anthropologists worked to explain ritual from a historical perspective. They saw a direct link between primitive rituals and the ones they celebrated in their own time and societies, and they often perceived present ceremonies as relics of the past. Sir Edward Burnett (E. B.) Tylor (1832–1917), Sir James Frazer (1854–1941), and William Robertson Smith (1846–1894) are three well-known researchers who studied rituals from an evolutionary approach.

In 1871, E. B. Tylor published *Primitive Culture* (1871/1958), which included a chapter on “Rites and Ceremonies.” In his work, Tylor discusses prayer, sacrifice, fasting, orientation, and other religious rites. His view of these ceremonies portrayed rituals as dramatic performances that allowed for communication with the deities. His discussion focused on the philosophy of *animism*, in which both animate and inanimate objects have souls. In his writings, Tylor used accounts of primitive rituals and ceremonies to attempt to explain the roots of modern culture. In his studies, he infers that modern religion and its rituals are relics of archaic practices.

A contemporary of Tylor, Scottish classicist Sir James Frazer, also believed that it was possible to trace the customs of modern society by studying primitive ancestry. Like Tylor, Frazer wanted to prove that many modern practices were holdovers from the past. In 1890, Frazer published the first edition of *The Golden Bough* (1890/1935). This massive work includes numerous rites from all over the world. Frazer's linguistic abilities, penchant to acquire evidence for comparative study, and writings have led scholars today to call him the father of anthropology.

During the 1880s, Scottish biblical scholar and *Encyclopedia Britannica* editor William Robertson Smith (1894/1969) hypothesized that ritual was an important component of religion, and that in primitive cultures rituals or practices preceded myths and beliefs (dogma). In his study of primitive religion, Smith observed that some clans were united by an affinity to a particular totem. He also determined that one of the oldest rituals, sacrifice, involved a ritual killing followed by a feast that was communally shared by the tribe and its god. Smith saw religion as a community unifier and ritual as a method of worshipping society. Smith's observations and perspective on primitive social cultures have led some researchers to the conclusion that Smith deserves to be called the father of social anthropology.

Toward the end of the 19th century, the evolutionary approach to the study of festivals and rituals lost its luster. Critics argued that data and analysis under this approach

were not scientific. They wished to conduct fieldwork and to implement more theoretical and methodological instruments.

Functional Approach

In the beginning of the 20th century, new functional approaches emerged among European and American sociologists and anthropologists. Functionalists studying festivals and rituals sought to explain their function or purpose. They observed festivals and rituals, but then went further by asking participants in the ceremony what this event meant to them. This form of methodology brought research forward by asking questions that required anthropologists to use more refined methods of comparison. This functional approach to studying festivals and rituals sought to understand how a particular ritual related to other customs within the society, why it was important to society, and how it might relate to similar occasions in other cultures. These functional anthropologists used firsthand observation and interviews with people participating in the ceremony. They attempted to explain festivals and rituals by appreciating the particular custom from the perspective of an individual within the society, and by understanding the social order as a whole.

French sociological theorist Émile Durkheim (1858–1917) promoted a basically functional theory of ritual. In *The Elementary Forms of Religious Life* (1912/1995), Durkheim's study of the Aborigines of Australia, he discussed the solemnity of religious ceremonies and the characteristics of rituals. Durkheim separates rituals into two categories: the sacred, which he dubbed "positive," and the nonsacred "negative." He describes the positive, religious ritual as a code of conduct that provides the proper behavior for religious comportment. He explains religious ritual as formal public enactments that include symbolic representation to provide meaning to the participants. According to Durkheim, positive rituals solidified the relationships between the individual, the society, and the spirit. He describes rituals as a means of gathering people together, motivating participants, and bringing about a new state of action. Durkheim views positive ritual as a method of reconstructing society and affirming its basic tenets, and he observes negative rituals as taboos.

Like Durkheim, Polish-born anthropologist Bronislaw Malinowski (1884–1942) viewed ritual as an important element in the function of society. After receiving training in mathematics, physics, and psychology, Malinowski traveled to the Trobriand Islands, north of New Guinea, where he conducted extensive fieldwork. Malinowski (1954) saw ritual as a means of aiding humans during their weakest hours. The presence of ritual, he suggested, provided guidance and an acceptable means of expressing emotion, especially during times of discord or distress. According to Malinowski, rituals helped to satisfy individuals' basic needs; satisfying these basic requirements was the function of society.

A third famous functionalist, British anthropologist Alfred Reginald (A. R.) Radcliffe-Brown (1881–1955), was obviously influenced by his predecessors' findings. Like Durkheim and Malinowski, Radcliffe-Brown (1952) included research on the function of ritual, in his studies, but he was more interested in the social framework of ritual. By providing a structure of analysis, Radcliffe-Brown created a better strategy for comparing different global societies. While he was not the first functionalist, anthropologists today consider Radcliffe-Brown a major contributor in the formulation of the methodology.

Many British and American anthropologists have pursued the study of ritual from the functionalist perspective. Among the major contributors who have followed this route are English social anthropologist Edward Evan (E. E.) Evans-Pritchard (1902–1973), American sociologist Talcott Parsons (1902–1979), and British anthropologist Edmund Leach (1910–1989). South African-born Meyer Fortes (1906–1983) was a functionalist who was heavily influenced by British scholars. Many functionalists have used the study of festivals and rituals as a way to explain religious activities and to understand the correlation between the participants' individual needs and the demands of the civilization. After World War II ended, many anthropologists sought a new paradigm for ritual explanation.

Protostructural Approach

In 1909, Flemish anthropologist Arnold Van Gennep (1873–1957) published *Les Rites de Passage (Rites of Passage)* (1909/1960). Van Gennep observed individuals' movement from one social status to another and concluded that there was a specific structure to the rites that surround major life crises. He examined birth, initiation, marriage, death, funeral, and other rites associated with transitioning from one stage of human life to another, and found that the events could be broken down into three steps. He labeled the crossing from one stage of life to another as the threshold or *liminal* phase. This liminal point, Van Gennep postulated, was preceded by a *preliminal* or separation period and followed by a *postliminal* or reintegration point. According to Van Gennep, rites of passage marked the stages in which an individual proceeded from one phase of life to another, allowing people a systematic method of coping with transition. The individual was removed from the former stage of life, went through a period of limbo, and then was incorporated back into society under a new standing. Van Gennep's research has been very influential in the study of festivals and rituals.

Structural Approach

Belgian classicist and anthropologist Claude Lévi-Strauss (1908–2009) examined myths and rituals from various cultures and concluded that there were similarities in the structure of myths that transcended cultural boundaries.

Having previously studied structural linguistics, he applied structural analysis to the study of myths. This afforded him the opportunity to show a logical, more scientific, method of understanding culture and relating the past to the present, and the present back to the past. He viewed ritual not only as a method of conveying myth, but also as a way of relating what society dictates. Lévi-Strauss was a major contributor in forming structuralism as a new method of studying society. This structural approach to myth and ritual has not proven to be the definitive answer that anthropologists hoped to find for the study of humankind, but it has added a new method for interpretation and analysis.

Symbolic and Interpretive Approach

Scottish writer Victor Turner (1920–1983) enhanced Van Gennep's ideas on the liminal or transitional stage of rites. He referred to this midpoint as being “betwixt and between” social stages of life. Turner believed that in this phase of liminality, when people are in a state of limbo, participants form a sense of unity and a spiritual bonding he called *communitas*. Turner's (1969) investigations of primitive societies led him to seek meaning in ritual rather than simply focusing on its function in society. He questioned the participants to gain knowledge of their interpretation of their rituals and found cognitive and emotional factors to be influential, and that symbolism was a basic element of ritual. Turner used his findings to create a method of analyzing symbols in terms of their level of meaning.

Symbolism and interpretation were key elements in American cultural anthropologist Clifford Geertz's (1926–2006) research on ritual. In the 1960s, Geertz advocated for a more philosophical explanation of culture. He studied rituals, myths, and symbols as valuable entities that provided meaning and order to life. In *The Interpretation of Cultures* (1973), Geertz describes ritual as “consecrated behavior” that makes people more committed to their beliefs. Geertz elaborates this basic definition by explaining the importance that symbolism has within these ceremonies and that they, too, serve to empower and enrich the experience. Geertz envisioned symbols and their meanings as units of religious rituals that, when understood in their original context, would explain the society's culture.

Modern Approaches

Ecological Approach

American anthropologist Roy Rappaport (1926–1997) focused his studies on culture, religion, rituals, and their environmental influences. In the early 1960s, he observed the Tsembaga clan of New Guinea and concluded that rituals

function to help control environmental relations. He perceived rituals he observed in New Guinea as a means of balancing the ecological system of the human beings and the pigs that resided in the area. In *Ritual and Religion in the Making of Humanity* (1999), Rappaport provides a lengthy explanation of his interpretation of ritual. He refutes some previous studies, supports a definition with a wider scope, and specifically denies that ritual is limited to religious occurrences. He also emphasizes the communication aspects of ritual and particularly accentuates that ritual is not just a succession of acts but includes *utterances* as well. Rappaport emphasizes that words and sounds are important in ritual. In his lengthy explanation, Rappaport also defines ritual as performance and highlights ritual as sequential and formal. With this, Rappaport and others were beginning to take a more secular, broader approach toward ritual.

Performative Approach

Sri Lankan social anthropologist Stanley Tambiah (1929–) began his studies examining kinship and ritual in Ceylon (Sri Lanka), transferred his research to Buddhist practices in Thailand, and later returned his focus to Sri Lanka. Tambiah worked to develop analytic modes that reflected the community he was examining. He rejected contemporary processes that superimposed Western thoughts on non-Western communities. In his research on rituals, Tambiah took what he called a *performative approach*. He related ritual to performance and saw connections between the actions and verbal expressions in rituals. Ritual language was an important part of Tambiah's research. His research also investigated politics, conflict, violence, ethnic identity, and social identity.

Neurotheology/Biogenetic Structuralism

Some anthropologists have recently begun examining festivals and rituals from a more biological viewpoint. These anthropologists have been applying psychological and neurological methodologies to determine how the human brain is wired and how it has evolved over time. American neurotheologist Eugene Guy D'Aquili (1940–1998) and Canadian neuroanthropologist Charles Laughlin Jr. (1938–) proposed a new school of thought—biogenetic structuralism. They theorize that the human body, particularly the brain, allows for human behavior characteristics that enable us to have the necessary skills for music, sex, linguistics, etc. They hypothesize that the brain provides for religious abilities, too. Based on this premise, neuroanthropologists use an interdisciplinary approach that combines neurosciences and physics with anthropology. Thus, they use physiological analysis to investigate the balance between the central nervous system and the environment. Since rituals are central components in all societies, these biogenetic structuralists apply their methodology to rituals.

Modern Applications

Modern anthropologists have continued to review their predecessors' research and to add their own insights to the body of literature on the topic. British anthropologist and functional structuralist Mary Douglas (1966) applies Durkheim's premises as she examines religion and symbolism in contemporary and tribal cultures. South African-born British Anthropologist Max Gluckman initially pursued Radcliffe-Brown's models, but later created his own school. Gluckman (1962) is noted for adapting Durkheim's and Van Gennep's theories to his own findings and enhancing them to apply to his fieldwork research on African legal systems and local conflict.

Since the 1960s, anthropologists have broadened their focal points of study. They have carried on with their interest in ritual in the context of religion, but have increased their investigation of formal procedures within secular events. This new, more cultural approach has triggered expansion of ritual inquiries into the arts, laws, customs, performance, and other areas as well. Recent anthropologists have delved into research areas that include academic traditions, military rites, parades, social clubs, oaths of office, habitual shopping sprees, health and folk festivals, and other public performances as falling into appropriate perimeters for ritual research.

Some of these anthropologists have also included major political events, national holidays, and national ceremonies in their studies. A review of the recent table of contents (1990–2008) of journals that focus on the study of rituals reveals articles with titles that include research on food, everyday life, art, gender, sports, athletes, professional wrestling, tooth-filing, well-being, snow days, television, and many that deal with performance or drama. These varying topics show the breadth of research today. Some anthropologists who study these events see similarities between the gathering of crowds for social events and for religious festivals and rituals. While religious rituals continue to be investigated in developing countries, there is clear indication that modern anthropologists are investigating broader aspects of civilization. Modern anthropologists have analyzed festivals and rituals from the traditional evolutionary and structural approaches but have tended to examine the functional, symbolic, and cognitive methods more often.

Research Methods

Descriptive Research

While observing and studying religious aspects of society, anthropologists realized that studies of festivals and rituals are essential for understanding religion and human origin. They are small building blocks that convey important aspects of religious life. Recognizing this value,

anthropologists began recording other people's accounts of festivals and rituals and then continued by documenting their own observations. In these accounts of festivals and rituals, anthropologists worked to provide descriptions of the people, details of the processes undergone in the ritual activity, and information regarding relationships among the group. Festivals and rituals were elements of religion in ancient times, and, as such, early ethnologists, sociologists, and anthropologists began providing empirical accounts of their existence in society.

Explanatory Research

Observation of tribal societies and their feasts, rituals, and festivals led anthropologists to follow their descriptive research with explanations as to why they exist in society. Attempting to understand their importance led anthropologists to exam their function, purpose, meaning, and symbolism for civilization. Endeavoring to clarify empirical studies with reasons for the survival of rituals has helped to broaden anthropologists' overall understanding of what they observed in these ceremonies, and it gave rise to new theories and interpretations. Explaining festivals and rituals from various theoretical points of view has been enlightening, but it has also fueled debates among social and cultural anthropologists.

Records of these observations and explanations have provided a wealth of information on festivals and rituals. These field research studies and analyses have also allowed social scientists to compare case studies with other historical accounts of festivals and rituals. Anthropologists continue to seek measurable standards that allow quantitative and qualitative data to be compared. Creating hypotheses, collecting and analyzing data, drawing conclusions, evaluating findings, and comparing and contrasting the information with information found from other rituals and cultures continues today. Recently, anthropologists have applied quantitative and qualitative research methods from other disciplines to provide further analytical information.

Types of Rituals

Imitative

As mentioned previously, most anthropological definitions of ritual include an aspect of repetitive or patterned behavior in their description. These behaviors may mimic or reenact actions from the past. These imitative actions can be ingrained traditions of religious ceremonial practices, repeat a story, or share a myth. The debate as to whether these actions stemmed from myths, or whether the myths came from actions, was a central point of contention between many anthropologists in the early 20th century. Later anthropologists appear to have agreed that some rituals stem from myths and some myths are

offshoots of ritual. Imitative rituals may include rites of passage, healing, purification, and more. They may be periodic or celebrate a particular occasion.

Periodic/Seasonal Rituals

Rituals that are celebrated at regularly spaced intervals are known as periodic rituals. Periodic rituals observe special days or seasonal events. They may occur on a specific date such as July 4th or at a more open-ended time such as during the first harvest moon or on the second Sunday in May. These rituals can be associated with seasonal celebrations, national events, community festivities, religious commemorations, and more. These holidays, or “holy days,” offer an opportunity for friends and family members to unite and celebrate a commonly held belief or practice. Most of these days are periodic, and many of them include symbolism. An American flag to mark the celebration of Independence Day, or an evergreen to celebrate Christmas, are just two such symbols.

While not necessarily holidays, similarly celebrated periodic occasions include birthdays, graduations, retirements, reunions, and anniversaries; these events are often honored with ritualistic activities. People gather together to honor someone or something, and to participate in prescribed actions that are not everyday activities for the honoree. The occasions are important to the individual, and the coming together of family and friends who participate in the attached activities enhances their value. These episodic revelries sometimes take on even greater significance at certain times in human life. Certain birthdays, for example, are more heavily revered than others. In some cultures, the first birthday is marked as a time of extra rejoicing because the baby has lived through a year that is often a tenuous year for children in those societies. In other cultures, this particular occasion is celebrated at a later point in life, but observed, nevertheless, for the same basic purpose, to mark the individual’s arrival at a safer plateau in life.

Healing Rituals

Among the many events commemorated during a human’s lifetime are those that are organized to assist people with healing processes. The loss of a loved one, major illness, or horrific violence can leave individuals in despair. A major life crisis, such as death, may leave family members and friends needing to bond with others in order to regain a sense of order in their lives. Ritual processes like the three phases discussed by Van Gennep (1909/1960) provide opportunities to express emotions and begin the healing process. Those people who are closely attached to the departed generally need to separate themselves from the lost member through mourning, transition through the phases of grief, and then rejoin society. Traditional ritual services that honor the lost person are celebrated throughout

the world. These ceremonies provide an opportunity to share the loss and provide mutual support during the darkest time periods. This need for therapeutic rituals occurs in times of illness, too. Special healers use time-honored practices to ward off evil and bring health to the ill.

Purification Rituals

Purification rituals may also serve a therapeutic purpose. Like healing ceremonies, they help people traverse through a series of cleansing processes: sanitization, solidarity, reflection, beseeching, and sacrifice. These rituals are practiced with all seriousness, for the ultimate goal is to show repentance in hopes of returning the sinner to society’s good graces. If a person has upset the divine order, restorative measures may be used to attempt to regain stability.

Ritual, Performance, Theater, Arts, Media, and Recreation

The challenge of defining festivals and rituals has resulted in no specific guidelines as to what they actually constitute. This lack of specificity has led to various interpretations as to the difference between rituals and theatrical performances. It has been argued that there are ritualistic festivals and ritualistic theatrical performances. Both include actions and incorporate the arts of singing, dancing, and music. The debate is whether or not theatrical performance is ritual, or ritualistic behavior. In this same vein, there has also been a disagreement over festivals and rituals and their place in parades, carnivals, beauty pageants, protests, and national ceremonies. Western anthropologists generally describe the entertainment aspects of theater, and the serious efficacy aspects of ritual, as methods of codifying what belongs within each of these categories; but festival, which has been affiliated with both ritual and theater, has a secondary definition of gaiety and merriment. While festivals may be merry, by most definitions rituals are not strictly fun, frolicking, and frivolous. In the past, anthropologists have contemplated ritual in theater and the other branches of the visual arts, but recent research has concentrated much more extensively on the secular arts and their relationship to festivals and rituals.

Ritual and Communication

When anthropologists began documenting rituals, they noted that the ceremonies appeared to include nonverbal messages. The participants seemed to be following a format in which they had been taught to share a series of actions with the community. In some instances, these activities appeared to provide the participant with some freedom of expression, and the anthropologists perceived that they were witnessing repetitive and imitative behaviors that communicate messages to society and the gods. Both the

solemn and highly charged rituals seemed to transform and empower the participants. Many of these rituals included verbal communication forms, too. Both verbal and nonverbal ritual communication, their meanings and their structures, have been of interest to modern anthropologists.

The process of analyzing and interpreting festivals and rituals includes three phases: (1) the messages conveyed within rituals and festivals, (2) the anthropologist's attempts to interpret and effectively express knowledge gleaned from these performances, and (3) the readers' or listeners' efforts to effectively receive this information. The communication that takes place within the ritual itself has been a regular component of the interpretation of festivals and rituals. Anthropologists recorded what they saw and later attempted to clarify their interpretations through participant interviews. Most of the anthropological studies of festivals and rituals that have been generated for English-speaking communities have been transmitted from a European-American perspective; but many of these festivals and rituals have been translated from non-English-speaking communities. Hence, there has been more effort to gain direct insight on festivals and rituals from within the culture.

Rituals and the Family

Social scientists' study of ritual may be viewed within the smallest social unit, the family. Families establish festivals and rituals that bind them as members of a large clan, as constituents of a religious unit, or as affiliates of political or social groups. Wedding services, holiday celebrations, and other family occasions provide people with shared experiences and develop and create new relationships. Rituals help meet humans' need for unity and stability. Family members thrive in households that provide unifying experiences that offer continuity with past generations, familiarity with periodic events, predictability in routine, and protection from the unknown. Rituals also provide significant coping techniques in a world that can often seem overwhelming.

Family rituals can be viewed as both emanating from society and providing protocol for the social order. Viewing the ebb and flow of festivals and rituals from all of the various interpretations has expanded research into many arenas. Today, even a family vacation holiday to a favorite getaway place may be seen as ritual.

Future Directions

The study of festivals and rituals has evolved parallel to the field of anthropology as a whole. Anthropology has been studied from both cultural and social traditions; but modern anthropology includes a host of subdivisions such as action or development, architectural, biological, business, ecological, economic, environmental, evolutionary, feminist, forensic, industrial, linguistic, political and legal,

psychological, and visual. These various divisions of anthropology offer even more study opportunities when a multitude of more specific categories are explored: aging, carnivals, education, race, social class, bioethics, ethics and justice, sexuality, and gender. Each of these research areas offers opportunities for further investigation of festivals, rituals, and ritualistic behaviors.

As the field of research has expanded, so, too, have the various approaches to the study of festivals and rituals. A review of the most recent literature appears to indicate that cognitive approaches, which involve thinking and reasoning, are likely to be in the forefront in the foreseeable future. New scientific emphasis on biology—also known as physical anthropology—and neurology are also providing anthropologists opportunities for unprecedented exploration. Current theoretical approaches to the study of festivals and rituals appear to be those that require thought, scientific methodology, and humanistic views. These methods are also ones that most easily lend themselves to cross-cultural interpretation. As communication methods and global transportation have seemingly shrunk the world, anthropologists have also become more inclined to utilize international and interdisciplinary approaches to investigate these basic elements of human existence. The study of festivals and rituals is inherent in the field of anthropology and will continue to be a valuable element in the science of human beings.

Conclusion

Festivals and rituals seem to have existed nearly as long as humans have walked the face of the earth. They are performed all over the world for a variety of purposes, including ritual compliance, recognition of respect, satisfaction of personal needs, improvement of cultural bonds, and social acceptance. Anthropologists have documented festivals and rituals as worship rites, rites of passage, celebrations of joy and sorrow, and components of everyday culture. They are integral parts of most societies that help shape culture and assist in establishing common connections between members of the culture. They provide a sense of commonality that facilitates participants' understanding of their heritage, eases transition from one stage of life to another, and provides legacies for the future. Although festivals and rituals are fundamental aspects of human culture, anthropologists have yet to truly understand their intrinsic values and their ubiquitous nature in society.

Anthropological studies of festivals and rituals have evolved from accounts of tribal religious practices to scientific methodology applied to both religious and secular events. Over time, some social and cultural theorists have described various aspects of festivals and rituals as being the most pertinent for their research in understanding humans. They have depicted festivals and rituals as ranging from prescribed, symbolically controlled sequences of

beliefs in actions with deep-rooted symbolism and meaning to simply being action that is separate or different. Various theorists and researchers have come to different conclusions regarding the function, meaning, and structure of rituals and the boundaries of festivals.

The abundance of literature on festivals and rituals has exploded into nearly every social and cultural arena. The broad and variant interpretations for festival and ritual have ranged from very solemn functional affairs to happy moments of social interaction. They have included periodic, life cycle, and performance events. When viewed in humanistic terms, the field of festival and ritual studies may have reached its preteens or adolescence, but there are still major growth prospects ahead.

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MUSIC AND DANCE

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Ethnographic approaches to music and dance in the 21st century explore how modes of expression and performance practices are involved in the making of lifeworlds. Cultural production is situated in specific contexts that generate meaning as particular sonic and kinesthetic phenomena relate to discursive processes and social structures. Scholars of music and dance engage with cultural flow through dialogic encounters and interpretative analyses. These studies help illustrate how performance practices produce meanings, mediate socialities, and configure political relations.

Ethnomusicology, which generally encompasses anthropology, dance ethnology, folklore, musicology, and sociology, situates specific theoretical issues in comparative social and historical contexts. Up to the late 1960s, the discipline explored and indexed the musical phenomena of non-Western cultures in ways that resonated with concurrent anthropological trends in area studies. Critical analysis of these approaches led to a rethinking of music in which music became not the object of culture, but rather the product and expression of human experience. In his writings on the relations between music and society, anthropologist John Blacking (1995) proposed:

We need to know what sounds and what kinds of behavior different societies have chosen to call “musical;” and until we know more about this we cannot begin to answer the question, “How musical is man?” As “humanly organized sound,” music is a bearer of meanings insofar as it exhibits and necessarily demonstrates a set of values that the society that generates it would otherwise lack. (p. 5)

Relations between music, dance, and society are thus viewed as complex networks of interdependence through which a given act embodies temporal and emplaced experiences that structure social processes. Contemporary ethnomusicology pursues a rigorous analysis of how cultural production generates social significance by positioning the individual as the agent of social change through historical encounter.

Theoretical Approaches

The Meaning of Music and Dance

Musical and social structures mutually constitute each other through human interaction. This cultural-studies approach derives from the seminal work of Raymond Williams, who claimed that culture is not fixed as a bounded work or elite mode of production, but is instead embedded in everyday experience and activity. As a cultural materialist who challenged orthodox Marxist accounts of historical epochs or phases, Williams framed cultural practices as sites of political contestation through which groups reproduce and resist modes of domination, particularly those that critique industrial capitalism (Williams, 1977). Critical to his work are structures of feeling that configure the ways in which particular generations and social classes experience difference among social relations. These feelings beget a lived experience of a particular moment in society and history that brings meaning into the lives of individuals and the

lifeworlds that they constitute. The production of cultural meaning is a fluid and dynamic process that emerges as a necessary process in which “new meanings and values, new practices, new relationships, and kinds of relationship are continually being created” (Williams, 1977, pp. 122–23).

Musical meaning is not itself generated through aesthetic critique, nor by reference to something extramusical, such as an emotion, landscape, or harmonic figure. Rather, musical elements and structures discursively relate to lived experience by an act of representation that fixes musical experiences to metaphoric and metonymic structures, forms, and works. These bounded entities are placed in a network of complex relations that can be explained through systems of representation in which musical ontologies serve as interpretive frameworks for diverse musical systems, whether Western symphonic music, Hindustani classical music, or Japanese *gagaku* court theater, or for categorization of musical cultures as classical, folk, popular, and traditional. Categories, however, do not necessarily correlate to an intrinsic value, but more productively relate to “how they are used and embodied in community relations to become structuring forces in musical life” (Holt, 2007, p. 29).

Ethnomusicologists today explore the discursive production of musical meaning as a contemporary response to what comparative musicologist Charles Seeger (1977) problematized as the “musicological juncture” (p. 16), or the gap of representation that occurs when communicating about one system of human communication (music) through another (speech). To redress claims that music is “untranslatable and irreducible to the verbal mode” (Feld, 1982, p. 91), ethnomusicology suggests that musical practice is less a latent mode of (artistic) representation but rather a (socially) active and engaged mode of producing reality. If speech is the communication of “worldview as the intellection of reality,” then music is the communication of “worldview as the feeling of reality” (Seeger, 1977, p. 7). What we perceive as “feelingful” occurs through the “generality and multiplicity of possible messages and interpretations . . . that unite the material and mental dimensions of musical experience as fully embodied” (Seeger, 1977, p. 91). As suggested by interpretive approaches to cultural anthropology, ethnographers study not experience, per se, but the feelingful and discursive structures through which experience occurs.

Musical experience is constituted as meaningful when social structures conjoin with individual consciousness through structures of feeling. Whereas structures suggest fixed relationships that are rigid and determined, feeling inflects the intense and personal experience of what is “believed, felt, and acted upon” (Frith, 1996, p. 252). This becomes important with regard to the construction of cultural forms, whether musical genres and styles or social categories and spaces. How people behave with regard to sound relates to what they perceive and think about such behavior. Anthropologist Alan Merriam (1964) proposed a model of musical anthropology that triangulates these axes of sound, concept, and behavior. This tripartite structure has been redressed by an interpretive analysis of dialectical

processes that consist of historical construction, social maintenance, and individual adaptation and experience; in other words, an agency-centered inquiry into how people create, experience, and use music (Rice, 1987).

Reception

Feelingful experiences occur through culturally specific processes that produce and perceive sound. Recent directions in the phenomenology of acoustic phenomena argue that sound is not the property of a musical object separated from its origin, but rather, sonic significance lies in the encounter of sound as musical. Sensory dimensions of experience suggest that sonorities may be heard as affective, feelingful, and emotional when perceived as musical patterns in specific cultural contexts. Phenomenological studies suggest the ways in which people relate to each other through senses of hearing. A hearing culture may make it “possible to conceptualize new ways of knowing a culture and of gaining a deepened understanding of how the members of a society know each other” (Erlmann, 2004, p. 3). In turn, individual and social processes perceive musical encounter “not through layers of cognitive categories and symbolic associations, but with a trained and responsive body, through habits copied from others and strictly reinforced, by means of musical skills” (Downey, 2002, p. 490). Listeners’ acquired habits of assimilating sensory experience to musical systems affect them viscerally, and lived bodies are fashioned by patterns of acting in relation to music at the same time that they are responsive to sonic textures.

Performance

Performance emerges through the interaction of corporeal gestures, discursive tropes, and performative utterances in social settings that situate these actions as musical or extramusical, verbal or nonverbal, cognitive or affective, sacred or secular. These actions are held together by aesthetic principles that are represented in the social and material world, just as the social and material world is imbued with extraordinary value. Performance and listening are intersubjectively and physiologically experienced in a trained and socialized set of artistic bodily movements that reflect values and ideas (Meintjes, 2003, p. 176).

Embodied realms of experience situate cultural practices in the physiological and expressive body and the social forces that operate through those bodies. Performativity asserts the materiality of nonverbal communication and expression and the presence of the body as it is mediated by the production of sound. Whether sound is produced by a singer, a musician, or mediated by technology, the presence of the medium leaves a material trace that regulates its origin (Barthes, 1978). For example, analyses of timbre consider the grain of the voice in recording—in addition to elements of texture, attack, delay, and pitch—and interpret studio techniques as signifying practices that are deeply connected to the discursive production of style and genre (Théberge, 1997).

Embodiment

Embodied performance by a socialized musician or dancer suggests how bodies may be regulated or may resist forces of power (Comaroff, 1991). The discourse of bodies in motion at Greek weddings, for instance, produces the dialectical relationships and mutual dependencies that are also regulated and constrained by their repetitive power as a body politic, or collective unit. By introducing non-Greek Roma musicians at wedding parties as *daulia*, or drums (Cowan, 1990, p. 102), Greek townspeople exert power over the materiality of both resonant and outside bodies. As sites of reception and agency, bodies bear narratives of time and place that coalesce into corporeal memories. The ways individuals perform these narratives construct identity and differences that endow sound and movement with the capacity to represent lived experience.

As forms of social action and as meaningful activity, music and dance create and give expression to human and social experience. Epistemological concerns have critically responded to the ways in which a kinetic body and a sound dialogically compose form through performance events, structured practices, and representational strategies. Rather than treat music and dance as objects of discourse that possess meaning in and of themselves, or frame body movement techniques and sonic phenomena as abstract properties that may be reconfigured according to context, ethnographers seek to localize the very terms by which understanding and knowledge of these performative dynamics are produced.

Research Topics and Issues

Sacred Performance

Music plays a significant role in preserving and transmitting the world's religions in terms of history, culture, and practice. The study of music in religious practices considers the ways in which music transforms experience into sacred meanings, narrates religious myths, and structures religious ritual and communities. The performative conditions associated with religious practice consider sacred sound not as the taxonomy of a particular belief system, but rather as a sensory spectacle through which experiences become enchanted. The sacred nature mediates by sonic utterances that may induce a phantasmagoric state of being, encode sacred language, or embody affective experience. Sound indexes religious experience through the presence of sacred instruments and the act of listening to liturgical chant. Sound also marks sacred spaces through pilgrimages and festival rituals, among other religious practices (Beck, 2006; Berliner, 1993).

The efficacy of music in sacred spaces suggests the ways in which sound may be sacred and how this sacred nature may be mediated through sonic practices. How sound conveys sacred meaning and experience in specific contexts raises ontological distinctions in that what is often perceived as musical in European and North American contexts may be considered nonmusical and sacred in other sacred spaces.

Contexts may determine how sound is received and interpreted and in what ways sound may be ontologically separate from music. Interpretation of sound also structures power relations, in which religious authority is maintained by ideological boundaries of sound seeking to differentiate between sacred practices and secular forms of expression (Baily, 2003).

Ethnographies of sacred performance practices have tended to focus on the capacity of music, dance, and ritual drama to organize religious activity through modes of social interaction that produce webs of associative meaning (Reily, 2002). Performance has been conceptualized as a medium through which participants demonstrate religious conviction and commitment; as a means to structure time, narrative, and symbolic systems; and as a mode of interaction that codifies organizational patterns and the conditions of participation in religious activity. For example, the sacred voice is a medium that binds individuals communally in religious activity. How these experiences shape and are shaped by musical practice is determined by the theological ways in which individuals engage with music and music making. More recently, ethnographers have considered ways in which religious-ritual activity depends on the act of performance in order to be perceived as sacred and, in particular, how sound and movements are mediums that frame a ritual act as sacred. As individuals negotiate moral boundaries between the sacred and the profane in contemporary contexts, the act of producing sound and movement becomes a contested arena where religious authorities judge the ethics of cultural production. Performance through music and dance may allow departure from the profane and entrance into the sacred, mark the aesthetic boundaries of secular space, or itself articulate the boundaries between the sacred and the profane by which religious practices acquired enchanted and sacred meaning.

Several bodies of scholarship have addressed musical change, religious renewal, soteriological potential, musico-religious orthodoxy, and other related issues. These different forms of religious practice, or syncretism, may be marked through distinct genres and styles that expose moments of encounter and uneven relations of power. In colonial spaces, religious repertory may occupy cultural spaces in ways that reproduce a hegemonic religious order and erase subaltern religious practices (Comaroff, 1991). Folkloric ensembles typically relate to historical or contemporary religious practices through complex processes of aestheticization that problematically blur distinctions between sacred worship, cultural traditions, and popular culture. These distinctions are in part based on a collective memory of the sacred that is translated through aesthetic ideals. The embodiment of these ideals demonstrates how religious ideologies are manifested through bodily practices that themselves produce sacred sound, movement, and performance.

Chant and Recitation

The power of sound embodied in speech patterns, or chant, may preserve and transmit knowledge and religious authority as well as mark historical change. For example, the Rigvedic texts of the Harappan in Pakistan and northwestern India are

considered sacred when correctly rendered through transmission and pronunciation of Vedic hymns. Recitation of these hymns occurs through three types of spoken accent with a melodic contour dependent on the succession of accent in the sung syllables, as well as the duration of each relative pitch. The consideration of Vedic chant as the foundation of contemporary Hindustani music in South Asia is, in part, attributed to its preservation through Brahman recitation. Codification of early performance practices, such as Gregorian chant in southern Europe, began when clergy notated plainchant in order to correlate its liturgical function with the medieval Roman liturgical calendar. Compositional practices that developed from these notations are widely considered to be the conceptual and historical basis for Renaissance and late European courtly arts (Bergeron, 1998).

Some religious cultures regard practices of recitation, or the sounding of religious text, as the divine act that makes speech patterns sacred by mediating the transmission of sacred texts through the vocal performance. The significance of such performances is governed not only by the syntactic conditions such as pitch and duration, but also by audition, or the appropriate response, performed by the ethical listener (Hirschkind, 2006).

Instruments

Instruments embody religious experience when endowed with the capacity to produce sacred sound. In some ritual practices, performance on a particular instrument, such as batá percussion ensembles in Cuban Santería, realizes the divine potential of the ritual event and produces religious transformation. Instrumental-performance practice marks the shift from secular to sacred contexts; produces the appropriate performance conditions for trance, ecstasy, possession, and other states of heightened sacrality; symbolizes tropes of religious narrative and function; and transfers knowledge and participation among believers (Hagedorn, 2001; Rouget, 1985; Wong, 2001).

Narrative

Sacred musical practices are often narrative—telling stories and relating myths to generate a sense of historical and religious meaning. Narrative may be considered musical through, for example, the ways in which music marks the passage of time in ritual performance and in the narrative sequence of events, or through the juxtaposition of different musical genres that layer and texture religious stories. Instruments often play a significant role in narrating epic myths with sacred content, such as within bardic traditions or Sufi mysticism. One way in which narrative components of sacred music may shape a religious community is by mediating a sense of place. The act of recalling an original event, such as an act of martyrdom or a miracle, links the event to a specific site. When enacted through song and other musico-poetic genres, the act of recall layers subsequent events to that site in ways that parse history as locally meaningful in religious communities.

Critical Musicology

During the early 1990s, musicologists readjusted paradigms in which musical performance expresses a natural mode of human existence or formalizes a universal set of aesthetic ideals (Solie, 1993). The critical inquiry espoused by “new musicology” advocated for the deconstruction of ideologies into iconicities of style that are reproduced and transformed by acts of performance. Performance practices now produce social relations that are represented in different categories of gender and sexuality, race and ethnicity, generation, class and nation, and other forms of identity. Cultural meaning is discursively constructed by specific practices of signification, and links between signifier and signified are not fixed but arbitrary. These practices may construct meaningful experience in ways that depend on conventions of taste and class that are situated in a particular time and place.

Place

Studies of place tend to be located in everyday life and explore the tactics by which people interact and engage with their environment. Gatherings, such as rehearsals among English rock musicians, are not only mediated by these practices, but also produce affective relationships to the settings in which social activities take place. Yet, as conditions of modernity separate space from place in lived experience, the physical settings of social activities are “thoroughly penetrated by and shaped in terms of social influences quite distant from them” (Giddens, as cited in Stokes, 1994, p. 1). Therefore, approaches to place, music, and dance seek to relocate cultural geographies within specific social, economic, and political spaces by addressing how individuals produce sound and movement in order “to reestablish their presence, situate events in a fixed place and time, and reembed actions within social structures” (Stokes, 1994, p. 3). Place becomes meaningful through affective processes that recognize and enable different experiences, mediate emotional relations to an environment, or produce nostalgia through acts of memory that bestow music and dance “with an intensity, power and simplicity unmatched by any other social activity” (Stokes, 1994, p. 3).

As individuals perceive what takes shape around them, they participate in the construction of a *soundscape*, or an environment structured by the perception and reception of sound. Soundscapes are differentiated not only by dynamics of power, class, and difference, but also by sentimentality, or the emotional and affective relationships that constitute a sense of place (Feld & Basso, 1996). An acoustemology of sound analyzes the sentimental relations to place that are embodied by sound production and reception among, for instance, Kaluli people in Papua New Guinea. Through interlocking, overlapping, and alternating singing that mimics bird calls in the rainforests, Kaluli voices index the natural environment; mediate places as sites of memory; and express an ecological sense of self, place, and time (Feld, 1982). Acoustic environments have also been critical to the historical progression of musical form in bourgeois

European society and the displacement of instrumentalists to the role of musical interpreters. Early performance practices were comprised of extramusical, literary, or narrative material that was, in part, marked by a musician's individualized embellishment of musical material.

In the 19th century, the concert room emerged as a performance setting that aestheticized the impression of immediate contact with the music as a listening ideal. Musical practices shifted to uphold universalist aesthetic ideals not only through listening appreciation, but also in celebration of a composer's genius. Dramatic structures were communicated by composers such as Beethoven through "the abstract logic of pure form" and the formal properties of the music itself in ways that privileged structural-listening practices in European art music. Thus, the commodification of musical knowledge and musical emplacement fetishized sonata form in the historical development of instrumental Western art music (Leyshon, Matless, & Revill, 1998).

Globalization

The commodification of musical place in a globalized world has induced a certain anxiety among critical musicologists over the ways that disembedding music and dance practices stimulates desires for authenticity by late-capital consumers in a hegemonic economic order. While the capacity for music to travel has augmented an appreciation for place and dismantled cultural borders, the poetics and politics of this have problematically differentiated relations between self and other. World music, and related configurations of art music, ritual, folk and ethnic genres, and world beat and roots music (Aubert, 2007), are authenticated by conditions of place. By privileging the geographically local as authentic, the particular can be naturalized in ways that fetishize locality through terms of belonging. The act of splitting sound from its source and reproducing it depends on uneven processes of representation that contest cultural rights and negotiate various modes of ownership (Feld & Basso, 1996). Styles associated with world music then demarcate community by linking dispersed places and allegiances that, through subjective identity, allow the strategies by which individuals register difference (Erlmann, 1999).

The globalization of world music has also been critiqued as a *pastiche*, or a process of reconfiguring time and space that detemporalizes the encounter between self and ethnographic others into an event beyond history, or perhaps at the horizon of a certain historical moment. For instance, the production and consumption of alternative folk rock links different historical moments into one bounded cultural space, while world-dance music may layer disparate local styles into a repetitive, temporal sequence (Erlmann, 1999). Cultural interchange and interaction in popular music thus depends upon a concept of culture that binds territory to groups in ways that demand the political engagement of cultural critique. Whereas narratives of cultural interchange such as hybridity, creolism, and syncretism tend to privilege myths of origin, postcolonial analyses encourage new approaches that no

longer engender forms of being by binaries of self (self and ethnographic other), place (here and there), and time (then and now), but rather by a third space that is constituted by these boundaries. The circulatory relations of cultural flow have furthered understandings of how historical consciousness may undermine essentializing cultural strategies. Studies of the black Atlantic (Gilroy, 1993) address how black popular music and dance styles shape and are shaped by particular African retentions and situate the Atlantic as a site of crossings, mediations, and exchanges that continually reconsider the cultural flow of African and African American expressive forms.

In response to large-scale processes of migration, globalization, and transnationalism that destabilize structures of belonging, critical approaches to place have also emphasized the production of locality through cultural practices. Tropes of place may uneasily mark displacement from an imagined structure of belonging, for instance when tropes of the crowd and the machine in the South African vocal genre of *isicathamiya* signify a sense of nostalgia for rural agricultural economies among populations who migrated to cities in search of labor opportunities. Another example can be found in how the mapping of memory fragments onto musical events, instruments, and kinship narratives of a retired Jewish community in Liverpool, England, shapes collective relations that in turn construct an immigrant neighborhood whose identity is nurtured by newly mediated and localized imaginaries of home and community. Locality may also be produced by sound-engineering practices that index a particular place and authenticate a musical style through the technological reproduction of sound in specific performance conditions such as "live" Austin country music (Greene & Porcello, 2005).

Gender and Sexuality

Gender and sexuality analyses situate performers and their texts within specific musical worlds and examine how these worlds produce gendered ideologies through performance practice, singing style, repertory, performance events and occasions, lyrics and elaborations, and instrumental practice. Thus, gender and sexuality are mutually constitutive of cultural experiences, and also mutually construct processes of subjectivity and alterity in ways that have been binarily opposed to biological explanations of lived experience. As a method of cultural critique, gender and sexuality studies analyze the ways in which ideology is maintained and transformed through the performance of a gendered self. These studies also examine the ways that musical practices mediate social relations as variously gendered—masculine, feminine, and perhaps hyperreal. Because gender theorists have understood sexuality as constitutive of gendered norms, distinctions between gender and sexuality have been largely premised on identity construction as theorized in psychoanalytic discourse. Lacanian theory argues that linguistic signs triangulate the enlightened self from its other in ways that destabilize a sense of identity by the desire for an object that might represent such identity. By reading social and cultural texts for hidden and repressed desires, critical theorists reveal conditions of heteronormativity that

shape and are shaped by cultural practices. Ultimately, gender and sexuality studies suggest how social distinctions may be magnified rather than ameliorated by the performative act of music making and structured movement.

A substantial body of literature has been devoted to highlighting and documenting women's contribution and women's roles in musical performance. As professional entertainers, as dramatic personalities, and as audiences, women convey social values and transmit cultural meanings in ways that may be different from those performed by men. The expression of sentimentality by women through forms and repertoires, such as sung poetry among Bedouin women in upper Egypt, resist, maneuver, and maintain patriarchal norms of modesty, honor, and shame that have been typified in Mediterranean studies (Abu-Lughod, 1986), whereas songs sung by Berber women in northern Morocco strategically empower potentialities of marital life (Magrini, 2003). Performance events and contexts have been analyzed with discourses surrounding these practices through elements of lyrics, style, technology, and appropriate behavior. These suggest how identity may be encoded and performed as masculine, feminine, or ambiguously gendered. Postmodernist approaches to the paradigmatic relations between musical and social structures have produced seminal readings of the gendered hierarchies in composition, such as immanent relations between the masculine and the feminine in sonata form (McClary, 1991), formulations of the Western music canon, constructions of ontological difference through gender (Solie, 1993), and the potential of music itself—as a performance rather than as text, to disrupt the masculine musicological narratives within which it is often contained (Abbate, 1991).

The broad compass of vocal performance in different registers constructs gendered and sexualized identities by embracing some, and refusing other, conventions of style and genre. Voice may characterize a range of erotic and emotional relationships among women who sing and women who listen in ways that “resonate in sonic space as lesbian difference and desire” (Brett, Wood, & Thomas, 1994, p. 28). This *sapphonicvoice* is found in operatic practices by female singers who assume “pants” roles, or castrato male roles sung by women, as well as other singers and singing personalities (Brett et al., 1994). Koestenbaum (1994) argued that the *brea* between registers is a gendered split that emplaces a voice between male and female. The ways in which the *brea* is negotiated may be “fatal to the act of natural voice production” (p. 220) when gender and sexuality are transferred beyond normativity, such as the *sapphonicvoice*'s synthesis of register; this replaces its splitting, or the falsetto register's failure to disguise this break. The combination of different registers may refuse vocal categories and polarities of natural and unnatural, and may establish interpretations of female desire, male desire, and the relations of class, age, sexual status, and identity through vocal performance (Koestenbaum, 1994).

The performance of gender engages with the kinds of subjects that musical and dance performances engender, both onstage and among audiences, and the ways that such

performance relates to everyday life as lived, embodied, and theorized. For instance, a feminized atmosphere at a wedding in Morocco is not dependent on the presence of female dancers, but rather on the performance of femininity among communal relations that may differentiate between gender, sexuality, and class. Perceptions and representations of Asian American femininity have shifted due to North American *taiko* performance that represents social space through gesture, movement, and the presence of women in drumming practices. In post-Apartheid South Africa, Zulu *ngoma* song and dance is critical to the performance of masculinity and the anxieties of retaining the presence of individualized expression and stylized body movement in the midst of unemployment, an AIDS epidemic, and a history of violence in KwaZulu-Natal (Meintjes, 2003).

Race and Ethnicity

Critical race studies examine how constructions of difference on the basis of body type and color are perpetuated by the representation of essentialized metaphysical conditions. Concepts of race are linked to the emergence of modern scientific inquiry into the natural world and are largely considered a product of Enlightenment thought and observation. The late 18th century produced a world “observed, processed and remapped on the imagination of Europe” (Radano & Bohlman, 2000, p. 13) in which race and music constituted logics of difference that categorized the natural world and sought to make it understandable. Moreover, racial discourse contributed to the formation of musical difference as human difference was mapped onto musical difference, that is, to the object of music itself. The epistemic model that measured harmonic relations on a mathematically proportionate scale and unified differences in pitch influenced Enlightenment thought on the structure and substance of not only resonating, but also racialized bodies. How music participates in the construction of race and racial imaginaries ultimately raises ontological questions of whether music itself represents these qualities, or whether our understandings of music are shaped by and through racial relations.

Racial constructs are connected to music through structures of understandability, that is, the capacity of sound to signify and communicate meaning, and through materiality, or the technologies, objects, and bodies that represent music and musical histories through particular ideologies (Brown, 2007). For example, the 19th-century German composer Richard Wagner claimed that the language of European opera and vocal music was degraded through the inability of European Jewish composers to fully control the language of music, which Wagner instantiated in terms of 19th-century German universalism that was first and foremost predicated on language and an assumption that music instantiates comparative linguistic properties. Elsewhere, race interacts with other systemic hierarchies, such as the historic provision of wedding and court entertainment by Jewish musicians in predominantly Muslim worlds situated along the Silk Road, from Bukharan weddings in central Asia to the Abbasid and

Omayyad caliphates of the 11th century. Categories in which instruments function as a racial mapping of power relations may be critiqued by participants themselves, such as Karnatak and Hindustani musicians who negotiate caste systems in South Asia that distinguish between the permissibility of Brahmin performance on the Karnatic vinalute and the delegation of instrumental performance on untouchable leather-skinned drums to less privileged castes. Conditions of difference, shaped by cultural practices, help to better understand relations of power in systems based on class, caste, kinship, religion, and other forms of belonging and ownership.

Racial conventions of blackness, whiteness, and other morphologies play a critical role in ideological distinctions of music as rational and intellectual, or as orally transmitted, communal, and embodied. The naturalization of certain structures as African retentions, such as improvised movement, antiphonal oppositions, and repeated cycles of interlocking rhythmic patterns, reinforces the putative inseparability of music and dance in the African diaspora (Meintjes, 2003). This becomes problematic when what is musical and universal is defined against conceptions of blackness as physical and embodied. Yet, performance practice and histories may join as lived experience in ways that affirm how blues practices in African American working-class communities in the southern United States influenced the emergence of jazz, gospel, soul, R&B, rock, hip-hop, and other black vernacular music. The problem of race translates into a cultural critique in which creative strategies destabilize the tropes through which they emerge by means of intertextuality, subversion, and other signifying techniques (Radano & Bohlman, 2000).

Ethnicity, like other forms of difference that participate in processes of exclusion and inclusion, is constructed on the basis of shared beliefs in a “common ancestry, memories of a shared historical past, and elements in common, such as kinship patterns, physical continuity, religious affiliation, language, or some combination of these” (Shelemay, 2001, p. 249). Musical and dance practices instantiate ethnic relations by performing social boundaries that reproduce and subvert ideologies; these relations simultaneously also produce meanings, that is, “a patterned context in which other things happen” (Waterman, 1990, p. 214). Ethnic identity is often discussed in terms of minority relations and population movements that are themselves predicated on political difference. Often, ethnic boundaries “define and maintain social identities which can only exist in context of oppositions and relativities”; thus, ethnography can engage with how “actors use music in specific local situations to erect boundaries, maintain distinctions between us and them, and use terms such as ‘authentic’ to justify these boundaries” (Stokes, 1994, p. 6).

Nationalism

Cultural nationalism is a complex process by which institutions and actors integrate diverse populations into structures of national belonging. Ethnography investigates the ways in which music and dance practices—and the discursive spaces that are dialogically created and inhabited by

such practices—generate national imaginaries in local contexts. Early forms of nationalism celebrated the universal claim to a single shared language and a set of particular customs and traditions situated in an ethnonational framework. Scholars have since criticized collective national identity as a product of state apparatuses that seek to reify lived experience into internationally recognized forms. Thus, the invention of tradition has been linked with nation-building projects in which state power emerges through the performance of national imaginaries and the efficacy of imagined communities (Askew, 2002). The extent to which symbolic production produces and sustains state hegemony through particular genres suggests whether these processes might be “multivalent, multivocal, and polyphonic” (Askew, 2002, p. 273) and how agents and institutions are involved in negotiating, defining, and contesting that which constitutes the nation. Musical ethnographies reveal the strategic shifts that characterize nationalist projects, ask whether events coincide with or interrupt official ideologies, illustrate why specific forms are chosen to represent the nation, and address how issues of authenticity and preservation are managed in these endeavors. Though global capital flow, access to electronic media, and transnational migration of people have decentered and deterritorialized processes of nationalism, the mediating structure of the nation continues to relate how people cross lines of difference through local transactions and cultural production.

Representation of the nation through music depends on a belief in the representational potential of music, that is, music’s capacity to embody a cultural whole that exists prior to its mediation. The production of national symbols, therefore, depends upon a modern discourse that is represented by cultural mediation. This discourse emerged from Johann Gottfried Herder’s claim that based national identity on the common narratives and histories of a given people and, in particular, on the capacity of language and folksong to represent such shared experiences. Herder’s proto-nationalist theory is comprised of a geographic model where music marks a place, such as the landscape of the nation, an acoustic model whereby sound distinguishes the nation as a whole, and a narrative model in which music encodes stories that represent the history of the nation (see Bohlman, 2004). The quintessential image of the nation, or a “preexisting entity that is more indefinite than definite,” is reflected by national music, “for whom it becomes the task to bring out as much of the definition as possible” (Bohlman, 2004, p. 83).

Conversely, nationalistic music does not harbor relations among a nationalized people, but rather services competition between nation-states. Nationalistic music secures the geographic identity of the nation-state by marking borders and producing alterity through the production of national difference. Alterity may be differentiated on the basis of class, race, ethnicity, and gender dynamics that exclude those whose presence prescribes the need to regulate desires and who trigger ambivalence as a condition of modernity. The marking of borders is instantiated by a presentation of the nation that embeds power in performance, or through a means of communicative interaction in which the act itself

is privileged over that which it mediates. Thus, nonverbal performance may communicate messages whose meaning is located in elements of sound and movement and in dialogic interaction between performers and audiences, or between modes of modernity—contingent on the specifics of the temporal and spatial moment.

Migration

Early studies of population movement addressed patterns of assimilation and acculturation through theories of culture-contact that failed to engage with political disparities and the contradictions of multiculturalism in modern societies. More recent approaches redressed these patterns as a postmodern condition that negotiates instantiations of nationalism, transnationalism, and displacement through the appropriation of expressive culture and the making of political alliances among transnational populations (Garofalo, 1992). However, the rigidities and essentialisms of diasporic identity created by multiculturalism may articulate or contradict the politics of national, postcolonial, and minority identities even as they stress emergent forms of culture, uneven relations of cultural hybridity, and ambivalent relations to national homelands (Ramnarine, 2007). Contemporary diaspora studies thus emphasize the “newness” of the diasporic experience, and address political belongings and further substitutions as historically specific and shaped by a historical consciousness. Fragments of this consciousness are inscribed within an in-between space by which immigrants may register a sense of loss, exile, and rupture through cultural production. Diasporic music making may thus be a practice of everyday life in local communities by individuals making strategic choices through music festivals, individual biographies, song texts, musical instruments, and intellectual movements. Politically articulated readings of these social relations and creative processes reveal economies of desire in colonial encounters, performances that mourn and remember ancestors, intercultural borrowings in African-Peruvian theater, or state interventions in the creation of broader diasporic groups (Ramnarine, 2007).

Studies of popular culture and music have helped to differentiate between experiences of voluntary and forced migration. The actions and behavior of refugees affect how groups produce and give meaning to their music as they negotiate loss and trauma, and pursue a state of stability that is represented by resettlement. For instance, Vietnamese refugee communities in the United States tend to display a preference for love songs and Western-oriented popular music that convey anticommunist nostalgia for a pre-1975 period of French, U.S., and Japanese colonial influence in Vietnam (Reyes, 1999). Other histories of dispossession and violence have prompted ethnographers to consider the social construction of place, self, and other through aesthetic experience as a means for understanding the performative capacities of particular histories and repertoires of violence and “the ensuing meanings violent performances carry for victims, perpetrators, and witnesses alike” (McDonald, 2009, p. 59).

Future Directions

Medical Ethnomusicology

Medical ethnomusicology seeks to integrate disciplines of music; health sciences; integrative, complementary and alternative medicine (ICAM); the physical and social sciences; medical humanities; and the healing arts through integrative research and applied practice. Research in music, medicine, and culture recognizes the dynamic and diverse practices by which specialized music and sound phenomena function as therapeutic strategies and as a means to cure illness and disease. Ethnomusicological discourse has demonstrated the extent to which specialized music emerges from a spiritual or religious ontology and is practiced in ritual or ceremonial events. When music combines with or functions as prayer or meditation, it may constitute preventive and/or curative practices that can be situated among a set of local medical practices. Medical ethnomusicology focuses on the performance of healing and the culture of health in order to better understand disease and illness, health and healing, as well as the performative nature of diagnosis, treatment, and healing. Recent studies and interventions include locating sites of ritual healing in *ngoma* practice among disparate communities; correlating beliefs about spirit possession to the intricacies of indigenous health care systems in Tumbuka communities; advocating and critiquing how the decline of HIV infection rates in Uganda correspond to the use of local musical traditions that support medical initiatives; engaging with science and religion through a focus on music, prayer, meditation, and healing; and the ways that these processes intimately link with transformational cognitive states in Tajikistan (Koen, 2008).

Applied Ethnomusicology

Applied ethnomusicology refers to work in the public sector that encourages the advocacy, curation, documentation, education, and performance of music and dance. These efforts apply the perspectives, principles, theories, and methods of ethnomusicology to encourage public awareness and participation in broadly defined fields of cultural practice. Advocacy engages with public-policy issues, such as arts access and participation, artists' rights, censorship, intellectual property, and cultural heritage through institutional and noninstitutional efforts. The Society for Ethnomusicology debates and assumes positions on the ethics of music and fair use, music and torture, and the rights of human subjects in scholarly research. Cultural initiatives facilitate opportunities for performers and performance practices through festival and concert organization, recording and documentary film production, and museum exhibitions.

Efforts to document and archive materials are encouraged through the acquisition and digitalization of archives, collaboration between institutions, improved access, and the support of scholarship, publications, and public programs. Public education and outreach develop curriculum at the

primary and secondary levels; establish performance ensembles and programs to nurture skills; and foster audiences and public awareness through the promotion and distribution of related events, productions, and publications. Performance of music and dance by specialists is encouraged not only as a research method in observing participants, but also as a means to preserve, transmit, and produce communities based on knowledge production and creative expression.

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CONFLICT AND AGGRESSION

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Humans, it often seems, are creatures of conflict. Without doubt, the annals of history bear stark witness to the reality of human aggression. By most measures, human conflict and aggression have directly or indirectly resulted in hundreds of millions of deaths over time. If mute statistics had explanatory power, then the inevitable conclusion would be that humans are by their natures irredeemably aggressive. This aggression, in turn, is at the heart of perpetual conflict. Certainly, this view has long been dominant in the West, where the biblical story of human corruption in the Garden of Eden has been a powerful and enduring influence.

Anthropology's particular approach to the related topics of conflict and aggression is biological and cultural, or *biocultural*. Humans are, first and foremost, animals that have evolved over many millions of years. This evolutionary history has present consequences, not the least of which is that humans are in many ways determined and constrained by their biology. But that is not all. As humans evolved, they developed tools, technologies, language, and knowledge which, taken together, are called *culture*. These processes were not, of course, separate. Physical change led to cultural change and cultural change promoted physical change. This synthetic process of coevolution has produced the most cultural and potentially aggressive of all animals.

Background

During the millennia dominated by Christian and scholastic thought, no one contemplated prehistory. Indeed, there was no such thing because it was believed that everything began with Genesis. Human nature was a settled issue. Over time, however, an increasing awareness of antiquity caused some to question the received biblical account. These thinkers began wondering about human life and society before the appearance of the first civilizations in Mesopotamia, Egypt, and Greece. One such person was Thomas Hobbes, and another was Jean-Jacques Rousseau. Between them, Hobbes and Rousseau established two sharply conflicting—and long-persisting—views of what human life had been like in the prehistoric past. Contained within each view is an assessment of essential human nature.

In 1651, Hobbes published *Leviathan*, a foundational work of political philosophy in which he argued that strong and centralized governments are essential to human well-being. Hobbes's entire argument hinged on his belief that humans are aggressive and forever in conflict. Projecting this belief back in time, he envisioned a dark and misty prehistoric past in which humans were perpetually at war. Hobbes called this imaginary time and place the "state of nature." For Hobbes, life in a state of nature was bleak, brutal, and brief. Humans without

government were in constant conflict. The operative assumption for Hobbes is that humans are by nature aggressive, and in the absence of governing authorities, will engage in conflict.

In 1762, Rousseau published *The Social Contract*, another foundational work of political philosophy. While advocating for certain forms of government, Rousseau outlined his own vision of humans in a prehistoric state of nature. As Rousseau imagines things, resources are plentiful and humans peaceful. It is society itself—a movement away from a state of nature—that corrupts and causes conflict. From this, later writers conjured the idea of the “noble savage,” people who lived harmoniously in a time before society and government. For Rousseau, humans are not by nature aggressive and are drawn into conflict only by dysfunctional societies.

Although these competing visions were purely speculative, they proved exceptionally influential and remain so today. Most modern forms of government are founded, in theory if not in practice, on an allegiance to one of these two visions. Rousseau’s ideas continue to inspire all manner of utopian idealists, while Hobbes’s thinking continues to legitimate all forms of centralized authority. This continuing influence is remarkable, considering that neither Hobbes nor Rousseau knew anything about the prehistoric past or peoples. It was not until science began its slow assault on the unfettered imagination that others began to question these two visions of the past.

Evolutionary Foundations

In 1859, the publication of Charles Darwin’s *On the Origin of Species* forever changed the way humans viewed themselves. Besides discrediting the notion of a special creation, Darwin also undermined purely speculative assessments of human nature. Although the *Origin* and Darwin’s later work, *The Descent of Man* (1871), firmly placed humans in the animal kingdom, this placement was not without its own set of ideas about the humans living in a state of nature. Darwin came of age in a time of great intellectual ferment, and the classical economic works of Adam Smith and David Ricardo shaped many of the debates. Unsurprisingly, the topics of competition and conflict were prominently featured.

Despite being couched in the language of economy and markets, Victorian ideas about nature ultimately remained rooted in Hobbes, whose bleak assessment of prehistory was based on his belief that all resources were scarce in a state of nature. In the absence of governments, this scarcity results in “war of all against all.” Thomas Malthus, an English demographer and political economist, shared Hobbes’s assumption that prehistoric societies suffered from scarcity. Consequently, population sizes were limited.

Over time, advances in technology increased production of foodstuffs, which in turn caused population growth. This growth created additional subsistence demands, in effect creating a positive-feedback loop involving improved technology, increased population, and intensified production. It was this process that caused Adam Smith to theorize that competition was the driver of all progress.

Darwin was familiar with these ideas and it was upon reading Malthus that the theory of evolution through the process of natural selection crystallized in his mind. All organisms are driven to reproduce, and this imperative causes a constant increase in numbers. Because resources are limited, competition ensues. Only the most fit survive and reproduce. This competition and struggle occurs not only within species, but also across species. Those traits that enable an organism to survive are favored and passed along through reproduction. Natural selection described a harsh nature “red in tooth and claw.” Although Darwin might have found a certain grandeur in this view of life, others were less sanguine. On close examination, the “new” Darwinian perspective did not really seem all that different from older biblical or Hobbesian ones—humans were condemned to a life of struggle, filled with both conflict and aggression.

Early Anthropological Views

After centuries of speculation about prehistoric humanity, Darwin finally had provided a theoretical framework within which this issue could be considered scientifically. In the decades following publication of the *Origin*, anthropology was founded as a discipline. In Britain, Edward Tylor applied evolutionary principles to culture and began assessing archaeological evidence of the past. In America, Lewis Henry Morgan studied native cultures and became a pioneer in ethnographic methods. Not surprisingly, neither Tylor nor Morgan was able to shake free of past prejudices, including those holding that prehistoric humans lived in near perpetual conflict. Both used words like *primitive*, *savage*, and *barbaric* to describe such early humans. The aggressive connotations were unmistakable.

During the first half of the 20th century, anthropologists largely busied themselves traveling the globe in search of little-known or unknown societies. The societies they studied were variously characterized as native, primitive, indigenous, and almost without fail *warlike*. That early 20th-century ethnographers should find aggression and conflict in the peoples they studied is hardly surprising. These anthropologists, after all, came from state-level societies in which aggression was considered natural and conflict inevitable. These anthropologists may have been looking in a refracted mirror, with the horrors of two world wars serving as background. Though with some notable exceptions

(such as Margaret Mead's pacific account of Samoan society), early ethnographies emphasized the aggressive natures of traditional peoples and highlighted their conflicts.

On the human evolutionary front, things were not much different. Although enigmatic Neanderthal fossils had been turning up in Europe since the late 1800s, no one at that time understood how they related to human evolution. In 1924, Raymond Dart's description of the Taung child (*Australopithecus africanus*) was the first of many hominid fossil finds in Africa. As these fossils accumulated, a basic understanding of human evolution began to emerge. With the exposure of "Piltdown Man" as a forgery or hoax in 1953, anthropologists began to accept the fact that australopithecines were ancestral to *Homo*. Dart, who had earlier come to this view, had by this time developed his own detailed and speculative vision of australopithecine life.

Dart initially had hypothesized that australopithecines were savanna scavengers; however, his subsequent examination of all the fossils associated with australopithecines caused him to conclude they must have been hunters. But these were not ordinary hunters—they were bloodthirsty killers. Dart noted that not only were many of the australopithecine skulls dented and crushed, but also that surrounding fossil bones were broken and damaged. For him, these were certain signs of hunting and butchery. Australopithecines thus became, at least in Dart's mind, vicious predators who used bones as weapons and tools. He even coined a name for this behavior and activity, calling it *osteodontokeratic* culture. It apparently never crossed Dart's mind, as it did later examiners of the same fossils, that the bones had been gathered and processed by two of Africa's most common predators—leopards and hyenas.

Although Dart's hypothesis failed to make headway in the scientific community, it captured the imagination of Robert Ardrey, a popular playwright and unlikely figure in the history of anthropology. After spending some time with Dart, Ardrey became a believer. Not only did he accept Dart's ideas; he also decided that the story needed to be told. Human ancestors as killer apes certainly made for good copy, and was entirely in keeping with a long line of thinking regarding human nature and prehistory. In 1961, Ardrey published *African Genesis: A Personal Investigation Into the Animal Origins and Nature of Man*, a best-selling book that shaped both public and scientific opinions regarding human nature. Ardrey argued that human ancestors could be distinguished from other primates primarily by the increased amount of aggression that is required for predation and hunting, which he identified as the key characteristic and defining feature of hominids.

Dart and Ardrey's shared vision of human ancestors as killer apes corresponded well with a biblically rooted tradition that became secular with Hobbes and scientific with Darwin. This traditional view received further support from the influential papers and ideas emanating from the

1966 symposium titled *Man the Hunter*. The anthropologists and primatologists who attended were nearly unanimous in concluding that hunting—with its attendant aggressive impulses and territorial conflicts—was the key to prehumanity and prehistory. Because anthropologists had phylogenetically linked humans to other primates and considered humans to be apes, it was only natural to begin looking for clues to human behavior in other species, including nonprimates.

Coincident with the *Man the Hunter* conference in 1966, Konrad Lorenz published his famous book *On Aggression*. Although Lorenz was a zoologist and a founder of ethology (the study of animal behavior), his observations and conclusions substantially influenced scientists of all stripes, including anthropologists, primatologists, and psychologists. Over several decades, Lorenz had recorded animal behaviors across many species. He interpreted his observations through a distinctly evolutionary lens, one which construed animal behaviors as contributing to the twin imperatives of survival and reproduction. Of the several instinctive behaviors Lorenz identified, aggression was paramount. The more familiar form of aggression occurred across species, *interspecific*, and was nearly always associated with predation. Aggression within species, *intraspecific*, was less familiar but nearly always associated with access to essential evolutionary resources—food and mates. The latter was a particularly important source of aggression in males, who often had to fight for access to females. Animal territoriality implicated both types of aggression; space was taken and defended because it provided access to food (survival) and mates (reproduction).

Whether as a result of religious belief or philosophical dualism, humans have long been kept separate from animals. After Darwin, this separation became difficult to maintain, and as our knowledge of other species increased over time, the lines between human and animal became blurred, if not obliterated. As a result of Lorenz's pioneering work, human conflict and aggression could be viewed more dispassionately, and without the distorting cultural fog that afflicts the study of so many things human. With empirical observation at the forefront, behavior could now be assessed within a Darwinian framework relatively free from metaphysical, moral, or cultural biases.

Biological Aggression

Aggression is a biological behavior exhibited, in several forms and with differing degrees of intensity, by all animal species. Any animal entirely lacking the ability to become aggressive would neither survive nor reproduce. In a broad study of aggression across animal taxa, Moyer (1976) has identified seven types of aggression: (1) predatory, (2) intermale, (3) fear-induced, (4) irritable, (5) territorial, (6) maternal, and (7) instrumental. Although this typology is useful for identifying the circumstances under which

aggression often occurs, it should not be interpreted exclusively or categorically. Any given display of aggression, in other words, is a synthetic behavior that may combine several of these types into coordinated action. Predatory aggression is required for animals that prey on other animals. Intermale aggression is an essential aspect of competition for resources, including food, mates, and territory. Fear-induced aggression is required for defense against attack. Irritable aggression frequently is used to reinforce dominance and rank. Territorial aggression is displayed by both males and females and is directly linked to resource acquisition and defense. Maternal aggression is required for defense of offspring. Finally, instrumental aggression is goal oriented and forward looking—it has a future objective. Although several species display instrumental aggression, it is especially well developed in primates.

Great Ape Aggression

Because culture plays such a prominent role in human conflict and aggression, it can be difficult to ascertain the extent to which biological factors account for these behaviors. The confounding effects of human culture can, however, be controlled to a limited extent by examining conflict and aggression in nonhuman primates, and especially among the “great apes” who are most closely related to humans. Although the analogies are imperfect, the aggressive behaviors of our nearest phylogenetic relatives can provide important insights into the core of human conflict. Over the last few decades, primatological field studies have greatly increased our understanding of great ape behavior. A general conclusion arising from such research is that conflict and aggression among nonhuman primates is highly variable between species and heavily dependent on ecologies. Because human behavioral plasticity exceeds that of any other primate, it is reasonable to infer that intraspecific conflict and aggression is, for *Homo sapiens*, similarly variable and dependent.

Chimpanzees

(*Pan troglodytes* and *Pan paniscus*)

Of all the great apes, chimpanzees and humans are most closely related and last shared a common ancestor approximately 5 million years ago. Because chimpanzees are our nearest evolutionary relatives, scientific interest in their behavior has been intense, and chimpanzees have been intensively studied in both captive and natural environments. Although early studies of “common” chimpanzees (*Pan troglodytes*) failed to reveal exceptionally violent behavior, more recent research shows that chimpanzees are quite aggressive toward one another and engage in behaviors that, at least among humans, would be labeled “warlike.” Given their closeness to humans, violence among chimpanzees surprised no one, and it was commonly accepted that these two species were genetically

and behaviorally alike. In recent years, however, primatologists have discovered that another species of chimpanzee, the bonobo (*Pan paniscus*), has remarkably different behavioral patterns, and that these differences are most pronounced in terms of conflict and aggression. Unlike common chimpanzees, bonobos are rarely aggressive toward one another and mortal conflict between them has yet to be observed.

Pan troglodytes, or common chimpanzees, are scrupulously territorial animals that live in male-dominated troops. As females reach maturity, they transfer from their natal group into neighboring ones. Males, who typically remain in the same troop their entire lives, continuously form coalitions as they strive for alpha status. This coveted status confers upon males various evolutionary benefits, including access to prime feeding grounds and females. High rank, however, is often tenuous and temporary. Males jockeying for dominance continuously form new coalitions, and dominance hierarchies are fluid. The formation and dissolution of these coalitions is the focus of Frans de Waal’s (2000) book *Chimpanzee Politics: Power and Sex Among Apes*. Despite the nearly constant tension between them, males within a single troop readily set aside their differences to defend—and even extend—their troop’s territory. With surprising regularity, males form “raiding” parties to patrol territorial boundaries. During such patrols, males will sometimes cross boundaries to attack and kill chimpanzees from neighboring troops. This aggressive behavior has drawn inevitable comparisons with humans, and it is the subject of Richard Wrangham and Dale Peterson’s (1996) book, *Demonic Males: Apes and the Origins of Human Violence*. Regardless of how one characterizes these behaviors, it is difficult not to conclude that chimpanzee and human aggression are similar in kind and intensity.

Not all chimpanzees, however, act in such distressingly familiar ways. Conflict between bonobos (*Pan paniscus*) is relatively rare, and aggression limited. Unlike common chimpanzees, bonobos live in a society that is female dominated, and newly mature males transfer to neighboring troops. Dominance is established by relatively stable matrilineal lines. Males do not form coalitions for purposes of rank. Instead, males attempt to ingratiate themselves with high-status females. Male competition is minimal due to the fact that sex among bonobos is constant, open, and prolific. Bonobos routinely greet one another sexually, and use sex to defuse tension and maintain cohesion. Sex is not limited to male-female copulation (though this is certainly common), but also includes frequent female-female genital stimulation. When neighboring bonobo troops meet at territorial borders, there may be unease but there is little to no fighting. Indeed, the groups will occasionally and temporarily mix. Though conflict certainly exists among bonobos, it is modulated and rarely results in physical confrontations.

Although much research remains to be done regarding the extraordinary behavioral differences between common chimpanzees and bonobos, two factors appear to account

for them: resource availability and mating opportunities. Common chimpanzees live in a much broader range of habitats than bonobos, and many of these ranges are limited or seasonal in resources. Bonobos, for their part, are geographically isolated and live in a small range of rainforest that is rich and regular in food resources. These differences in resource availability seem to be driving two remarkably divergent types of behavior. When resources are limited, conflict inevitably ensues. When resources are abundant, conflict is minimal. Resource availability thus sets the stage for differences in mating behaviors that impact the evolutionary imperative of reproduction.

Because territory is critically important in resource-constrained settings, male common chimpanzees advance their interests by forming strong coalitions that are able to defend and extend home ranges. This, in turn, provides males with access to females and their young, who are dependent on an adequate resource base for survival. But when resources are abundant, the dynamic is considerably altered. With adequate resources, the importance of territories—and males—diminishes. Females become free to pursue their evolutionary interests, which do not generally include high levels of conflict and aggression. Under the relatively rare circumstance of resource abundance, males become essential only for sexual reproduction. The result, as we see with bonobos, is a female-dominated, tranquil society characterized by frequent and open sexual behavior.

Gorillas (*Gorilla*) and Orangutans (*Pongo*)

After chimpanzees, gorillas are the nearest evolutionary relatives to humans, having separated from the hominid lineage around 8 million years ago. Unlike humans, but like our ancestors the australopithecines, gorillas exhibit a high degree of sexual dimorphism, a trait associated with dominance by a single alpha male and haremlike social structures. Gorilla troops typically number between 5 and 30 members. A single dominant male, known as a silverback, leads the troop and is the only reproductive male. Conflict within the troop is rare, and aggression is kept to a minimum by the silverback. Many field researchers have been struck by the apparent peacefulness of gorillas. As young males within a troop near maturity, the dominant silverback will force them to leave. After dispersing, young males roam alone or in small groups for a period of 2 to 5 years. When they have reached full size and maturity, these males begin seeking troops of their own. The primary source of conflict among gorillas occurs when silverbacks challenge one another for troop supremacy. Although the rewards are great, in terms of reproductive opportunities, the risks are significant for participants and others. Aside from the grievous injuries males may inflict on one another during such contests, victorious challengers may promptly kill any infants sired by the deposed silverback. Such killings cause mature females to resume estrus, and allow

the new male to begin propagating his own genetic lineage in relatively short order.

Of all the great apes, orangutans—who last shared a common ancestor with humans approximately 14 million years ago—are the least social, a fact probably linked to habitat and feeding ecology. Though orangutans live in verdant rainforests on the islands of Borneo and Sumatra, food resources are often scarce. Orangutans are dietary specialists largely dependent on ripe fruits. Because such fruits are both sparse and seasonal, orangutan density is limited and sociality constrained. This fact alone may account for reduced conflict between them. Female orangutans and immature males do not establish territories, and they usually avoid one another as they forage across the territories of mature males. Mature males, for their part, are highly aggressive toward one another, and their territorial conflicts can be intense, even if infrequent. In a remarkable display of phenotypic plasticity, reproductively mature males who lack territories do not develop the large fatty deposits, or *flanges*, and long hair characteristic of territorial males. Because flanged males apparently fail to perceive nonflanged males as competitors, territorial males generally ignore them. This, in turn, allows ostensibly non-mature males to avoid conflict and roam across territorial boundaries in search of food and females. When non-flanged males encounter females, they are known to force copulation. This aggressive behavior finds its parallel in human rape. By nearly all accounts, female orangutans prefer copulation with flanged, territorial males who mate by invitation rather than force.

Although this brief survey of aggressive behavior and conflict among the great apes cannot possibly capture the full and subtle array of such behaviors, it provides basic insights into the wellsprings of that behavior. Evolutionary fitness ultimately is determined by differential survival and reproduction. Successful organisms are those that survive long enough to reproduce. Dominance and rank usually determine which individuals have access to the resources necessary for survival and the mates required for reproduction. Given these biological facts, it should come as no surprise that animals—humans prominently included—aggressively pursue these goals, and conflict is often the result.

Group Aggression

Like other animals, all humans are born with the behavioral capacity to be aggressive. This capacity, however, varies considerably depending on contexts and cultures. There also is variation in aggressive propensities between individuals. Certain people are more aggressive than others, and these differences may provide those individuals with a fitness advantage in some situations. In social settings, however, excess aggression can be costly, in terms of both energy and reciprocity. As is true of all adaptations, costs are weighted against benefits. Among highly intelligent

social animals, this calculus is not as simple as it might seem. The biggest, strongest, and most aggressive—those most prone to conflict with others—do not always prevail. Studies of chimpanzees and baboons—both of whom live in troops similar in size to those of most known hunter-gatherer groups—consistently show that high rank is the balanced result of many factors, including inheritance, cooperation, intelligence, and aggression. Within-group aggression is limited—though never absent—by this combination of factors. Without-group aggression, however, implicates a different kind of calculus.

Out-group aggression can be either interspecific (across species) or intraspecific (within species), and sometimes both. Interspecific group aggression is frequently observed between species that occupy similar ecological niches, with the most prominent example being that of lions and hyenas. These sympatric and social species routinely attack one another in coordinated groups, and the results are often fatal. Because lions and hyenas directly compete for the same limited resources, conflict between them is nearly constant. Although postagricultural humans do not have many direct competitors, a few species have been perceived as such, with wolves being a primary example. Throughout history, humans have waged war on wolves, with the result being the near extinction of that species in many areas. Nonetheless, interspecific aggression involving humans and other species is relatively rare. The same cannot be said of intraspecific aggression involving humans. Human-on-human aggression is most intense and prevalent when it involves opposing groups.

On a general level, group living is a behavioral adaptation that confers significant benefits on social species. Among these benefits are cooperative foraging, predator avoidance, collective defense, offspring assistance, food sharing, and reproductive opportunities. Given these advantages, maintaining group cohesion becomes an important and perhaps even paramount goal. When groups splinter or individuals are expelled, the costs may be high. Smaller groups are less able to compete with larger ones, and social solitaires often do not survive. These costs intrinsically limit the amount of competition and conflict within a social group. Because group solidarity is critical to survival, cohesive behaviors have been favored by natural selection. Essential to these behaviors is the ability to distinguish group members from nongroup members and to treat them differentially. Primates, in particular, have well-developed abilities for recognizing outsiders. When survival depends on group solidarity, the differential treatment of in- and out-group members is adaptive. But when survival no longer depends on strict maintenance of boundaries between groups, such behaviors may become maladaptive.

Cultural Conflict and Aggression

Although it is difficult to reconstruct the precise social structures of early humans, it seems probable that

Homo erectus lived in groups similar in size and nature to those of common chimpanzees. Whether characterized as a troop or a band, this type of social unit persisted for nearly 2 million years and played a key role in human evolution. At some point, these groups would become recognizable to us as band-sized hunter-gatherers. Despite this more modern characterization, these foraging bands continued to resemble common chimpanzee troops in overall size and structure.

While many bands were affiliated with one another through kinship or marriage and occasionally aggregated into something like tribes, these units eventually enlarged into chiefdoms, cities, and states. In all cases, this process involved a movement to centralized authority and social stratification. To consolidate power and govern, ruling elites began controlling cultural institutions and generating cultural products. These institutions and products were both material (public works, temples, palaces, art) and immaterial (knowledge, religion, ideology, nationalism). Regardless of form, many of these cultural forces played directly into the strong evolutionary behaviors associated with in- and out-groups. The creation of separate and distinct identities—setting one group apart from another—has long been the occupation of elites, who manipulate these identities to channel aggression and direct conflict. In the setting of cities, states, and empires, our ancestral hostility toward group outsiders—or the “other”—has proven costly, and it is in most modern contexts maladaptive. This emphasis on groups, however, does not imply that individuals are unimportant or that they passively imbibe something called “culture.”

Individual Acculturation and Aggression

At its core, *culture* is learning passed from generation to generation through social behaviors. By this definition, humans are not alone in having culture—many species teach their offspring behaviors essential for survival and reproduction. Despite this fact, human culture is qualitatively and quantitatively different from that of all other species. It has been said, with good reason, that the primary evolutionary adaptation for humans is culture. Culture does not, however, operate on a blank slate. In the absence of some defect, humans are born with certain capacities and limitations. These capacities and limitations are biological in nature and are sometimes explained by anthropologists using the biogram concept. The biogram represents a human at birth—an individual who has not yet been imprinted with learning or culture of any kind. Immediately after birth, cultural patterning begins and continues for the remainder of one’s life. This biocultural model is depicted in Figure 79.1.

Starting with an infant, the heuristic in Figure 79.1 tracks different phases of development and acculturation. Each outer circle represents a layer of social learning imprinted on the individual biogram. These acculturating

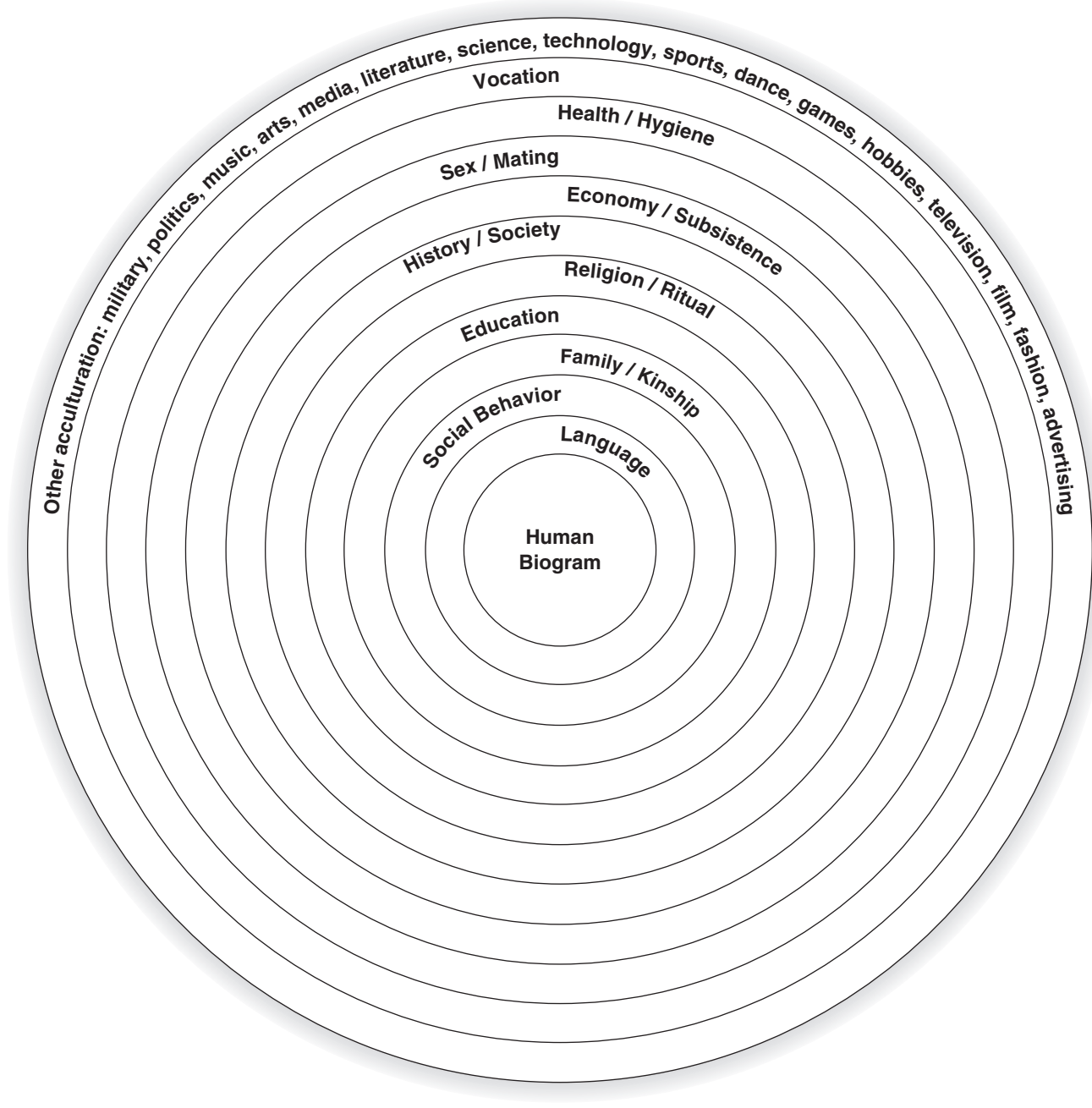


Figure 79.1 The Biocultural Model

SOURCE: Cris D. Campbell.

layers are not rigidly fixed, neatly separated, or always applicable. The innermost rings are, however, fairly consistent across space and time: The first things infants learn are socialization and language. From the moment of birth, a child is embedded in social and linguistic settings. By the time children are able to interact and speak in social settings, the patterning process is already far advanced.

This process is both formal and informal, active and passive. It occurs by instruction, example, observation, and interaction. In nearly all cultures, this formative period

also includes teaching and, in most societies, prominently features religion. A bit later, children begin absorbing cultural knowledge regarding society, history, vocation, and health. As children continue the long process of maturation, most receive additional instruction, with varying degrees of emphasis and intensity, in the following cultural topics: politics, economy, reproduction, sports, military, science, technology, literature, music, arts, dance, games, hobbies, and fashion. In developed countries, media play a key role in acculturation.

It is important to note that every individual participates differently and unevenly in culture and that the acculturating layers represented by this model are permeable, multi-directional, and variable. Layers can be added or deleted, depending on what is omitted, accepted, or rejected through the lifelong process of social learning. It is equally important to note that this process is never disinterested—someone or some group is always producing cultural knowledge and materials.

With these concepts in mind, it becomes easy to see that culture strongly patterns both aggression and conflict. Much of this patterning is a mere happenstance of birth at a particular time and in a particular place. Although these acculturating forces do not precisely determine how any given individual will act, they are powerful predictors of such action. When families, religions, societies, and governments take a keen interest in patterning individuals in a particular way, people usually think and act in accord with that acculturation. Through this process, essential evolutionary behaviors such as aggression and conflict can be either amplified or modulated. A good example of amplification is the militarist acculturation of children in ancient Sparta. A converse example of modulation is the pacifist acculturation of Semai children in Malaysia. In each case, interested adults and societies raise children in environments that place great emphasis on aggression (Sparta) or nonaggression (Semai), with fairly predictable results in terms of propensity for aggression and penchant for conflict. Most people are not, however, raised in cultural milieus so dedicated to these antipodal positions. For them, acculturating influences on aggression and conflict are less obvious, though no less influential.

Power, Population, and Resources

Though the drive for power is often obscured by the workings of culture, it is a fundamental, evolutionary impulse nearly always directed toward the acquisition of resources. In the late 1800s, Friedrich Nietzsche was the first to recognize this relationship and link power to evolutionary ideas regarding dominance. Nietzsche noted that all interactions between humans implicate power because, as social animals, we habitually order ourselves according to rank. This ordering creates hierarchies, and those on top have access to more resources than those on the bottom. As Michel Foucault later recognized, these relationships and imbalances do not involve only those of high and low rank—they envelop everyone in the social and cultural system. And as these systems become ever larger and more complex, power relationships become more subtle and pervasive.

This is a process that materialist thinkers have long understood, even if their analysis begins with economy rather than biology. For Karl Marx, all things cultural arise from and are tied to underlying material factors. Economic modes of production determine cultural forms, whether

political, religious, legal, or moral. Historical progressions are an important aspect of this understanding. By materialist reasoning, hunter-gatherers have a mode of economy that structures their cultural forms. Similarly, feudalism produces one type of culture, and capitalism another. Cultural forms may vary, but only within the constraints of economy. By making economy foundational to culture, materialists simply recognize that all economies are constrained by resources, and ultimately by populations.

For nearly 2 million years, humans foraged for a living. Because naturally occurring plants and animals are everywhere and always limited, population sizes remained relatively small. Hunter-gatherer groups that became too large eventually depleted their resources and were faced with a stark decision—leave or starve. As long as there were unoccupied territories with untapped resources, migration could occur without conflict. However, migration into already occupied areas most often came at the price of conflict. Groups living in those areas would not have welcomed outsiders and usually resisted incursions by groups not closely related by kinship. It is not surprising, therefore, that archaeologists have discovered evidence of conflict among most preagricultural societies, and that among historical hunter-gatherer groups, conflict was a fairly regular occurrence. In most instances, this conflict revolved around resources.

Approximately 12,000 years ago, humans began domesticating plants and animals. Other than evolution itself, no other event has so profoundly influenced human history and culture. The shift from food gathering to food production led to permanent settlements and population growth. When the process of domestication began around 10,000 BCE, there were perhaps no more than five million people worldwide. Ten thousand years later (1 CE) and as a direct result of agriculture, global population had increased to 300 million. This explosive growth had many consequences, not the least of which is that hunter-gatherers were pressed on all sides by expanding agricultural communities. In some cases, this expansion would have occurred through assimilation. In others, it would have been violent. Though foragers had a long history of fighting one another over fertile lands, the conflicts they now faced were different. With their ability to produce food surpluses, agricultural communities were populous and specialized. Some of these specialists devoted themselves solely to the arts of war. Foraging warriors were no match for agricultural armies. This inexorable accretion ultimately resulted in the formation of chiefdoms, cities, states, and empires.

Although this sequential description is overly simplified and there were important variations, it roughly describes the transition from band-size groups to empire-size states. In a mere 10,000 years, humans had gone from living in groups numbering not more than 150 to groups numbering in the hundreds of thousands and even millions. Marvin Harris (1977) describes this process as one of constant intensification; once it started, it could not be stopped.

Intensification has a logic and inertia of its own, and social groupings can only become larger and larger. Growing populations demand more resources. To meet these demands, production is improved and territories are expanded. Improvements in production and expansion of territories generate more resources, which are in turn consumed by growing populations. At this point, the cycle begins anew. Admittedly, this is a rather dry and mechanical description of postagricultural human history. It has the virtue, however, of identifying the resource-based cause of much conflict and aggression over the past 10,000 years.

None of this is to deny that aggression can be highly individualized, and that in isolated cases, those in power have pathological tendencies which may result in larger scale conflict. Only infrequently, however, do individual pathologies translate into war. When it comes to mass conflict, it is the people—those who produce and fight—who must be persuaded. Blatant appeals to conquest and spoils have not, except in rare cases (i.e., the Vikings and Mongols), proven effective in mobilizing entire populations for war. The material costs and mortal risks of conflict simply are too great. Knowing this, rulers and elites persuade and delude the masses with politics, ideology, religion, ethnicity, and nationalism. With depressing regularity, these identity-forging cultural forces have proven effective at tapping into ancestral and primatelike behaviors that favor, at all costs, one's own group over another. Maintaining group separation and solidarity is key to this persuasion. So long as others remain strange and outside the group, aggression toward them is encouraged and justified. It is only when others are familiar and inside the group that aggression is discouraged and prohibited.

Future Directions

Aggression is an essential animal behavior that has evolved through natural selection over millions of years. In evolutionary terms, success (or fitness) is a matter of survival and reproduction. An animal entirely lacking in the capacity for aggression would not long survive and almost certainly would not reproduce. Certain animals are naturally more aggressive than others, and these differences usually relate to feeding ecology. Predators are sensibly more aggressive than browsers. Like other primates, humans are born with the capacity for aggression. At a biological level, this capacity does not differ in degree, kind, or intensity from that of other primates. Any primate—including humans—can become aggressive under various conditions or circumstances. Limited resources of all kinds (food, water, territory, mates) guarantee competition, and where there is competition, there will be aggression.

Where humans differ from other primates, and indeed from all other species, is in their capacity for extreme aggression and continuous conflict. Humans also differ from other primates and species in the extreme development

of their cultural adaptations. It is this variable—culture—that accounts for hypertrophied human aggression and conflict. Culture can operate either to dampen aggressive impulses or to amplify them. For the better part of human history, culture has unfortunately been used to amplify those impulses, primarily through the promotion of distinct identities and separate groups. When culture co-opts naturally adaptive behaviors such as aggression, the results can be disastrous. Culture has the capacity to detach aggression from the pursuit of food, protection of offspring, and defense of territory. It also has the capacity to engender and redirect aggression toward others, with an intensity and scale unique in the animal kingdom. No other species cultivates aggression and encourages conflict with the same dedication or intensity as humans.

Because the capacity for aggression is neither mysterious nor deviant, and because conflict can nearly always be explained in terms of power and resources, there is not much to be gained from additional studies explaining what is already known. Although the proximate causes of conflict—such as people involved, issues invoked, and reasons provided—will continuously change with the progression of time, the ultimate evolutionary causes remain the same. So long as these causes are obscured and distorted by acculturating forces—whether in the form of nationalism, religion, ethnicity, or ideology—prospects for change are minimal. As is true of any behavior or description of behavior, aggression and conflict have their opposites. To understand aggression and what provokes it, future research should be directed at converse behaviors such as cooperation. The same is true for conflict. Without a thorough understanding of the conditions and circumstances under which aggression is minimal and conflict absent, our understanding of these subjects will remain incomplete.

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SOCIAL PROBLEMS

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Social problems are relevant to all of us, and it is no coincidence that scholars from many different disciplines—including anthropology, sociology, psychology, and criminology—have systematically studied this area. Unlike natural scientists, social scientists often employ moral judgments during the course of their research. If, for example, an anthropologist wanted to study the effects of Hurricane Katrina, then he would face different obstacles than if a meteorologist were to study the same phenomenon. Most people would agree that it would be unethical for an anthropologist to passively sit by and take notes, rather than offer assistance to victims while conducting fieldwork in the aftermath of a devastating storm. A natural scientist, on the other hand, would probably not experience the moral dilemmas that would be faced by social scientists. Because anthropologists often are in the unique position of studying other human beings, the potential for bias is not surprising, and they may often face difficulties in remaining neutral and objective during the course of a particular study (Newman, 1999).

Because there is no broad consensus as to which type of social problems are the most worthy of our attention, social scientists may show their biases merely by the topics that they choose to study (Mooney, Knox, & Schacht, 2009). By choosing which issues are the most worthy of investigation, anthropologists are employing their own personal discretion. This makes the systematic study of social problems somewhat subjective. For example, one researcher may identify

racism as the most important social problem plaguing society, whereas another researcher may avoid this issue altogether. Because anthropologists are humans studying other human beings, anthropology will never be as scientific as disciplines in the natural sciences. Nevertheless, in spite of this caveat, anthropologists can add much to the discussion of social problems. They employ a unique set of methodologies, such as ethnography, which provide valuable insights into various problems (Newman, 1999; Malinowski, 1941). Additionally, an anthropological perspective is important to our understanding of social problems because it examines factors, such as culture and power dynamics (Bodley, 2008). As it will later be shown, powerful institutions, including the media, have largely shaped and defined society's conception of what is and is not a social problem.

Problems of Natural Disasters and Erosion of the Earth

There is no question that the 21st century has seen its share of natural disasters, especially when one considers that we have not been in this new millennium for even a decade. Perhaps, at least for Americans, the most recognizable instance of a recent natural disaster occurred in 2005 when Hurricane Katrina devastated the city of New Orleans. Hurricane Katrina is considered to be one of the deadliest and costliest natural disasters in American history. It may

have been responsible for taking the lives of as many as 1,836 people and causing upwards of \$81.2 billion worth of damage (Mooney et al., 2009). Hurricane Katrina shall be referred to periodically throughout this chapter because it represents numerous types of social problems in addition to being a problem associated with the environment. For example, Hurricane Katrina illustrates problems related to inequality, racism, and sexism. African Americans, Latinos, women, and children tended to be disproportionately affected by this natural disaster and were the most likely to be among the dead in the aftermath of the storm (Kornblum & Julian, 2009).

According to anthropologists, ethnocentrism is when an individual believes that her culture is superior to other cultures (Malinowski, 1941). When discussing these and other social problems, social scientists strive to adopt a global perspective, rather than to engage in ethnocentric thinking. It is particularly important, then, not to focus solely on natural disasters that have occurred in the United States. In addition to Hurricane Katrina, there have been other natural disasters that have occurred throughout other parts of the world during the 21st century. While there is no question that Hurricane Katrina may be one of the most frequently cited natural disasters, it pales in comparison with the destruction caused by the Asian tsunami of 2004. It is likely that this disaster claimed the lives of more than 150,000 people (Mooney et al., 2009). As in the case of Hurricane Katrina, most of the victims of the Asian tsunami were poor. These individuals had substandard homes that could not withstand any type of resistance force, and most did not have insurance policies or savings accounts to help them get on their feet in the aftermath of the disaster. It is safe to speculate that the poor are usually more vulnerable to natural disasters than other members of society.

It is a cruel irony that while the poorest segments of society often suffer the worst from natural disasters, in many ways it is wealthy and privileged individuals who bear the most responsibility in destroying the earth. Corporate greed and consumption have led to global warming and climate change, which may contribute to an increase in natural disasters of a magnitude similar to that of Hurricane Katrina and the Asian tsunami in the future. Relative to its population, the United States emits the highest amount of carbons. For example, in 2005, less than 5% of the world's population lived in the United States, yet it still produced 21% of the world's carbon emissions from burning fossil fuels (Energy Information Administration, 2007). These gas pollutants from automobiles and factories produce a "greenhouse effect," which could have catastrophic consequences if this goes unchecked (Heiner, 2006). As the temperature increases, some areas of the world may experience heavier rains, and at the same time others may become drier (Bodley, 2008). A temperature increase of only a few degrees has the potential to drastically change life on this planet. In

addition to emitting the highest carbons, citizens in the United States also generate a disproportionate amount of solid waste relative to other countries. For example, according to Cheeseman (2007), more than 380 billion plastic shopping bags are used in the United States every year. These bags are particularly bad for the environment and may take up to 1,000 years to decompose. Countries such as Taiwan, Singapore, South Africa, and Bangladesh have restricted or outright banned these harmful products, yet the United States refuses to follow this example (Cheeseman, 2007). In addition to this, a recent study conducted by the Environmental Protection Agency (2009) found that Americans dispose of approximately 4.54 pounds of garbage every day. Also, citizens in the United States and other industrialized countries are likely to dispose of large amounts of electronic equipment. This phenomenon, which has been referred to as "e-waste," is very devastating to the environment (Mooney et al., 2009). When disposed of in a careless manner, electronic equipment has the potential to contaminate our water supply and soil.

Anthropologist Richard H. Robbins (1999) contends that capitalistic societies, such as the United States, are responsible for elevating human consumption levels which in turn leads to the depletion of natural resources and the destruction of the environment. He argues that our culture encourages laborers to accumulate wages, capitalists to accumulate profits, and consumers to hoard goods. Robbins also suggests that a handful of powerful elitists reap the benefits from being involved in a culture dedicated to consumption. In fact, these individuals often are responsible for using the media to create consumerism in order to advance their own interests. It is a well-known fact that capitalists in the United States rely heavily on advertising in order to sell commodities. Even when a commodity is frivolous, clever advertising often has the ability to present the product as a necessity and make consumers feel compelled to rush out to the stores. This has devastating consequences for the environment and often results in pollution, resource depletion, and waste.

Generally speaking, capitalists and corporations have been highly resistant to the idea of allowing the government to regulate businesses in order to preserve the environment. In fact, beginning in the late 1970s, U.S. businesses began spending billions of dollars a year to convince the American public that there was too much environmental regulation (Beder, 1997). This intense lobbying proved to be very effective because many environmental regulations that were passed in the seventies were either repealed or simply unenforced during the 1980s (Bodley, 2008). The fact that corporations have been so resistant to environmental regulation illustrates how a small number of powerful people are benefiting from the destruction and pillaging of the earth's resources. The forces of capitalism not only have depleted valuable natural resources but also have produced a highly stratified and nonequalitarian social system. Social problems related to poverty and

inequality are of considerable concern to anthropologists and shall be discussed in the following section.

Problems of Poverty, Inequality, and Racism

In addition to exemplifying a recent and horrific natural disaster, Hurricane Katrina also represents social problems related to poverty and inequality. It is very plausible, for example, that before the storm hit New Orleans, wealthy residents and visitors were given priority over poorer residents and bused out first. In fact, one account suggests that 700 guests and employees of a Hyatt Hotel were given the first opportunity to leave, while lower-class individuals were relegated to the end of the evacuation line (Dowd, 2005). It is true that low-income African Americans were the most likely to remain in the city during Hurricane Katrina (Dyson, 2006; Elliot & Pais, 2006). It also may come as no surprise that during the Asian tsunami of 2004, foreign tourists also received substantially more aid during the storm than the thousands of impoverished villagers who were more or less left to fend for themselves (Mooney et al., 2009).

Almost without exception, whenever a natural disaster strikes, those who are poor or are considered to be on the fringes of society tend to be victimized the most. It may be no coincidence that in the aftermath of Hurricane Katrina, women, children, and racial minorities were very likely to be among the dead that were found scattered throughout the streets of New Orleans. Dyson (2006) argues these groups were unable to evacuate the city prior to the storm due to financial constraints. Many low-income New Orleanians may have simply not had access to reliable transportation. Even if some of these individuals were fortunate enough to have personal vehicles, evacuating may have been seen as a considerable expense. Some residents may have opted instead to take their chances, only to realize later that they had made a monumental mistake.

While racial minorities were disproportionately the victims of Hurricane Katrina, the media also victimized them throughout this natural disaster (Brezina & Kaufman, 2008). During the storm, for example, there were media reports that grossly exaggerated the levels of violence among New Orleanians. According to Brezina (2008), many of these stories stereotyped the urban poor as prone to violence and extreme forms of criminal behavior. Other scholars suggest that a few of the media depictions were outright racist. For example, Tierney and colleagues (2006) contend that the news media coverage following Hurricane Katrina portrayed New Orleans as a “snake pit of anarchy, a violent place where armed gangs of black men took advantage of the disaster not only to loot but also to commit capital crimes” (p. 68). Stories were also published with alleged incidents of child rape and mass murder among evacuees who were in the New Orleans Superdome.

It is astonishing that major news outlets published the bogus stories described here without any meaningful attempt to check for accuracy. It is even more disconcerting that most of the general public seemed willing to accept these stories without question. Perhaps for a few individuals, these horrific tales even confirmed a few privately held beliefs regarding the poor and people of color. Even in spite of overwhelming evidence to the contrary, some white Americans still regard racial minorities as being culturally or intellectually inferior to themselves. It does not help that the media often exacerbate these misperceptions by frequently publishing stories that depict racial minorities, particularly members of the African American community, in a negative light. One does not have to look very hard to find stories that portray African Americans as either welfare recipients or criminals.

Fortunately, many anthropologists have dedicated their careers to speaking out against racial stereotypes. One relatively recent example is illustrated in the work of the late Eugenia Shanklin. In perhaps her best-known work, *Anthropology and Race*, Shanklin (1993) advances the notion that race is socially constructed. She also argues against the notion that race is a valid scientific concept. In many respects, Shanklin’s argument builds upon the classic work of renowned anthropologist Franz Boas. Boas wrote extensively about race during the beginning of the 20th century, and he too concluded that this was a social, rather than a biological, concept (as cited in Williams, 1996). In retrospect, his writings against the evils of racism were quite ahead of their time. This is especially true when one considers that these were written during a period when social Darwinism and eugenics were at the height of their popularity (Williams, 1996).

In addition to writing about race, other scholars have also examined the processes by which members of racial minorities become disenfranchised. For example, in his classic article, “The Culture of Poverty,” anthropologist Oscar Lewis (1966) argues that for some people poverty is a way of life. Often this may be due largely to structural barriers, such as a lack of jobs and inadequate educational systems. Lewis contends that at an early age, children living in urban slums begin to subscribe to a set of values and beliefs that are conducive to poverty. It is not uncommon for many of these children to be racial minorities. Children who are assimilated into this culture have problems deferring gratification and avoid participating in society’s major institutions (Lewis, 1966). This culture is also characterized by a high concentration of single-parent households that are usually headed by females. Over time, children who are socialized in these environments begin to adopt self-defeating attitudes that can make them less competitive in the marketplace when they enter adulthood. Even today, more than 40 years since it was published, Lewis’s study still has relevance. African Americans and Hispanics are among the poorest people in the nation. In fact, year after year, the rates of poverty among these minority groups are 2 to 3 times higher than

the poverty found among Caucasians. Sadly, many of those who are impoverished in this country are children. For example, Conley (1999) writes that “over half of African American children under the age of 6 are living in poverty” (p. 10).

It can often be very challenging for individuals who are raised in poverty to overcome obstacles in order to obtain even the most menial types of employment. According to Princeton anthropologist Katherine S. Newman (1999), even minimum-wage jobs at fast-food restaurants are extremely competitive, and there are usually more applications than there are positions. She contends that often African Americans are excluded from these jobs, even if the restaurant is in a predominantly African American neighborhood. Individuals who are fortunate enough to obtain jobs as “burger flippers” must still compete with other employees for hours and often suffer incivilities from supervisors and customers. During the course of her research, Newman (1999) conducted countless interviews with low-income fast-food workers and observed them in their natural environment. She argues that many of America’s poor are working in dead-end jobs, such as the fast-food industry, with little hope of advancement.

While the United States certainly has problems of inequality and poverty, it is currently the richest and most powerful nation and does not suffer from the same level of poverty as many third-world and developing countries. As mentioned previously, it is important for anthropologists to adopt a global perspective when studying various problems. Regardless of where someone lives, we are all members of the human race, and therefore a problem experienced by one culture inevitably affects us all. Consider that throughout the world more than one fourth of the earth’s population (roughly 2.5 billion people) subsist on less than \$2 a day, and approximately 1 billion people (or 1 in 6 individuals) live on less than \$1 a day (World Bank, 2007). The planet has more than enough resources, yet millions of people throughout the world currently lack access to food, durable shelter, and clean drinking water.

Anthropologists such as Bodley (2008) argue that these are the consequences of living in the contemporary commercial world. Unlike small tribal societies that were prevalent thousands of years ago, the contemporary commercial world prevents some individuals from obtaining basic necessities. Today, levels of global inequality are at an all-time high. As power elites race toward accumulating capital, this has produced enormous wealth and power differentials. Bodley (2008) writes:

The daily lives and future prospects of virtually all of the world’s 6 billion people are shaped by the political and economic decisions made by a relative handful of people who command trillions of dollars in financial capital and overwhelmingly powerful armed forces. (p. 17)

Given this statement, it may come as no surprise that currently the wealthiest 10% of adults own 85% of the world’s

total wealth, while the poorest half of the adult global population holds slightly more than 1% of the world’s wealth (Davies, Sandstrom, Shorrocks, & Wolff, 2006).

Clearly inequality, poverty, and racism are problems not only in this country but also throughout the world. Bodley (2008) contends that many of these problems stem from global competition. In the name of competition, corporate executives in the United States hold back wages from their employees and deny benefits that are standard in other industrialized countries (Gray, 2000). There is no question that workers in European nations enjoy far more rights than workers in America. In Western European countries, for example, it is much more difficult to fire an employee, and it is virtually unheard of for companies to “downsize” merely to add to the overall profit margin. Also, workers in France enjoy a shorter workweek and more paid time off compared with their United States counterparts (Heiner, 2006).

While it seems as though European nations have the most humane system, there is at least some indication that a few of these countries are beginning to imitate the U.S. model in order to gain a competitive edge (Heiner, 2006). Currently, the United States is considered to be the most capitalistic society in the world because it has the least amount of governmental regulations. This lack of regulations has resulted in gross disparities and outright discrimination (Bodley, 2008; Kornblum & Julian, 2009; Mooney et al., 2009). Global competition has also led to the exploitation of third-world countries. According to Heiner (2006), this has been going on for several hundred years. He contends that there is a long history of powerful nations establishing colonies throughout the third world in order to plunder and export valuable natural resources such as gold, silver, silks, and other items. Also, even though some corporations have recently relocated from the first world to the third world, Heiner (2006) suggests that poverty has actually been on the rise in underdeveloped countries since the arrival of these new companies. Standards of living have also been on the decline in the third world and are likely to continue (Mooney et al., 2009). It seems that extreme forms of capitalism exacerbate inequalities in poor countries just as they do in wealthy ones, such as the United States.

While it may seem obvious to many of us that unbridled economic pursuits have created enormous inequalities throughout the world, the media have done much to shape the way we think about capitalism. By and large, in the United States, capitalism is held as one of the highest virtues. This is in great part due to the media-constructed image of the “American Dream,” where anyone can achieve wealth and success with enough hard work (Messner & Rosenfeld, 2007). Even though extreme forms of capitalism have resulted in gross inequalities, Americans are socialized to believe that it is the best system. Ironically, this also applies to poor people. Newman (1999) suggests that even the poor tend to embrace the notion of the

American Dream, in the hope that they may one day achieve success and accumulate wealth.

The media, owned in the United States by the power elite, bears a large responsibility in generating the idea that anyone can be successful in a capitalistic society (Heiner, 2006). This has dire consequences. When individuals in the United States fail to move from rags to riches, they often blame themselves. In this country, perhaps more than anywhere else in the world, there is a tendency to blame the poor whenever they fail to be successful or provide for their families. It is no surprise that in this country, in order to be considered successful and good providers, many workers are spending more time at the office and less time with their families. While some individuals have been able to accumulate more possessions and increase their purchasing power by working longer hours, sadly this has come at a considerable expense to their families (Mooney et al., 2009). In fact, one of the greatest social problems facing Americans today involves problems related to the family. This deserves a considerable amount of attention and shall be discussed in depth in the following section.

Problems Related to the Family

In the United States and elsewhere throughout the world, there are many different varieties and types of families. The U.S. Census defines a family as a group of two or more people who are bonded by marriage, adoption, or blood. Mooney and colleagues (2009) contend that the above definition is somewhat restrictive because it does not take into account foster families and unmarried same-sex and opposite-sex couples. The official definition of a family also fails to consider those relationships that function and feel like a family. For example, college students living together and sharing expenses and household chores might be considered a family in the broadest sense of the word. As we begin to examine the various social problems that plague the family, it is necessary to understand that today's family knows virtually no bounds. In fact, the traditional conception of the family, with a father who is the breadwinner and a mother who stays at home with the children, is probably one of the least typical types of families in the United States.

According to Skolnick (1991), throughout history people have warned that the family was on the verge of becoming extinct. During political campaigns, social conservatives tend to be the most vocal about the decay of the traditional family unit. For instance, it is not uncommon for conservative candidates to attack liberals for their tolerance of gay marriage and single parenthood (Kornblum & Julian, 2009). It is also not unusual for some traditionalists to blame problems of the family on working mothers. Many social conservatives argue that in order to solve many of society's problems, families should return to the breadwinner-housewife model that was

popular in the United States during the 1950s (Heiner, 2006; Hewlett & West, 1998). Some scholars claim, however, that these are merely tactics to divert attention from the low levels of government funding given to families that are struggling financially.

Conservatives, who ardently favor independence and self-sufficiency, often fail to remember that their idealized conception of the 1950s family was possible only because of unprecedented amounts of governmental assistance, such as low-interest housing loans and educational subsidies (Hewlett & West, 1998). During the 1950s, the federal government spent billions of dollars on public transportation, sewage systems, parks, and other projects designed to help families (Hewlett & West, 1998; Kornblum & Julian, 2009). From past experience, it would seem that a similar use of public subsidies would be an effective way to help facilitate families in the new millennium. It is ironic, however, that many traditionalists tend to be against this idea. Of all the industrialized countries in the world, the United States has the fewest governmental policies and programs designed to support the family. Given this, perhaps it should come as no surprise that the United States also has one of the highest divorce rates and is willing to tolerate levels of child poverty that would be unconscionable in other countries. These are current issues that plague the family and will be discussed later in more detail.

In his classic ethnographic study of familial relations among natives of the Trobriand Islands, anthropologist Bronislaw Malinowski (1941) argues that even in the most primitive societies, there is an expectation that "every family must have a father," and "a woman must marry before she may have children" (p. 202). Currently, while it is true that premarital pregnancy in the United States is frowned upon, unmarried mothers are generally not as stigmatized as they have been in past history (Kornblum & Julian, 2009). In fact, today approximately one out of three children in the United States is born out of wedlock (Mooney et al., 2009). While this may seem high to some people, it is important to note that countries such as Norway, Sweden, Iceland, Denmark, the United Kingdom, and France have even higher rates of nonmarital births than the United States. In Iceland, as many as 2 out of 3 children are born out of wedlock, and in approximately half of the births in Norway and Sweden, the mother and father are not legally married (Money et al., 2009).

In addition to the above countries, there are also parts of West Africa where unmarried women may have children without being ostracized or punished. This is especially true if the mother is not considered to be promiscuous. According to Kornblum and Julian (2009), as long as the identity of the child's father is known, an unwed mother will experience very little, if any, stigmatization. While some social conservatives have expressed moral outrage at the rise in the rate of nonmarital births, many children both in this country and in other cultures throughout the world have been able to find love and acceptance in

family structures that may not be considered traditional by American standards. It is also important to mention that children who are raised in nontraditional families may be provided with a higher level of care and nurturing than those whose father is present but struggling with a problem such as substance abuse or unemployment (Kornblum & Julian, 2009).

The family is very important to our understanding of social problems because it is often identified as being either the solution to or the source of societal ills, such as alcoholism, crime, and poverty (Heiner, 2006). If children come from a “good” family, for example, then it is commonly believed that they will avoid engaging in deviant or pathological behavior. Most traditionalists assume that children who are adequately socialized will ultimately receive a good education, raise families of their own, pay taxes, and more or less be productive citizens. On the other hand, if a child is delinquent, turns to drugs, or has problems in school, the family is often singled out as being the source of the problem. Given the importance that we place on the family, it is no surprise that this has been an important research topic for many social scientists.

Recently, there have been numerous studies examining whether or not—and to what extent—financial problems plague the family. Most of the current literature indicates that a tough U.S. economy has led women to largely abandon the role of solely being a homemaker (Jacobs & Gerson, 2004). Today, approximately 71% of women with children under the age of 18 are employed outside the home (U.S. Department of Labor, Bureau of Labor Statistics, 2007). Also, ever since the 1970s, both men and women have consistently been working longer hours. In the United States, it is not unusual for many individuals to work more than 50 hours a week (Jacobs & Gerson, 2004). In fact, a recent study conducted by the Economic Policy Institute (as cited in Bernstein, Mishel, & Schmitt, 2000) found that, on average, married working couples with children spent 256 more hours at their jobs in 1997 than they did in 1989. This is roughly the equivalent of an extra month and a half of time spent at the office rather than at home.

Not surprisingly, family members today are more stressed out than ever before as they try to juggle domestic and work responsibilities. Sadly, children often have the most difficulty in adjusting to the pressures of living in a dual-income family. Occasionally, some may even become “latchkey children,” who are largely responsible for their own care, since both of their parents are working. If this is true in two-parent households, then it is especially the case for children who live in families with only one parent. In this country, 49% of non-Hispanic white single-mother households are due to divorce, in contrast to 62% of African American single-mother families, where the mother never married (Fields, 2004).

Currently, the United States has the highest rate of divorce among Western nations. According to Kimmel (2004), 40% of marriages in this country end in divorce.

The rate of divorce rate is even higher when one looks at couples who have already been married at least once. Also, children are involved in 60% of divorce cases. In other words, when a marriage dissolves, more often than not, children will be affected by this decision.

Divorce represents perhaps one of the most serious problems plaguing the family because it has the potential to result in many devastating consequences. First, divorce is likely to create significant economic hardships for mothers and their children. Many women, who might have been unpaid homemakers or part-time employees during their marriage, are not fully prepared to enter the workplace in the aftermath of a divorce (Amato, 2003). Usually, following a divorce, they must go back to school and at the same time find a way to increase their income. Often, this entails getting a job (or a second job), putting in more overtime, and finding other means to make money. At the same time, they often have to take on new financial responsibilities, such as balancing the family budget. On top of this, women are disproportionately likely to assume many (if not all) of the child-rearing duties following a divorce (Amato, 2003). To make matters worse, it is not uncommon for fathers to offer little or no economic support.

In addition to the adverse economic impact that it has on families, divorce also places children at a higher risk of developing psychological and emotional problems. Some children with divorced parents may become extremely sensitive or overly aggressive and develop serious self-esteem issues. If this behavior goes unchecked, it can lower a child’s performance in school and have serious long-term effects on his or her future. Amato and Cheadle (2005) contend that the repercussions of divorce are so powerful that even future children, who have not even been born, have the potential to be affected. For example, a divorce that occurs in the first generation of a family may be associated with lower education, more divorce, and greater familial tensions in the second generation, which then may in turn contribute to similar problems in the third generation. While there are some situations where divorce may be the only option, there is no question that it can result in many negative consequences for a family’s well-being.

Finally, there is some relatively new literature indicating that natural disasters can affect a family’s well-being. While these events can result in the loss of lives and financial ruin, it appears that events such as floods, hurricanes, and tornadoes can also impact families. In one recent study, for example, it was estimated that approximately 1 in 4 (22%) of New Orleanians indicated that they had experienced marital discord as a result of Hurricane Katrina (Kaiser Family Foundation, 2007). In this study, 10% of the subjects even admitted to throwing things at their partner, yelling, and losing control. Other studies have confirmed the above finding that natural disasters, such as Katrina, can lead to domestic violence and various other forms of familial abuse (Brezina & Kaufman, 2008; Enarson, 1999). While domestic violence clearly is an issue that is related to the

family, it is also one of many social problems that are related to crime. Problems related to crime shall be discussed in more detail in the following section.

Problems Related to Crime

Of all the various social problems, perhaps those related to crime tend to receive the most attention. According to Mooney and colleagues (2009), a crime is considered to be an act or omission of an act that is punishable by either federal, state, or local law. In other words, in order for there to be a crime, the state must be able to impose a punishment. Also, someone who commits a crime must be acting willfully and voluntarily. An action is also likely to be seen as a crime if there is no legitimate excuse as to why the actor engaged in a particular proscribed act (Mooney et al., 2009). Interestingly, in spite of clear-cut legal definitions of crime, the popular media have influenced our conception of crime and criminals. Television shows such as *CSI*, *COPS*, and *Law & Order*, for example, have provided distortions about the criminal justice system. The media, then, often take an active role in shaping and defining the types of acts that we as a society should consider to be crimes, as well as the types of people who are likely to be perceived as criminals.

In order to illustrate the above point, one only needs to tune in to an episode of *COPS*, a reality television show that enables viewers to follow police officers during the course of their 8-hour shifts. The viewer, from the comfort of home, sees life from the inside of a patrol car. One of the more controversial aspects of this program is that it features a distorted view of criminals. For example, usually, but not always, the perpetrator on the show is a minority male. The suspect is often intoxicated and portrayed as a burden to society. The officers, on the other hand, are seen as the heroes who quell the disturbance and dispense justice within the confines of the law. Almost always, the officers are depicted as being fair, calm, and highly professional. They are very seldom, if ever, shown to be aggressive, hostile, or downright abusive. While some television viewers may find crime shows such as *COPS* to be extremely entertaining, these programs nevertheless have the potential to be very misleading and can even generate negative stereotypes about racial minorities. As Heiner (2006) argues, much of the reality of crime is edited out of “reality-based” crime shows. In writing about these shows, he contends that they “depend upon the cooperation of the authorities, and their producers must keep in mind that if the police are not presented in a positive light, then they will not get their cooperation for future broadcasts” (Heiner, 2006, p. 115).

As a result of being exposed to a heavy regimen of cop and reality crime shows, some members of the public may be left with an impression that most racial minorities use drugs and are an overall menace to society (Heiner, 2006).

These shows rarely, if ever, portray offenses that are committed by law enforcement agents, though certainly these do exist. Also, they say very little about white-collar offenses, though these have the potential to be much more costly to society than traditional street crimes (Messner & Rosenfeld, 2007).

The images of crime that are perpetuated by the media also have a high likelihood to create a sense of fear and anxiety. Every year, Americans spend billions of dollars on safes and home-security devices. One can only wonder how many of these expenditures are related to the distorted images that are routinely shown on reality cop shows and the nightly news (Beirne & Messerschmidt, 2000). Many television programs are notorious for portraying criminals as disproportionately likely to be members of racial minorities who offend against Caucasians. Sadly, this does little to further race relations in this country.

Even though there is absolutely no evidence that members of racial minorities are more likely to be criminal by nature, African American and Hispanic males are disproportionately overrepresented at virtually every stage in the criminal justice system (Bureau of Justice Statistics, 2006; Steffensmeier & Demuth, 2000). This may be due in large part to an institutional bias against minorities. Police officers, for example, may engage in racial profiling where they target suspects solely based on their race. This practice amounts to little more than outright discrimination and may be just one example of the racial bias that is inherent in the criminal justice system. African American males are particularly likely to be the recipients of institutional racism. According to the Bureau of Justice Statistics (2006), it is estimated that 12% of all African American males in their late 20s are in some type of correctional facility compared with only 1.7% of white males in this same age range. African American males are also more than 8 times as likely as Caucasians to be sent to prison for drug offenses (Mooney et al., 2009). In fact, 1 out of every 8 African American males can be found serving time in some type of correctional facility on any given day (Kornblum & Julian, 2009). It would be naive to think that members of racial minorities are not discriminated against at every checkpoint on the criminal justice assembly line.

Perhaps one of the greatest problems plaguing the criminal justice system today is the current incarceration binge in the United States. As of this writing, the United States has one of the highest rates of incarceration in the world, with approximately 702 out of every 100,000 of its citizens incarcerated (International Centre for Prison Studies, 2005). Also, Americans are more likely to be incarcerated than individuals living in less democratic countries, such as Russia or South Africa. The United States, without question, has the highest incarceration rate of all other industrialized democracies. Yet many Americans tend to believe that we are “soft” on crime (Mooney et al., 2009). This is in spite of the fact that between 1975 and 2002, the prison population increased from 204,593 to 2,033,331 (Heiner,

2006). In other words, in slightly over 25 years, it increased almost tenfold.

The costs of America's obsession with punishment should be enough to scare any fiscal conservative, yet often these are the very individuals who are lobbying to build more prisons. Perhaps the most frightening fact of all is that this recent preoccupation with imprisonment has not corresponded with an increase in crime. In other words, even as the crime rate in the United States has decreased, the incarceration rate has nevertheless continued to increase (Kornblum & Julian, 2009). Again, it cannot be understated that the current incarceration binge is extremely expensive. Today, American taxpayers spend approximately \$60 billion a year to maintain the prison system. This is quite astounding when one considers that the cost was \$9 billion only two decades ago (News Highlights, 2007). Perhaps if the United States was not so preoccupied with punishment, this money could be utilized for education, health care, and public transportation. Society's response to crime has in and of itself become an enormous social problem and is currently depleting valuable tax dollars.

Conclusion

One does not need to look very far to see that there are numerous social problems currently plaguing the world. Though this chapter has discussed a variety of different types of problems, this in no way implies that the list is exhaustive. In addition to the social problems mentioned in this chapter, anthropologists also study problems related to health and the health care system, population and immigration, alcohol and drug use, gender and sexuality, mental illness, and terrorism. Unfortunately, there are a variety of problems that the world is currently facing. It would be beyond the scope of this chapter and quite impossible to discuss them all.

One major theme of this chapter is that the media play a vital role in defining and constructing various types of problems. Often, the information that the media present has the potential to be biased. Contrary to popular opinion, most news organizations are a far cry from being radical, left-wing institutions. Instead, many tend to be tainted by corporate influences and sponsors who buy advertisements (Heiner, 2006). This inevitably affects the way we as a society view social problems. To make matters worse, many citizens in the United States seldom go to the polls to cast their votes. If policymakers perceive the public as being largely apathetic and uninformed, then there is a high likelihood that little action will be taken to alleviate social problems. Therefore, it is crucial for Americans not only to vote but also to stay informed.

Admittedly, it can be difficult to keep abreast of the latest news, given that many media outlets have been co-opted by powerful corporations. Nevertheless, there are at least a few Web sites that provide insights into different social

problems throughout the world. Heiner (2006), for example, points to the following sites: factcheck.org, truthout.org, alternet.org, corpwatch.org, and projectcensored.org (a site that is maintained by students). Perhaps through open communication and the dissemination of information, individuals can work together and begin to find ways to solve today's problems. Anthropologists and other social scientists have a special responsibility to educate and empower the people of the world. Though there is undoubtedly a great deal of work to be done, this is not an undertaking that is altogether impossible. In order to be successful, everyone must do their part to make the world a better place. This can start on a small, individual level and can include activities such as volunteering and recycling. If everyone is willing to contribute, there is great hope.

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GANGS

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Gangs today are a worldwide phenomenon and, moreover, not unique to contemporary societies. Youth gangs have existed in Western and Eastern societies for centuries, and in the United States, gangs in urban centers existed before the 19th century. More recently, researchers have studied gangs in Amsterdam, Australia, Brazil, Germany, Hong Kong, Ireland, Italy, Kenya, Mexico, the Netherlands, Norway, the People's Republic of China, Peru, Russia, South Africa, South Korea, Taiwan, and Tanzania. In many instances, gangs use the symbols, style of dress, and behavior of American gangs because these features are transmitted through movies, books, videos, and magazines. Indeed, today's urbanized and globalized world is producing gangs faster than ever before in a variety of shapes and forms, and contemporary gangs play a significant role in many kinds of violence.

Curry and Decker (2003) indicate that gangs in the United States developed during four distinct periods. The first stage occurred as a consequence of immigration and industrialization in the latter part of the 19th century, when groups of recent immigrants—primarily Irish and Italian—engaged in petty property crimes. In the 1920s, a second wave of gangs emerged in cities, again composed of recent immigrants, but they had symbols of membership and were more actively involved in crime than the gangs of the first period. In the 1960s, another generation of gangs developed that contained a significant number of

racial minorities. The availability of automobiles and guns gave these gangs the ability to fight other gangs in neighborhoods across a city. As a consequence, more gang members served time in prison and the prison itself became a source for the perpetuation of gangs. Once released, these individuals brought gang ideology and practices with them and recruited young new members. This creation of intergenerational gangs in the 1990s is the fourth generation of gangs.

This chapter examines the phenomenon of gangs from several vantage points. First, it describes how gangs are defined and the social conditions for their emergence and persistence. Second, it considers how social scientists study gangs by describing some of the classic and contemporary studies of gangs. Third, the chapter will analyze some of the contemporary issues associated with gang activity: female gangs, prison gangs, and drug trafficking. A fourth focus is to examine gangs in a global context, especially in terms of the reasons for the proliferation and growth of gangs in the world today. A fifth focus examines future directions for social science research. Finally, while the word *gang* can refer to many different kinds of groups, such as organized crime groups (gangsters) and hate groups (the Klan), most social scientists use the word to refer to youth gangs, also called street gangs. These gangs are comprised of adolescents and young adults. Therefore, this chapter will primarily focus on youth/street gangs.

Theory

A discussion of gangs is replete with a variety of theoretical issues that are of importance to social scientists. Three issues of special significance are (1) the definition of a gang, (2) the conceptualization of what constitutes gang membership, and (3) theoretical explanations concerning the social conditions that stimulate the development and persistence of gangs.

Definition

Social scientists have not formulated an agreed-upon definition of what constitutes a gang. Generally, there are two distinct conceptualizations that dominate theory and research. The first conceptualization emphasizes that gangs are unsupervised peer groups of adolescents who may or may not engage in criminal activity. Early definitions of gangs emphasized this conceptualization and described the gang's social-support function. For example, Thrasher (1927) argued that the gang is not initially organized to commit delinquent acts; rather, it is spontaneous and unplanned in origin. It serves to give members a sense of community or belonging that is lacking in their lives. Therefore, from this perspective, gangs function as a residual social institution when other institutions fail. Contemporary researchers who subscribe to this meaning of gang argue that gangs are unsupervised peer groups who are socialized by the streets rather than by conventional institutions. They emphasize that members identify themselves with a gang or some similar term.

The second conceptualization requires engagement in criminal activity as part of the meaning of what constitutes a youth gang. For example, Malcolm Klein and colleagues (1971) argue that a gang is a group of youngsters who are perceived as a distinct group by others, recognize themselves as a distinct group, and have been involved in a sufficient number of delinquent acts that call forth a negative response from law enforcement or neighborhood residents. Usually, this conceptualization views gangs as groups with an identifiable leadership and internal organization that claim control over territory in a community, and whose members engage in violent activity or other forms of criminal activity. Often, researchers using this second formulation emphasize the changed character of gangs in contemporary societies because of their increased involvement in violence and other illegal behavior, especially narcotics trafficking. From this perspective, contemporary gangs pose a greater danger to public safety and call for an increased response from law enforcement.

Sharing the second conceptualization but with an attempt to further isolate the characteristics of contemporary gangs, Curry and Decker (2003) posit that there are a number of elements typically included in the definition of a gang. The first element is that a gang must include a group: Seldom does a gang have as few as two members.

A second element is the use of symbols that represent membership. Clothes and hand signs are examples of such symbols and serve to give gang members a sense of belonging and identification. While most gang symbols only have meaning within the gang, sometimes symbols become widely known throughout a community or society. Third, gangs use a variety of words and nonverbal forms of communication, including graffiti and hand signs, to communicate messages. Often gangs also use graffiti to mark the external boundaries of their territory. The fourth element is permanence: Gangs must be in existence for a period of time. This element can be highly variable. For example, some gangs in Los Angeles have been around for nearly 60 years while other gangs have a very short life span. Hagedorn (2008) notes that major gangs in Chicago, Cape Town, and Rio de Janeiro have been around for more than 40 years and have spread outside their original neighborhoods. In these cases, the gangs have become institutionalized. A final element included in the definition of a gang is involvement in crime. Curry and Decker (2003) claim this characteristic is the factor that distinguishes gangs from other youth groups.

Gang Membership and Organization

Closely related to the problem of defining what constitutes a gang is the issue of deciding the criteria for gang membership. In part, the difficulty stems from the fact that researchers use different methods to obtain measures of gang membership. The clearest measure of gang membership is self-nomination; that is, individuals identifying themselves to researchers as belonging to a gang. Yet, this kind of estimate relies on individuals sufficiently trusting researchers to acknowledge gang membership. In addition to self-nomination, symbols and behaviors can be used to distinguish gang members from nonmembers. For example, a gang tattoo or clothing that displays gang symbols indicates gang membership. Researchers can also ask neighborhood residents about their knowledge of gang activity, and researchers can observe the company that an individual keeps to establish whether that person is a gang member. Finally, law enforcement and police agencies keep records of the names of gang members. Generally, their figures are based on arrests or a focus on "high-profile" gangs. Law enforcement data, therefore, may not capture the true extent of gang membership in a community.

Similarly, while much juvenile crime is committed by groups of young people, most researchers do not count membership in a delinquent youth group as necessarily indicating membership in a gang. Spergel (1990) indicates that while research in the 1950s and 1960s tended to view delinquent youth groups and gangs as equivalent, contemporary researchers attempt to provide definitions of gang membership that differentiate delinquent youth groups from gangs. From this perspective, gang delinquency is law-violating behavior committed in groups that are complexly organized

with established leadership and rules. This view also holds that gangs display more violence than a delinquent youth group and, furthermore, share communal values; have conflict with other gangs; and have a tradition of turf, colors, signs, and symbols.

Social Conditions and Gangs

Anthropologists and sociologists who were members of the Chicago school of sociology conducted some of the first studies on gangs in the 1920s. These social scientists used observation and intensive interviewing to study the urban communities of Chicago, emphasizing the study of the relationship of social phenomena to their environment (human ecology). Much of the explanation for the emergence and persistence of gangs is derived from research by these social scientists. This research emphasizes the social conditions (social structure) that generally stimulate and perpetuate gangs and juvenile delinquency. From this perspective, delinquent youth are a product of their environment and gangs develop in response to environmental conditions. This section will review the major social-structural explanations used to explain gangs and gang membership, including social disorganization theory and subculture theory. These theoretical perspectives are not exhaustive of all theories that place emphasis on social conditions to explain gangs, but they serve to highlight some of the most significant classical theoretical developments in this area.

Social Disorganization Theory

Social disorganization theory was one of the most important theories developed by the Chicago school of sociology in the 1920s and 1930s. *Social disorganization* refers to the confusion of norms, values, and relationships at a community level. In this kind of community, there are weak personal ties between residents and, consequently, it is argued that there is weak social control over the individual. In his studies of Chicago gang youth, Thrasher (1927) first utilized social disorganization theory to understand the development of gangs. Thrasher posited that gangs were “interstitial,” meaning that they filled the gaps created by deteriorating neighborhoods, shifting populations, and the disorganization of slums. Thrasher argued that these neighborhoods were to a large extent isolated from the wider community and its culture. Those who resided in socially disorganized neighborhoods were the losers in the processes of competition and conflict within the larger society. Weak families and schools that were not effective in socializing youth characterized these neighborhoods. Their weakness left an opening for the development of gangs. Therefore, social disorganization theory advanced the view that gangs would not develop in strong communities.

Thrasher and those who followed him, especially Shaw and McKay (1943), argued that different degrees of social disorganization might exist in low-income neighborhoods. Those neighborhoods that suffer from extreme disorganization are characterized by extensive deterioration, social disorder, and greater violence. In these neighborhoods, gangs exert greater control because social institutions fail to function as agencies of social control. Moreover, it was the growth and development of cities that created the conditions for social disorganization because there was a succession of different racial, ethnic, and income groups in urban areas, often undergoing a very rapid transition, thereby creating a culture of conflict and a corresponding succession of gangs. Using social disorganization theory, Miller (1975) explained that an exodus of whites from central city areas occurred in the 1960s and 1970s and gave rise to the development of the segregated ghetto and an increased population from which to draw gang members. Social disorganization theory became a key theory in developing gang policy in the 1960s and 1970s. Creating strong communities became the approach to preventing the development of gangs.

In the 1990s, Robert Bursik and Harold Grasmick (1993) further developed social disorganization theory by arguing that there were three levels of community social control in urban areas. The first level was the personal level of social control based on the interpersonal ties among community residents. This was the level that Thrasher and his followers had identified. The two additional levels of community social control identified by Bursik and Grasmick were the parochial and the public. The parochial level consisted of ties between community residents and institutions such as schools and businesses. Ties such as these can create, for example, employment opportunities for residents or after-school activities for young people. The public level of social control concerns the control of residents over community resources such as law enforcement. Involvement in community policing is an example of the public level of social control. Bursik and Grasmick argued that even when personal control is high, low levels of parochial and public social control can result in gang activity. Their modifications to social disorganization theory remain an important contribution to explaining the development and persistence of gang activity in a community.

Subculture Theory

Closely connected and derived from social disorganization theory is subculture theory. A subculture is an identifiable group within a society that has patterns of behavior and norms that set that group apart from other groups within the society. Researchers who initially formulated a social disorganization explanation for the emergence of gangs later often extended their analysis to include subculture theory. For example, Thrasher's book *The Gang* (1927) contains conceptions about subculture as applied to gangs.

Thrasher argued that urbanization, along with the miseries of poverty, created classic conditions in poor communities for the growth of what he called gangland. Similarly, while Shaw and McKay initially focused on social disorganization theory to explain juvenile delinquency and gang behavior, the criticisms of the weaknesses of social disorganization theory led them to develop subcultural explanations. They argued that the subculture of gangs could serve as a social mechanism for transferring deviant normative values and behaviors from older to younger members.

Since these early writings on subcultures, several subculture theories were developed, each with its own set of important concepts and theoretical formulations. Four of the most influential subculture theories are Albert Cohen's (1955) subcultural theory of delinquency, Walter B. Miller's (1958) focal concerns, Gresham Sykes (1957/1990) and David Matza's (1964) techniques of neutralization and delinquency and drift, and Marvin Wolfgang and Franco Ferracuti's (1967) subculture of violence. More recently, James Diego Vigil's (2002) multiple marginality theory has drawn upon the ideas contained in subculture theory. Each of these theories will be briefly reviewed.

In 1955, Albert Cohen developed one of the most influential subculture theories of delinquent gang behavior. He focused on young males who live in economically disadvantaged neighborhoods. Cohen asserted that lower-class boys are judged by middle-class standards in school. However, lower-class boys fail to succeed in meeting these middle-class standards. Cohen maintained that lower-class boys do not have the prior socialization of middle-class youth and therefore are not prepared for achieving middle-class goals. As a reaction, lower-class boys develop a set of negative values that, when collectively shared, lead them to become a gang. Cohen argued that when lower-class boys are not able to achieve middle-class achievement goals taught in schools, they experience status frustration and react by inverting middle-class values. These middle-class values emphasize independence, success, delayed gratification, control of aggression, and respect for property. Instead, the values that lower-class boys adopt are nonutilitarian (gang members steal items for no reason), malicious (gang members enjoy the discomfort they cause others), negative (norms are opposite those of society), and versatile (gang members steal a variety of things) and include short-run hedonism (gang members emphasize momentary feelings) and include and group autonomy (gang members resist outside pressures for conformity).

In 1958, Walter B. Miller proposed a refinement of subculture theory in which he asserted that lower-class culture contains systematically related attitudes, practices, behaviors, and value characteristics designed to support and maintain the basic features of the lower-class way of life. He developed what he termed the *focal concerns* or key values of delinquent subcultures. Such concerns include trouble, toughness, smartness, excitement, fate, and autonomy. He claimed that subcultural crime is not the direct

consequence of poverty and lack of opportunity, but rather derives from specific values that are characteristic of a subculture. More specifically, Miller claimed that trouble is a dominant feature of lower-class culture. Getting into trouble, dealing with trouble, and staying out of trouble become focal points in the lives of many members of lower-class culture. Miller believed that the lower class's concern with male toughness was an outgrowth of the fact that many men were raised in female-headed families and consequently, lower-class boys lack a consistently present male role model. He described smartness as a capacity to outsmart, outfox, con, or dupe another person in order to achieve some valued end, such as material goods or personal status. He described excitement contained in such activities as fights, gambling, and picking up women as a search for thrills, which he saw as often necessary to overcome the boredom of lower-class life.

A concern of subcultural theorists was to explain why subcultural participants choose behaviors that negate the norms or values of the larger society when they, at the same time, to a certain degree, are participants in the larger society. More simply stated, how can a person be committed to two different sets of values—those of the subculture and those of the larger society? Gresham Sykes (1957/1990) answered this question by claiming that offenders can overcome feelings of responsibility when involved in criminal activities by using types of justifications for their actions which he called techniques of neutralization. Five types of justifications were identified: (1) denial of responsibility, by pointing to one's background of poverty and the lack of opportunity as the reasons for criminal behavior; (2) denial of injury, by claiming, for example, that "everyone does it" or that the specific victim could "afford it"; (3) denial of the victim, by asserting that the victim deserved the victimization; (4) condemning the condemners, by claiming that authorities are corrupt or responsible for their own victimization; and (5) an appeal to higher loyalties, such as in defense of one's family, gang, or neighborhood as the rationale for the criminal behavior.

A few years later, David Matza (1964) argued that youth tended to drift between criminal and conventional activities and used techniques of neutralization as justifications for deviant behavior. Matza used the term *soft determinism* to explain that youth were neither forced to make delinquent choices, nor were they entirely free to make choices unencumbered by their life situation.

In 1967, Marvin Wolfgang and Franco Ferracuti published *The Subculture of Violence: Towards an Integrated Theory in Criminology*. They claimed that violence is a learned form of adaptation to certain life circumstances, and that learning to be violent takes place within the context of a subculture that emphasizes the advantages of violence over other forms of behavior. Certain features characterize these subcultures, such as songs and stories that glorify violence, gun ownership, and quick response to

insults in order to preserve one's prestige within the group. Wolfgang and Ferracuti maintained that subcultures of violence both expect violence from their members and legitimize it when it occurs. In other words, they claimed that for participants in violent subcultures, violence can be a way of life. Wolfgang and Ferracuti also developed the idea of the "wholesale" and "retail" costs for homicide. They asserted that killings that are perceived to occur within a violent subculture generally result in a less harsh punishment than do killings that occur outside of the violent subculture. Punishments, they argued, relate to the seriousness of the offense; if the members of a subculture accept the violence, then members of the wider culture that impose the official sanctions on the perpetrators will also.

A more recent extension of subculture theory is contained in the work of anthropologist James Diego Vigil (2002). He maintains that embedded within the subculture of violence framework are the issues of "street realities" and the "state of mind" of the individual. Street realities include such factors as neighborhood, poverty, culture conflict, and sociocultural marginalization. Street realities ensure that a street subculture emerges among children who do not receive social control from families, schools, and law enforcement. Street socialization occurs when individuals who have traumatic family and personal backgrounds have to spend most of their lives in the streets from a very early age. During adolescence, group-oriented preteen activities coalesce and merge into that of the street gang. The streets become the place to learn how to gain recognition and approval. The culmination of all street experiences is the shaping of a mind-set that Vigil calls *locura*. He describes *locura* as a kind of quasicontrolled insanity, of moving in and out of wild events and adventures, showing fearlessness and toughness, and exhibiting daring and especially unpredictable forms of destructive behavior. This mind-set, Vigil argues, becomes a necessity for street survival and a standard for identification and emulation. He claims gang violence is a complex problem and social scientists need to include many factors or levels of analyses, referring to his complex research approach as multiple marginality theory.

Limitations

Social disorganization and subculture explanations of gang behavior are macrolevel explanations; they do not attempt to focus on specific individuals or examine the specific social or psychological reasons why an individual joins and stays in a gang. That kind of research is important, but historically it is not a primary interest of research conducted by anthropologists or sociologists who explore and examine the relationship between social conditions and the presence of gangs. The focus for understanding the formation and persistence of gangs, for these researchers, is at the societal and community level of analysis.

Methods

Researchers have used both qualitative and quantitative approaches to study youth gangs. Early studies primarily used qualitative approaches. These studies of gangs relied upon ethnographic fieldwork and interviews with gang members. Beginning in the 1970s, the early emphasis on qualitative research gave way to more emphasis on quantitative research, especially because of the availability of data gathered by police, the courts, and corrections. For the most part, this shift occurred because of increased government funding in the United States for criminal justice research that could assist law enforcement in controlling gang activity.

The Qualitative Approach

The qualitative approach generally focuses on the non-delinquent and noncriminal aspects of gang behavior, as well as law-violating behavior. This approach frequently examines the everyday realities of gang life. Often these studies indicate that crime and violence are only a small part of gang life. Instead, gang members spend much of their time "doing nothing" or drinking and partying. These descriptions portray gangs as loosely structured groups that lack clear and stable leadership. For example, Frederic Thrasher's (1927) pioneering work on Chicago gangs examined how members are motivated by typical youthful concerns, such as thrills and excitement. Fighting was the predominant activity and stealing was the most serious crime. Also of note is William Foote Whyte's (1943) study of an older group of corner boys in Boston during the Great Depression that he identified as the Nortons. While the main activity of the Nortons was gambling, Whyte focused on giving detailed descriptions of personal interaction among group members. Other field studies include but are not limited to Yablonsky's study of New York City gangs (1962), Spergel's (1964) research on New York City gangs, Short and Strodbeck's (1974) Chicago field research, Klein's (1971) research on Los Angeles gangs, Moore's (1978) research on Los Angeles gangs, Hagedorn's (1988) research on Milwaukee gangs, Padilla's (1992) study of a Chicago drug-selling gang, Decker's (1996) research on Saint Louis gangs, and Fleisher's (1998) ethnography of a Kansas City gang.

Although qualitative studies provide rich descriptions of gang life, they have several limitations. Qualitative research does not provide general information about the extent of gangs or sociodemographic characteristics. Moreover, Hughes (2005) notes that qualitative research is subject to methodological biases. Researchers tend to study the gangs to which they are able to gain access because the research requires a great investment of time and may entail both significant risks and the cooperation of the research participants. Therefore, using qualitative methods, the representativeness of the gangs studied is

questionable. In addition, observational data may be biased because of the presence of the observer and observer-participant relationships. Also, field researchers often assume that the members they interview are representative of other gang members. However, interview samples may consist of gang members selected because of certain considerations, such as their willingness to be interviewed or because they are currently under investigation for violent crimes. Finally, gang members' accounts of their criminal and violent activity may be exaggerated and may be contradicted by other evidence.

The Quantitative Approach

Quantitative research on gangs includes surveys of law enforcement officials, analyses of data compiled by law enforcement agencies or the courts, and self-reports of samples of youth or young adults. Walter Miller (1975), a Harvard anthropologist, published the first study of the nation's gang problem. Miller studied gangs in 12 cities by interviewing police and asking them whether they thought there was a gang problem in their city. He classified 6 of his 12 cities as "gang problem" cities. In 1982, Miller conducted a second study that included interviews with 173 agencies in 26 intensive study sites. He concluded that there were 9 cities with gang problems. Miller's research, as well as more recent surveys of law enforcement officials (e.g., Curry, Ball, Fox, & Stone, 1992; Klein, 1995; Needle & Stapleton, 1983; Spergel & Curry, 1989), indicates that gangs are disproportionately involved in delinquent and violent activities. Research methods expanded further in 1994, when the Office of Juvenile Justice and Delinquency Prevention established the National Youth Gang Center in Tallahassee, Florida. In its first national survey in 1995, 1,492 municipal police departments reported gang problems in their jurisdictions. Since 1996, the National Youth Gang Center has annually conducted a survey of a representative sample of city and county law enforcement agencies concerning the scope of the gang problem. In 2007, for example, the National Youth Gang Center reported that, following a marked decline from the mid-1990s to the early 2000s, a steady resurgence of gang problems has occurred (Egley & O'Donnell, 2007).

Although quantitative studies provide important general information about gangs, like qualitative research, they have limitations. Hughes (2005) notes quantitative studies do not explain the dynamics of gangs, such as how youth become involved in gang crime and gang violence. In addition, it is difficult to compare research that utilizes different definitions of gangs and different sampling strategies (e.g., official records, surveys of law enforcement, incarcerated youth); official records may also be incomplete, inaccurate, and confusing. Moreover, interviews of gang members may be problematic because gang members may feel pressure to hide delinquent and violent activities, or to exaggerate them to corroborate gang images. However, quantitative research

appears to be the only method to assess general patterns of gang prevalence. Indeed, quantitative research that relies on surveys of law enforcement officials, or data compiled by agencies or the courts, generally focuses on the control of gangs, and therefore their research serves the purpose of responding to the gang problem in society. On the other hand, research based on self-report samples of youth or young adults tends to have crime prevention as its focus—achieved through using results to further understand the youth who become involved in gangs. In this respect, it is similar to qualitative research in that both focus primarily on understanding the nature of gangs.

Applications

Early research on gangs focused on adolescent males involved in street gangs who were generally involved in such delinquent activities as petty property crimes. More recent research examines other gang-related issues. Three such topics will be reviewed: female gangs, prison gangs, and drug trafficking.

Female Gangs

It was often assumed that females did not become gang members, and therefore early studies of gangs concentrated on males. While it is true that, at that time, most gang members were male and mainly males commit gang related crimes, Chesney-Lind and Hagedorn (1999) describe how previous researchers ignored the study of female gangs or saw their study as unimportant. Moore and Hagedorn (2001) note that most early research focused on whether female gangs were "real" gangs or merely satellites of male groups. Female gang members were portrayed in terms of their sexual activity or as weapon carriers for male gang members. Being a gang member, for girls, meant being a bad girl. These early studies reflected the widespread notion that gang membership for females was more shocking than for males because it violated gender-role norms.

In the United States, both male and female gangs proliferated in the 1980s and 1990s. Campbell's (1984) research documents both the neglect of research on female gangs and the growth of female gangs. Moore and Hagedorn (2001) maintain that the proliferation of both female and male gangs stems from the economic decline in the 1980s and 1990s with the resulting growth of an informal economy, especially drug dealing. They indicate that female gang members were also affected by recent changes in the welfare system that have reduced or eliminated welfare payments and therefore created pressures to participate in the informal economy. As a result, many female gang members are involved in some type of delinquency or criminality, with drug offenses as among the most common offenses committed by female gang members. Available

research also consistently indicates that the gang is a refuge for women who have been sexually abused at home. Joining a gang can be an assertion of independence from family, as well as from cultural and class constraints. However, in spite of recent research, further research on female gang members' lives is needed.

Prison Gangs

A prison gang is a close-knit and disruptive group of inmates organized around a common affiliation. Prison gangs exist for the purpose of mutual care taking, solidarity, and profit-making criminal activity (Camp & Camp, 1985). The Gypsy Jokers, a gang formed in the 1950s in Washington state prisons, was the first documented American prison gang. The Mexican Mafia, which emerged in 1957 in the California state prison system, was the first prison gang to have nationwide ties. In the United States, the Crips, the Mexican Mafia (also known as *La Emet*), *La Nuestra Familia*, the Texas Syndicate, the Mexicanami (also known as the Texas Mexican Mafia), the Gangster Disciples, the Bloods, Latin Kings, and the Vice Lords are among the largest prison gangs.

Criminal activities of incarcerated gang members have a distinctive character. Tattoos, special attire, macho images, and official titles reflect the sense of ganghood. In contemporary societies, prisons and street gangs are interrelated. Sometimes gangs are created in prison and these gangs move into the streets after inmates are released. However, usually prison gangs are a consequence of street gangs (i.e., incarcerated gang members continue gang activities in prison after incarceration). In addition, older gang members in prison are often leaders in their gangs, and from prison they regulate the activities of other incarcerated gang members and continue to provide leadership to gang members on the street. Activities of prison gangs include extortion, intimidation, drug trafficking, gambling, and homosexual prostitution. Gangs often bribe weak correctional officers, infiltrate job assignments, and abuse privileges to gain privileges, money, and drugs (Camp & Camp, 1985).

Discipline matters are far more serious among gang members than nongang members. Most prison-gang hostilities are not directed at prison officials but are directed at other prison gangs or inmates. To identify gang crime or gang violence, the term *security threat groups* (STGs) is used within the prison system in the United States (Knox, 2000). With this, prison officials have implemented a number of strategies to control gangs, such as segregation units for prison gang members, isolating gang leaders, and monitoring the internal and external communication of gang members.

Drug Trafficking

The relationship between gangs and drug trafficking is not clear and is the subject of debate by researchers. Curry

and Decker (2003) state that there are two different views about the role of gangs and gang members in drug sales. The first view claims that street gangs are well-organized sellers of illegal drugs. Researchers who share this view see gangs as directly and substantially involved in drug transactions. An alternative view rejects this claim and argues, instead, that drug sales by gangs are rarely well organized. Furthermore, when drug sales occur, it is because gang members act independently of their gangs in selling drugs. Proponents of the first view often argue that many gangs are organized solely for the purpose of selling drugs. These gangs are entrepreneurial gangs and not the traditionally territorial gangs usually associated with street gangs. Entrepreneurial gangs are well-organized groups with clear goals. However, this view of gangs as well-organized groups with a common purpose is contradicted by other research that claims that gangs are often disorganized and lack shared goals. Therefore, gang membership adds little of a distinctive character to street-drug sales.

Some researchers propose an evolutionary framework to understand the relationship between gangs and drug trafficking. Hagedorn (2008) makes a distinction between the periods before and since the 1970s. He maintains that there has been more gang violence since the 1970s because of the adoption of economic functions (especially drug trafficking) by some gangs, the use of violence to regulate illicit commerce, the proliferation of firearms, the effect of prisons on neighborhood gangs, and the effect of mainstream cultural values regarding money on gang youth with limited opportunities. The National Drug Intelligence Center (2006) reports that some gangs have evolved from turf-oriented gangs to organized, profit-driven criminal enterprises whose activities include not only retail drug distribution but also other aspects of the trade such as smuggling and wholesale distribution. Some of the most highly organized gangs, such as the Latin Kings, Gangster Disciples, and Vice Lords, have centralized leadership cores that can conspire to transport and distribute drugs throughout the country.

Global and Topical Comparison of Gangs

As indicated at the beginning of this chapter, gangs are not confined to American society. They are present throughout the world, and in many cases gangs outside of the United States use the symbols, style of dress, behavior, and language of American gangs, with adaptations to their host culture. Social scientists are involved in research that seeks to understand formation, growth, and persistence. For example, the Eurogang Program (Decker & Weerman, 2005) examines street gangs in Europe utilizing both qualitative and quantitative research. Unlike contemporary American research that is government funded for the purpose of gang control and suppression, the Eurogang program is not based on such an ideology. On the contrary, many countries researched by social

scientists in the Eurogang Program contain a wide variety of social service and justice models.

In *A World of Gangs: Armed Young Men and Gangsta Culture*, John Hagedorn (2008) argues that the recent proliferation of gangs is a consequence of globalization (i.e., conditions associated with contemporary globalization such as urbanization, poverty, and immigration create the marginalization and isolation of groups, leading to the formation of gangs). Moreover, he maintains that many urban areas are transforming into megacities of more than 20 million people, and while the populations of cities are growing, so are their youth populations. Hagedorn claims that in today's world, the government has retreated from providing social welfare, cutting back on the safety net for the urban poor. Moreover, in the third world, the government cannot provide adequate employment, services, or security for the vastly expanding, poor-urban neighborhoods. Hagedorn asserts that when there is no regulation and control by legitimate forces of the government, there is ruthless control by the illegitimate forces of violent, private groups. Young men, particularly armed young men, he claims, are filling the void left by weak, repressive, racist, or illegitimate rulers. In some cities, gangs have exercised ruthless control of areas for decades. They have become institutionalized, like the Colombian drug cartels. Moreover, the gang "subculture" is no longer located in a neighborhood but rather is present in hip-hop culture and gangsta rap. Hagedorn argues that gangsta rap has become popular because it expresses the rage of the gang members in the ghetto.

Future Directions

Future research on gangs is important for many reasons. First, gangs provide us with information about a society and its values. Second, studying gangs informs us about the lives of young people and how social structure and social institutions influence them. Third, researching gangs is essential because gangs contribute to crime and delinquency and, as such, it is important to understand the social factors that give rise to gangs. Finally, some gangs have become institutionalized, or persisted for generations, and show no signs of disappearing. Youth growing up in cities where gangs have been institutionalized have an ever-present role model in local gangs. The gang may be the only chance many youth have to get a job, given the lack of legitimate economic opportunity in the slums of many cities. However, gangs not only give youth an economic opportunity but also have rituals, ceremonies, and a distinctive outlook. Young people searching for an identity can find one in gangs that are deeply rooted in inner cities. Future research needs to examine the relationship between globalization, urbanization, poverty, marginalization, and the development of gangs and their institutionalization. As inequality increases in

many parts of the world, racial and ethnic groups are often the most neglected populations economically and politically. Therefore, the youth in those populations will continue to find meaning and identity in gangs.

Conclusion

Gangs are one of many kinds of groups that are socialized in the streets and not by conventional institutions. The vast majority of gangs are adolescent peer groups that have been socialized to the streets. In other words, gangs are mainly made up of youth who are displaying delinquent behavior. However, in the wake of a vast increase in urbanization and social and economic marginalization, gangs are being spontaneously created in cities all over the world. Gangs as a social problem become a more complicated issue for study when we understand that many of today's gangs contain young men and women who exercise power not only over neighborhoods, but also sometimes even in larger spheres in cities of all sizes. The globalization of gangs and their institutionalization is one of the most significant developments of the 21st century.

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DEVIANT BEHAVIOR

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Many anthropologists have studied deviant behavior throughout the course of their careers, yet deviant behavior has always been somewhat difficult to define since it can vary from situation to situation and across cultures. It would not be necessarily deviant, for example, to cry at a funeral. In fact, it might even be expected to some degree. On the other hand, if a student was to begin crying hysterically during one of his classes, this could certainly be seen as deviant.

While the term *deviance* often has negative connotations, it is important to remember that deviant behavior can also include attributes or characteristics that are highly valued (Heckert & Heckert, 2002). For example, in the once popular television show *Doogie Howser*, the title character was a 16-year-old doctor. If such a doctor actually existed, he would certainly be considered deviant, even though being a genius or academically gifted is not at all a bad thing. In the show, the character Doogie faced problems that were directly associated with his unique situation. He was, after all, different than his peers, and his status as a teenage doctor affected his interpersonal and social relationships.

While one can certainly find examples of modern-day deviance by turning on the television set, anthropologists often choose to study this phenomenon by examining behaviors in other cultures. Interestingly, what is considered to be deviant in one area of the world may be a perfectly acceptable practice elsewhere. In this sense, deviant

behavior can be a difficult concept to define. Howard Becker (1963), in his classic examination of deviance, contends that the term is somewhat relativistic. In other words, it can be in the eye of the beholder. This may complicate matters immensely for even the brightest students of anthropology. According to Goode (2008), deviance involves the violation of a norm. Norms are informal rules that govern what we should and should not do. Usually, they are held by a wide segment of society. Of course, they can vary from culture to culture. For example, in America, it is generally considered rude to belch, especially at the dinner table. In other parts of the world, however, this may actually be seen as being polite.

It is important to remember that in order for an individual to be labeled as “deviant,” at least one other person must witness an offending behavior and judge it as breaking a norm. If the behavior is especially egregious, this is likely to result in stigmatization. In some cases, if the norm violates a law, this could even result in an individual’s loss of freedom. If an individual commits murder, then he is very likely to be sent to prison or perhaps even executed. This, of course is an extreme case. The vast majority of norms are not laws. For example, while many people might find it repugnant to see someone picking his or her nose in public, one would be hard-pressed to find a law that forbids this activity. Deviant behaviors such as this tend to be sanctioned informally. From an early age, members of society are socialized as to what is and is not acceptable

behavior. Small children are usually permitted to break social norms with impunity, since it is assumed that they have not become fully socialized. If a child was picking her nose in public, then this might go virtually unnoticed. If, on the other hand, an adult was doing the same act, then he might receive angry glances or other forms of disapproval. This illustrates that some deviant behavior can vary from person to person, depending on a variety of different variables.

Virtually all of us, at one time or another, have engaged in some type of deviant behavior. As Goode (2008) contends, human beings are after all “evaluative creatures” (p. 3). By this he is inferring that it is not uncommon for people to cast judgments and disapprove of one another’s behavior. Of course, some forms of deviant behavior are more likely to be tolerated than others. A behavior such as nose picking, for example, is much more likely to be forgiven than a violent criminal offense. One of the challenges for anthropologists is to examine various behaviors without imposing their own moral judgments. It is important to remember that different cultures have different social mores. What may be acceptable in one area of the world might not be tolerated elsewhere. Nevertheless, all societies have members who do not conform. In this respect, deviant behavior is a phenomenon that is central to the human race. This chapter will provide a discussion of the various types of deviant behaviors. First, we shall examine deviant behavior in culturally pluralistic societies, such as the United States.

Deviant Behavior in Culturally Pluralistic Societies

Belgian anthropologist Marie-Claire Foblets (1998) contends that the greater the number of cultures that come in close contact, the greater will be the number of ways available to deal with a situation, making it less likely that any set of norms will be followed, oftentimes leading to more deviant actions as defined by the penal law of the host country. This is a problem when migrant populations are poorly acculturated into the host society. The legal system of a society, usually of a postcolonial society, is influenced by several legal systems whether overtly or covertly. This has resulted in a significant increase in cultural conflicts (Foblets, 1998). According to Foblets (1998), culture conflicts are an “outgrowth of the process of social differentiation” (p. 190), where several small social groups are created within the host society and each group tries to compete and exert the importance of its own rules and regulations, leading to a legally or culturally pluralistic society (Demian, 2008; Foblets, 1998; Leach, 1977). At this point, it is very likely that the action of an individual based on one set of rules could easily violate other sets of rules. The issue of an honor killing or vendetta is a case in point, where families are obligated

to avenge the death of their family members by killing members of the family that killed their own relative to protect the honor of their family (Foblets, 1998).

This leads to the other extreme issue in a pluralistic society where conflict arises between parents who still uphold the values of their own cultures and the children who have adopted the values of the country they reside in. This has been the subject of innumerable movies where parents resent the adaptation of the new culture of the host country by the children. Despite several attempts on their part to keep the old traditions alive, the environment plays a major role, and simple actions, like making friends in school with members of the opposite sex, which are acceptable in the country they reside in, might be looked upon as deviant behavior by the parents and grandparents. Foblets (1998), drawing from ethnography, notes that even when the various social groups within a society might agree as to the deviant nature of an act, the ways to deal with this criminality may be almost infinite. While some reject the crime rather than the offender, others focus on retribution and the responsibility of the offender in the commission of the crime. Yet others focus on ways of healing and treating the deviant behavior.

Culture-Related Alcohol and Substance Abuse

The Navajo, the largest Native American tribe in North America, are currently faced with high rates of alcohol and substance abuse. According to Garrity (2000), the abuse of substances such as marijuana, cocaine, and amphetamine is highly prevalent among the Navajo people, with the younger population starting out by abusing inhalants such as glue, paint thinner, and gasoline. Alcohol abuse in particular has contributed greatly to the higher rates of morbidity and mortality among the Native American population (Garrity, 2000; Mail & Johnson, 1993). The crisis of alcohol and substance abuse has affected the Navajos both at the individual level and as a people (Garrity, 2000). One Pentecostal minister, coming from a family of medicine men, could not become a medicine man because his father, who learned about the trade from his father, was always too drunk to pass on the family trade to the next generation (Garrity, 2000). While the Native American Church and the Pentecostal Church are actively involved in the process of healing and treating Native Americans suffering from alcohol and substance abuse, the traditional healing practices are geared toward altering the mind to its former good and driving away the evil spirit that leads to tobacco smoking and other deviant behavior in general.

This traditional healing among the Navajos has never developed a way to treat alcohol abuse in particular even though it is a serious problem (Garrity, 2000). The reason lies in the findings of anthropologists Stephen Kunitz and

Jerrold Levy (1994), who point out that alcohol had a positive connotation and was associated with wealth, prestige, and status from the 1800s to the 1960s. Navajos blame the Anglo population for introducing alcohol to them and hold them responsible for the misfortunes alcohol has brought. Traditional chanters also blame the erosion of traditional values among the Navajo youth as another cause for alcohol and substance abuse as well as their lack of willpower to change their deviant behavior (Garrity, 2000).

Jessor, Graves, Hanson, and Jessor (1968) carried out an anthropological study on deviant behavior in a tri-ethnic community consisting of Anglo, Hispanic, and Native American populations. While the Anglo population comprised the elite, the Hispanic and Native American populations held subservient positions in society. In their study of this small town in southwest Colorado, the authors found that the Native American and the Hispanic people were more prone to drinking alcohol than the Anglos. As opposed to 3% of Anglos, 38% of Native Americans reported having been drunk at least three times in the past year. In addition, 74% of Native Americans, as opposed to 34% of Anglos, reported that they drank heavily. In fact, the Native Americans exceeded both the Hispanics and the Anglos in their level and frequency of deviant behavior. The authors found that while 59% of Native Americans had court records, only 1% of Anglos had court records. Moreover, 60% of the Native Americans as opposed to 25% of the Anglos admitted to serious deviance such as child neglect.

The authors ascribed such deviance to sociopsychological factors resulting from a feeling of alienation and a high degree of anomie, or social instability, suffered by the Native Americans and the Hispanics due to personal and external forces. Citing Merton (1949), anthropologist Theodore Graves (1967), in another article drawn from the same study of the tri-ethnic community in southwestern Colorado, held that retreatist behavior as categorized by Merton is often characterized by excessive drinking. Retreatism, according to Merton (1949), manifests when there is a lack of socially approved means to achieve the socially approved goals of society, which usually includes monetary success in an American society. Thus the Native Americans who were in a socially and financially disadvantaged position in society did not have access to socially approved means for monetary success and thus suffered from anomie.

These new goals of monetary success among Native Americans can be explained by the concept of *acculturation* in anthropology, which can, for instance, come about with Native children attending high school and thereby adopting Anglo American values and being exposed to middle-class goals (Graves, 1967). Graves (1967) found that those Native Americans who were acculturated and had jobs, thus providing them an access to their new goals, showed lower levels of drinking and other deviant behavior. Besides sociopsychological explanations, culture itself

plays a role in behavior that is defined as deviant by a dominant group within any given pluralistic society.

Cultural Defense of Deviant Behavior

The United States is a melting pot of extremely diverse cultural entities. While following a common situational bond, these cultures often conflict for the lack of understanding of one another's cultures. The law depicts the norms of the cultural majority in a nation, but the norms of the other ethnic groups may be defined as criminal behavior. Sellin (1938) focused on the cultural diversity in a modern industrial society where people have come together from various parts of the world. For instance, Sellin cited the case of a Sicilian father who killed his daughter's 16-year-old lover to protect the honor of his family, and as such was quite surprised when he was arrested for it. In another instance, a Turkish father forced his 16-year-old daughter to marry her polygamous distant cousin to honor a previously arranged contract between the two men that also involved a stipulated bride price. At times, host authorities have shown deference to cultural norms of the migrant populations that would otherwise be considered deviant. For instance, authorities often left Chinese gamblers alone, as gambling, being deeply entrenched in the customs of the Cantonese population, was viewed as an internal matter for the Chinese to deal with (Smith, 1937).

The concept of cultural defense in criminal law relates to the presentation of cultural dictates as a justification for criminal behavior (Demian, 2008). Wikan (2002) expressed frustration at anthropologists being called in by lawyers to be expert witnesses in cases where they feel a cultural defense is the only way out of a difficult situation. According to Demian (2008), the concept of cultural defense has found its appeal in the last 20 years or so as a result of multiculturalism and its politicization. To elucidate the point of cultural defense, it can be said that when a cultural defense is invoked in a lawsuit, the intention of the actor while engaging in the criminal behavior can be found in the dictates of the person's culture where the act in question is the norm (Demian, 2008).

An instance of cultural defense in the United States can be found in California. Lawyers successfully defended the case of a Japanese woman who tried to kill her children to protect her family's honor, following the norms of her culture, as her husband was involved in an adulterous relationship (Demian, 2008; Renteln, 1987/1988). In this case, *People v. Kumira* (1985), on hearing about her husband's adulterous relationship, Kumira tried to drown herself and her children in a parent-child suicide ritual. The children died, but she survived. Kumira was initially charged with first-degree murder, but later the charges were dropped to voluntary manslaughter because a team of psychologists testified that she was insane. A petition

signed by 25,000 Japanese was sent to the district attorney's office explaining that the parent-child suicide, called the *oyaku shinju*, although illegal in Japan, was a cultural concept, and that Kumira's actions were dictated by it (Demian, 2008). Although the insanity defense was the one that succeeded in this case, Demian believes that the cultural defense definitely played a role in apprising the court of Kumira's intentions. Even where the culture is the same, the dominant class within it has the potential to define deviant behavior and ostracize the minority as outcasts. Such behavior is seen in northwestern California, where the Maidu people, discussed in the next section, are still residing.

Deviance in the Maidu Culture

In northwestern California—the home of the Maidu people, who reside in the Sierra foothills and the Sacramento River valley—the society is divided into small tribes that follow their own norms and have their own definitions of deviance (Brightman, 1999; Dixon, 1905). Anthropologist Robert Brightman (1999) studied the ritual clown performances that occurred during the late 1800s and early 1900s among the northwestern Maidus as they parodied deviant behavior by outrageously defying the authority of the priests. While this practice was performed in jest, it nevertheless was an important form of social conditioning. According to Brightman, the Maidus, in both the foothills and the valley, comprised several triblets with their own autonomous social structures. They had a hierarchical structure, with the village headman (foothills: *huku*; valley: *yeponi*) and the priest (*yukbe*) being at the top of the ladder. At the lower extreme were the deviant population called *suku*, comprising indigents, vagabonds, immoral women, and cross-gender people of both sexes (Brightman, 1999; Loeb, 1933).

Brightman (1999) contends that Maidu males were formally initiated into a secret society called the Kuksu cult, which sponsored various kinds of dances featuring spirit and animal impersonations. The elite occupied a high status in these societies. Those who were not members were socially ostracized, and these were usually the *sukas*, who were viewed as social deviants (Loeb, 1933). It is likely that a similar society was there for females (Brightman, 1999). During the ceremonies of the societies, clowns played a major role, often mimicking women dancers, and taking pleasure in feasting, smoking, and gambling. Disobeying the commands of the priest, the clown often indulged in several socially disapproved deviant actions like lying, begging, pilfering, excessive eating, and malingering (Brightman, 1999). Brightman (1999) comprehends the clown as one in the garb of comic relief, pointing out through license and ridicule the social constraints as being artificial and not necessarily consensual—ones that restrain rather than emancipate the individual in society. Interestingly, what makes it even more ironic is that the clown, according to Brightman,

is actually a *yeponi* who trained young boys in the society after their formal initiation.

Deviance Based on Physical Characteristics

Brightman's (1999) examination of the Maidus illustrates that individuals can be labeled as deviant for being indigents, vagabonds, or sexually permissive. It is important to note, however, that an actor can also be viewed as abnormal due to a deformity or unusual physical characteristic. In other words, even if an individual follows all of society's social norms, a physical defect has the potential to render the actor as deviant. For example, if a person is considered too tall, plus-sized, or simply too ugly to look at, there is a high likelihood that she will be stigmatized. Sadly, if a person is physically handicapped, it is also likely that he will be treated differently. Members of racial minorities may also be seen as deviant. All of the above examples involve what are known as "ascribed statuses" (Adler & Adler, 2006, p. 11).

According to Goode (2008), ascribed statuses are usually thrust on individuals from the time they are born. For example, in the classic play *Cyrano de Bergerac*, the title character has an unusually long nose. Although he is a talented poet and swordsman, Cyrano is subjected to ridicule and is painfully aware of his deviant physical appearance. He attempts to manage this stigma by helping another man woo the woman of his dreams. Like Cyrano de Bergerac, many people are born with physical imperfections. If they have the financial means and perceive that the imperfection is extreme enough, then some individuals may even opt to engage in plastic surgery. Of course, there are also those individuals who are addicted to plastic surgery and have operation after operation, even when it is completely unnecessary. This is another interesting form of deviance in and of itself. While today plastic surgery is certainly a viable alternative for some, this was unfortunately not an option for Cyrano de Bergerac. He lived in the mid-17th century, an era when cosmetic surgery was by and large unavailable.

In his classic book *Stigma*, Erving Goffman (1963) writes extensively about the stigmatization of individuals who have unusual physical characteristics. He refers to these people as having "abominations of the body" (p. 4). These can include features such as being deaf, mute, or handicapped. He contends that individuals with deviant physical characteristics are unable to have conventional interactions with other people (whom he refers to as *normals*). When someone with an abomination of the body has any kind of a contact with one of the normals, it tends to be awkward, superficial, and strained. Goffman contends that normals may attempt to conceal their feelings of repulsion. However, they are never fully able to look past the deviant traits. He contends that actors who possess these deviant physical characteristics are often acutely aware that other people find them to be repugnant. Understandably, they

may be very self-conscious and in some cases seek refuge in the arms of fellow deviants.

Although Goffman (1963) did not specifically discuss obesity as being a type of “abomination of the body,” many scholars have written that individuals who are overweight tend to be viewed as socially deviant. Interestingly, some studies have suggested that even children perceive this to be true. There are even a few well-documented cases of young children who attempt to diet. Even today, in spite of the fact that obesity presents serious health issues, it is still considered somewhat acceptable to poke fun at people who are overweight. One only needs to turn on a sitcom to find numerous examples of fat jokes. It would be much more difficult, on the other hand, to find television shows that ridicule other abominations, such as being an amputee, blind, or confined to a wheelchair. For whatever reason, social mores have afforded obesity less protection than other ailments. Perhaps it is because there is a misperception that individuals who are overweight are gluttonous and lazy. As Clinard and Meier (2008) suggest, many people assume that obese people could have avoided this label had they exercised basic self-discipline. Some “normals” may even believe that by taunting overweight people, they may actually help them become motivated to diet and exercise. This attitude, however, does little to help and is more likely to be counterproductive. Obese people may become overwhelmed by cruel jokes and simply decide to quit trying to lose weight.

While it is likely that anyone who is overweight is likely to be stigmatized, females may be especially vulnerable to being criticized. In the Western world especially, women are led to believe from an early age that they must be thin and petite. One need only look at the latest fashion magazines to see images of tiny (perhaps even slightly emaciated) models. Often, unbeknownst to many people, these images have been airbrushed and manipulated by computer technology. In other words, imperfections, such as a model’s little “potbelly,” go completely unnoticed. This gives men completely unrealistic expectations and often forces some women to attempt to achieve this ideal by whatever means necessary. Sadly, women who are perfectly healthy may even develop eating disorders in their attempt to mimic the images in magazines. Women who are excessively overweight are especially vulnerable, and they may be the most likely to be regarded as deviant. Goode and Preissler (1983) argue that overweight women may even be exploited in the dating arena. According to the authors, average-sized men will enter into relationships with these women with the implicit understanding that they will have a high level of sexual access while offering a low level of sexual exclusivity. Clearly, being overweight is seen as deviant and sanctioned by society.

Culture and Mental Illness

Mental illness may be a stigma and seen as deviant or may be viewed sympathetically depending on the dispositions

of cultures. While human behavior can be observed, the mental process that leads up to that behavior is often implicit or hidden. Anthropologists Lorand Szalay and Bela Maday (1983) defined *implicit culture* as “psychological dispositions, perceptions, and motivations which are shared by people with similar backgrounds and experiences and which lend organization and direction to overt behavior” (p. 110). In their study on the measurement of psychocultural distance between groups, they looked into the theme of mental illness as perceived by two cultural groups, Hispanics and Anglo-Americans, and found that Hispanics considered mental illness as an extreme form of incurable madness. It was highly stigmatized, considered a matter of shame—a deviance that brought disrepute in society. An analysis of related themes like mental health and psychiatry showed they were similarly stigmatized by the Hispanics: Mental health has little positive connotation, and psychiatrists are to be visited only when all hope is lost. Anglo-Americans, on the other hand, consider the possibility of treatment and cure of mental illness, look at a psychiatrist as a friend and helper, and view mental health positively, something that gives a proper understanding of the mind and the environment and so is necessary for happy and wholesome living (Szalay & Maday, 1983).

Interestingly, a common source of mental disorders such as anxiety and depression can be economic. Anthropologists Craig Hadley and Crystal Patil (2008) identified the source of anxiety and depression as insecurities in various societies—poverty and low educational level in urban societies and food insecurities in rural societies. Hadley and Patil conducted a study of two groups of people in rural western Tanzania, the *Sukuma*, who were the agropastoralists, and the *Pimbwe*, the horticulturalists, living in areas with seasonal agriculture, subsistence economies, and limited health care. While the Sukumas, who raise cattle and grow rice and corn, enjoy higher household production, the Pimbwes are poorer, have smaller households, have no cattle, and have smaller plots of land (Hadley & Patil, 2008).

During the insecure food months (December through March), people struggled for food, went to bed hungry, or sold their labor for food, with the Pimbwes suffering more as a group than the Sukumas, thus experiencing greater food insecurity (Hadley & Patil, 2008). The researchers randomly selected women from both the Pimbwe and the Sukuma communities and found that increased levels of food insecurity in households caused higher levels of anxiety and depression among women as opposed to men, who were concerned with owning material assets. The researchers also found that Pimbwe women experienced higher levels of anxiety and depression as they faced higher levels of food insecurity. According to Quisumbing, Brown, Feldstein, Haddad, and Pena (1995), women play a major role in the production and preparation of food for the family throughout sub-Saharan Africa, and thus are more sensitive than men to issues like access to food. Clearly,

deviant behavior that is related to mental illness has the potential to vary from culture to culture.

Sexual Deviance in the United States and Across Cultures

While virtually all societies believe that certain sexual practices are deviant, there is at least some variation across cultures. In the United States, as in virtually every other society, there are strong taboos against rape and incest. Still, however, some exceptions do exist even for this norm. For example, cultural anthropologist Gilbert Herdt (1987) contends that the Sambia of Papua New Guinea force young boys to orally ingest the semen of older boys and men. While this behavior would be considered extremely deviant and illegal in most areas, it is not condemned in this society. According to Herdt, the Sambia engage in this behavior because they believe that ingesting semen is the only way that a young boy can grow into manhood. If a child refuses to engage in this activity, he is beaten into submission. This activity may go on for many years until the boy develops muscles and is considered to be masculine by other members of the tribe (Herdt, 1987). At this point, he will then force younger boys to engage in this activity.

Clearly, the above case of the Sambia tribe illustrates that what is considered to be sexually deviant has the potential to vary across cultures. Prostitution is another sexual behavior that can vary from culture to culture. While most areas throughout the world stigmatize prostitution, some societies are nevertheless more accepting of it than others. In her analysis of the sex-trade business in Southeast Asia, for example, medical anthropologist Marjorie Muecke (1992) contends that prostitutes are usually able to avoid stigmatization. According to Muecke, if a prostitute supports her family and contributes money to the Buddhist temple, she will usually be seen as a “good Buddhist.” Rather than being labeled as a social deviant, she may even be revered through her good deeds. Muecke even argues that some prostitutes in Southeast Asia, particularly in areas such as Thailand, are able to bring prestige to their families. Muecke views sex work as a strategy that women employ in order to pay for their siblings’ educations and help take their families out of poverty.

Unlike in parts of Southeast Asia, Americans generally disapprove of prostitution, and it is perceived as deviant. Currently, Nevada is the only U.S. state where prostitution is legal, with certain counties that do not criminalize it. Still, this act is regulated and heavily taxed by the state. Women are required to work in brothels, which are typically large trailer complexes on the outskirts of town (Brents & Haasbeck, 2001). Many of the women who work in these brothels pay as much as 50% to 60% of their income to the brothel. While this form of prostitution is permissible in parts of Nevada, it is important to note that it is

not allowed everywhere throughout the state. In the city of Las Vegas, for example, prostitution is actually illegal.

Also, *streetwalkers* are not allowed to operate anywhere in the United States, including Nevada. According to Clinard and Meier (2008), streetwalkers are the most visible types of prostitutes. They tend to solicit clients in public and may even perform their sexual acts in places such as alleys, parks, or cars. In most cases, they are modestly paid and may often exchange sexual favors for drugs. While most streetwalkers in the United States are women, there are also men as well as those who are transgendered. In virtually all cases, they sell their services to men.

In addition to streetwalkers, *call girls* are another type of prostitute in the United States. Call girls tend to have the highest status of the various types of prostitutes. Generally, they make the most money and are less likely than streetwalkers to be stigmatized by society. In fact, they are usually able to operate with a great deal of autonomy and privacy. Many call girls have a select clientele, and some may even perform background checks on their clients. It is not uncommon for some call girls to have college degrees, and some may opt not to have sex with their clients. They are also much less likely than streetwalkers to be arrested by the police (Clinard & Meier, 2008). Shuger (2000) suggests that many call girls use the Internet to meet customers. He explains that they may pay a monthly fee to advertise on an escort Web site. By advertising on the Web, some call girls are able to find customers who are willing to pay as much as \$4,500 a day.

Sexual Paraphilias in the United States

According to criminologist Eric Hickey (2006), a *paraphilia* is defined as “sexual arousal through deviant or bizarre images or activities” (p. 26). Paraphilias can range from behaviors that are seemingly harmless to those that are sadistic and violent. In order for a behavior to be considered a paraphilia, there is typically a fantasy that fuels a particular behavior. An actor will experience extreme frustration if not able to fulfill this fantasy. Hickey argues that males are far more likely than females to engage in paraphiliac behavior. He also contends that according to the current *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*, an individual must engage in a behavior for at least a 6-month period in order for it to be considered a paraphilia. In the United States, an actor may engage in a variety of different sexual paraphilias.

Perhaps one of the most common paraphilias in the United States involves the usage of pornographic and obscene materials. It is no surprise that computers have played a large role in disseminating pornographic material, including illegal “kiddie porn.” Individuals who are obsessed with pornography may also surf Internet chat rooms in hopes of having *cybersex*. Cybersex is an activity where participants flirt and exchange romantic messages

via the World Wide Web. Cybersex can be completely anonymous, or participants can use a webcam in order to see and hear one another. Some chat rooms cater to individuals with fetishes. According to Hickey (2006), one who obtains sexual gratification from objects has a fetish. Some individuals, for example, have foot or shoe fetishes. Someone with this paraphilia may actually spend hours fantasizing about inanimate objects.

Another sexual paraphilia in the United States is known as erotic asphyxiation. This activity occurs whenever an individual deliberately cuts off his or her oxygen supply as a means of achieving sexual gratification (Hickey, 2006). It is important to note that this behavior has the potential to be extremely dangerous. Every year, hundreds of people die from engaging in this deviant activity. Another type of sexual paraphilia is known as sado-masochism. This occurs whenever someone receives sexual pleasure from either receiving pain (masochism) or inflicting it on other people (sadism). The pain may be of either a mental or physical nature. Typically, at least two participants engage in this behavior. It is always consensual. Often, individuals who engage in this behavior will have a *safe word* that is used whenever one of the actors feels that the activity is getting out of hand.

While most people with paraphilias tend to be men, there is at least one condition that tends to be more common in females. This phenomenon, known as hybristophilia, refers to individuals who are attracted to prisoners and criminals (Money, 1989). According to Linedecker (1993), many hybristophiles have been victims of domestic abuse and a few may even wind up being murdered by their criminal boyfriend or husband. This is consistent with Worley and Cheeseman (2006), who assert that some females who have romantic relationships with inmates are likely to have been involved in abusive or promiscuous relationships at some point in their lives. Often these women harbor tremendous feelings of guilt and inadequacy (Linedecker, 1993). Some hybristophiles are also socially isolated and decide to become romantically involved with an inmate in order to achieve a sense of belongingness (Worley & Cheeseman, 2006). This deviant paraphilia has the potential to be very harmful for the hybristophile and her family. Individuals who are sexually attracted to criminals are also highly likely to be exploited by criminals and prisoners.

Conclusion

As this chapter has shown, there are a variety of different types of deviant behaviors. Anthropologists have conducted numerous studies in researching this phenomenon. When many people think of the term *deviant*, they may tend to conjure up images of criminals or perverts. Hopefully, we have demonstrated that deviant behavior is a much broader term. It is likely that all of us, at one time or another, have been labeled as deviant. Humans, after all, tend to be very

judgmental beings. Certainly, it would be atypical for an individual to go an entire lifetime without violating at least one social norm. Whenever someone breaks a social norm, no matter how small, this individual runs the risk of being considered deviant. Also, as shown earlier, if an individual possesses certain physical attributes, this can also result in the actor being labeled as deviant.

It is important to note that deviant behaviors vary across cultures. For example, as discussed earlier, young boys in the Sambia tribe of Papua New Guinea are treated very differently than are boys in other parts of the world. In most societies, the activities that the Sambia engage in would be considered highly illegal, or at the very least, repugnant. The fact that the Sambia encourage a practice that is not tolerated in other places illustrates that deviant behavior may be influenced by a society's religious, ethnic, and "tribal" characteristics (Goode, 2008). Also, whenever someone violates a norm, it is likely that the actor's social position may play a role in whether the individual is regarded as deviant. If an individual is poor and a racial minority, for example, he may be more likely to be sanctioned than someone who is a wealthy member of the racial majority. It is also likely that a deviant behavior that is committed in private will be much less likely to result in a sanction than behavior committed in public places. Given this, Americans understandably may be leery of being captured on camera. In today's society of phone cameras and YouTube, virtually anyone has the potential to have a deviant behavior recorded and displayed before a large audience. This is a topic that in and of itself warrants further academic study. It would behoove anthropologists to examine this area in the future.

Finally, as this chapter has shown, deviant behavior is seldom criminal. In other words, it usually does not violate laws. While crimes are certainly deviant, most deviance does not rise to the level of being a crime. Criminologists and legal scholars may be the best equipped to study behaviors that violate formal norms. For the purposes of this discussion, we are most curious about the softer forms of deviance, such as the examples that have been presented throughout this chapter. Clearly, deviant behavior is an area worthy of our attention. It has been the focus of numerous anthropological studies for several decades, and it is likely to be a topic that will continue to interest other social science scholars in the years to come.

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DELINQUENCY

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What is juvenile delinquency? In common parlance, there is an understanding of juvenile delinquency as meaning adolescents breaking the law or participating in mischievous behavior. Defining juveniles as being under the age of 18 years is the general rule of thumb because, in the current legal system, upon reaching this age individuals can be tried as adults, serve in the military, and, in some states, consume alcohol.

One may ask why juvenile delinquency is viewed as a separate construct from adult deviant behavior. The answer to this legitimate question is derived historically from societal attitudes about children (Aries, 1962). Only after the Victorian Age were children seen as emotionally and intellectually developing human beings. During the Victorian Age, children were simply viewed as little adults. They were not regarded as having a world of their own. Their reality was that of their elders. With the industrial revolution and the social reforms that followed (child labor laws, mandatory educational requirements, etc.), children were viewed as a group to be protected. From this attitude concerning the welfare of children sprang the juvenile justice system. The role of the juvenile justice system was to rehabilitate wayward youth. The idea of *parens patriae*, the court acting as the parent, became the foundation for the juvenile justice system. Unlike the adult criminal justice system, which was a penal system demanding restitution and levying penalties for breaking the law, the juvenile justice system was seen as a means to reform adolescents

who, through no fault of their own, had fallen victim to deviant ways, through either bad friends or lack of parental guidance. Driving the juvenile justice system was the philosophy that the young could be rehabilitated.

It is this view of adolescence that persists to this day, at least to a limited degree. While there is the inevitable ebb and flow of societal reaction to juvenile crime, the underlying attitudes about society's perceptions of childhood emotional and psychological development affect how society assesses juvenile crime.

Historical Perspective

Upon birth, it was customary for children during the Middle Ages to be presented to their fathers, who either accepted them into the family or rejected them. If they were not accepted into the family, then they would be left to churches or orphanages. Reasons for not being accepted could be deformity or disease (Aries, 1962).

As soon as they were physically capable, children were expected to take on adult occupations. Society did not acknowledge the existence of childhood as we know it today. As soon as they were old enough to train or apprentice, children would, depending upon their economic class, prepare for their given occupation.

Social status would determine whether schooling was in a young man's future. For boys of landholding families, a

monastery school might be called for with eventual knight-hood. Girls from landholding families might be taught rudimentary household finances in order to run their future husband's homes. For boys of poorer families, education would entail farming or learning their father's trade such as masonry, and for the girls, these occupations would include housekeeping and domestic trades such as needlework.

From today's perspective, children were treated severely. Instead of the warm and nurturing family that we cherish as the hallmark of the environment for a child, friendly, safe place to raise children, children were raised by wet nurses. Children were typically separated from their parents from their earliest years.

In terms of discipline, infractions were treated with physical beatings. To the parent of the Middle Ages, the idea of giving a child a period of "time-out" would be a concept difficult to comprehend. An infraction would be handled with immediacy and swiftness, as well as blunt force. This perspective developed for a number of reasons. First, parents saw corporal punishment as a means of preparing their offspring to survive the inevitable harshness of adulthood. Second, with the emphasis on the oldest male child in terms of inheritance, there left little room for the other children in terms of their parents' attention. Finally, the high mortality rates of children led to a more detached and impersonal relationship between parent and child, although this commonly held belief has been questioned in recent years (Hanawalt, 1993).

This is not to say that children did not commit criminal activity during the Middle Ages, but rather that the concept of juvenile delinquent was not part of the vocabulary during this period of time. If a transgression occurred, then punishment was meted out regardless of child or adult status.

With the passage of the Middle Ages came the dawn of the Enlightenment. The Enlightenment produced the writings of Voltaire, Jean-Jacques Rousseau, and John Locke, as well as a change in the family. Schools were established in many of the larger cities and children had the opportunity to learn some of the basic academic subjects. The status of children improved considerably during the Enlightenment as alternative forms of punishment replaced corporal punishment.

In England, chancery courts were founded primarily to protect property rights; however, these courts also were charged with looking after orphans. The Latin phrase *parens patriae* originated with these courts; that is, children were under the protection of the king and it was the right of the king to take care of his people, especially the children. This term became the basis for the court's intervention in the lives of the families under the crown's authority and, in time, came to mean the right of the state to act in the best interest of the child.

In early American life, children's lot was not so different from that of their peers in Europe. If they worked as apprentices, then they had to deal with abusive masters. If

they worked in factories, as many did during the turn of the 19th century, then they were working alongside their parents. Furthermore, while discipline may have been considered harsh by today's standards, few cases of child abuse were reported to the courts.

Children who were accused of crimes were sentenced in court alongside adult criminals. And their punishment was commensurate with their crime. Youthful status would not necessarily be taken into account when administering sentences.

By the turn of the 20th century, there was an air of reform in America. This reform movement was the basis for the idea that children had a special place in society. This movement promoted the realization that children, who were working alongside adults in factories and were being punished as adults, should not be treated with the same harshness as their laboring adult counterparts. The leaders of this movement, or child savers as they were known, argued that children should be sent to school, should not be working long hours in factories, and should not be subjected to the sentences of adult criminals (Salerno, 1991). With this, the child savers pushed for a separate juvenile justice system. It is from the efforts of these reformers that our modern-day juvenile justice system was born (Fox, 1970). The idea of *parens patriae*, or the government stepping in to care for wayward youth, was again called into action. The juvenile justice system, unlike the criminal justice system that was one of punishment, was one designed to focus on the best interests of the child.

The inherent philosophy of the juvenile justice system, as originally envisioned by its founders, is one of rehabilitation and treatment, not of retribution. It is from this understanding of the juvenile justice system that the term *juvenile delinquency* comes. Juvenile delinquents were those youths who had committed crimes and were now under the jurisdiction of the state. Under the juvenile justice system and *parens patriae*, the state was charged with rehabilitating. Juvenile delinquency is thus a fairly modern concept, as it is closely tied to the concept of childhood and adolescence in the 20th century.

Reflection of Societal Values

Delinquency as portrayed in the cinema is another interesting means of assessing our society's views of adolescent misbehavior. Beginning with Marlon Brando's portrayal of the rebel teen in the 1950s movie *The Wild One* (1953), there followed a host of movies showing teenagers suffering the angst of preadulthood. The Hollywood version of these movies is especially interesting because it depicts the times, the breaking away of these youths from their familial ties, and the struggles that they faced in doing so.

According to Daniel Biltereyst (as cited in Shary & Seibel, 2007), movies such as *The Wild One* (1953), *Blackboard Jungle* (1955), and *Rebel Without a Cause* (1955), so-called juvenile delinquency movies, caused a great deal of public

debate because they brought the topics of drugs, sex, and crime to the forefront of the public square. The discussion centered upon whether the viewing of these movies promotes delinquent attitudes and therefore delinquency. In essence, the debate that arose around these movies was based on an argument regarding the social values of the era. These movies were created in the post–World War II era. The 1950s was a period of rebirth of sorts for America. The GIs had returned victorious and were assuming their roles both in the family and in the corporate world. This was the period when the baby boomers were born. Social roles were well-defined. Rosy the Riveter, who had worked tirelessly during the war years, now put down her tools to stay home and take care of her family so that her GI Joe husband would have a job. A good wife was someone who stayed home and took care of her family, and a good husband was someone who went to work every day and provided for his family. Children were to obey their parents by going to school and avoiding trouble.

What these movies signified was an undercurrent of discontent to the façade of happiness that was the American dream. For some who opposed the showing of these movies, these movies challenged the social norms that they had come to accept as fundamental to their way of life. For others who were necessarily afraid of the challenge, this was a negative reinforcement for impressionable adolescents at the time.

Theory

Male Theories

Many theories have been proposed to explain delinquent behavior. Since males commit the majority of crimes (Federal Bureau of Investigation, 2008), most of the theories are directed toward explaining male delinquency. For the most part, it was assumed that theories applied to both males and females in spite of the fact that research studies focused primarily on males due to their higher delinquency rates. However, with the increase in female delinquency (U.S. Department of Justice, 2008), there has been an acknowledgment that the causes of female delinquency may be different than the causes for male delinquency. This is reflected in the Office of Juvenile Justice research-supported agenda. A research team known as the Girls Study Group has been given the task of looking into female delinquency.

In addition to the differences between male and female delinquency theories, the question of whether delinquents are born or created—that is, a nature versus nurture perspective—is one that continues to be debated. Some theories propose that there is a biological basis for delinquent behavior, while other theories propose that delinquent behavior is learned, while still others propose that delinquent behavior is a psychological problem.

Suggestions of biological causality have their earliest roots with the work of Cesare Lombroso (Lombroso & Ferrero, 1895/1980). Lombroso studied the physical makeup of convicted criminals and noted their physical characteristics. Greatly influenced by the work of Charles Darwin, Lombroso concluded that some men were “born criminals” and is credited with use of the term *atavism*. Criminals were evolutionary throwbacks, according to Lombroso, and hence atavistic in nature. Some of the traits that Lombroso reported were low foreheads, broad noses, enormous jaws, acute sight, and tattoos. The criminals had an inordinate number of tattoos, he reasoned, because they were insensitive to the pain associated with administering them.

While his theories of criminality are, for the most part, no longer accepted, it is important to note that those scientists who now study biological criminology trace their scientific lineage to his line of research.

The major theories of juvenile delinquency for males fall under three major categories: social structure, social process, and social conflict. Suffice it to say that this is not meant to be an exhaustive list of theories, but rather an introduction to the highlights in these areas.

Social Structure Theories

Social structure theories are so named because they attribute the causes for delinquent behavior to the structure of society (i.e., place, identity, and socioeconomic factors). Social structuralists suggest that environmental factors influence delinquent behaviors. These theories do not necessarily say that individuals lack choice as to their delinquent behaviors, but, instead, propose that the choices that are offered to them are in many ways limited due to race, class, or gender. While there are a plethora of researchers who deserve credit for their contributions to this line of theoretical reasoning, some factors deserve mention in particular: social disorganization, strain, and cultural deviance.

One of the earliest theories of delinquency is that of social disorganization. The idea of social disorganization theory has its introduction in the work of W. I. Thomas and Florian Znaniecki (1927). These early sociologists studied the immigrant Polish population in Chicago in the early 1900s. They noticed that the crime rates of this immigrant population were higher than rates for those who lived in the surrounding areas of Chicago and proposed that the cultural transmission of values was somehow disrupted by the immigration process. They referred to this disruption as social disorganization. Their proposal was an important first step toward understanding criminal behavior in terms of place.

Robert K. Merton proposed strain theory in his 1967 book, *Social Theory and Social Structure*. In his work, he proposed that dysfunctional behavior (i.e., criminality) was due to societal pressure—or the strains of society on the individual. Merton explained that American

society was particularly susceptible to societal strains because of the cultural norms to attain economic success. American society stresses attainment of the American dream—a large home, expensive car, designer clothes, and, in general, acquisition of material wealth. He further explained that individuals respond to the pursuit of the American dream in different ways, and he classified them into typologies.

Cultural deviance theories (Miller, 1958; Sellin, 1938; Thrasher, 1927) propose that criminal behavior is caused by different cultural norms of various groups in society. It is the differences among group definitions of behavior that generate delinquent behaviors.

Social Process Theories

Social process theories, also known as interactionist theories, support the notion that delinquency occurs as a result of behaviors learned through the individual's interactions with society. The nature of the individual's interactions delineates the perspective of each of these theories. The theorists who support the social learning model of delinquency believe that delinquent behavior is a learned behavior. Unlike the structuralists who believe that societal influences promote and, indeed, incite criminal behavior, social process theorists attribute behavior to association with others who influence and teach values. Primary theories that promote this perspective are differential association, social bond theory, labeling, and dramaturgy.

Edwin Sutherland and Donald Cressey (1978) first proposed the theory of differential association. The crux of this theory is based on the premise that criminal acts are learned. Sutherland and Cressey proposed a list of nine propositions to describe the nature of criminal behavior. At the heart of this theoretical perspective is the idea that all human behavior is learned and criminal behavior is simply another learned behavior. In spite of societal messages regarding acceptable behavior, they believed that crime occurred because individuals learned or were more strongly influenced toward these negative behaviors.

Social control theory, as originally proposed by Travis Hirschi in 1969, claimed that the reason for juvenile delinquency was the weak social bond that the individual formed with society. Rather than ask the question of why delinquency occurred, Hirschi asked why most individuals conformed to the rules of society. He answered this question by stating that it was the individual's bond to society that prevented deviant behavior. This social bond was comprised of four elements: (1) attachment, (2) commitment, (3) involvement, and (4) belief.

Attachment as defined by Hirschi referred to the direct and indirect control that parents and teachers exercised over adolescents. Indirect control is the influence that parents or authority figures have over the decisions of the adolescent when not physically present. Within this context, the adolescent reflects upon the opinion of the parental figure and

refrains from participating in deviant activity. The stronger the indirect control, the less likely the adolescent will transgress societal norms. The weaker the indirect control, the more likely the individual will commit the act. Commitment, according to Hirschi, refers to future goals. He believed that individuals striving to attain college degrees, obtain good jobs, and marry would be less likely to participate in activities jeopardizing their success. Hence, commitment toward personal goals would decrease the likelihood of delinquency. Hirschi also thought that involvement in extracurricular activities would decrease the likelihood of delinquency, as this would minimize the opportunity to commit crimes.

Belief, for Hirschi, refers to the acceptance and support of social norms. Adolescents who agree with societal standards of right and wrong are less likely to commit delinquent acts. Conversely, if they reject the norms, then they are more likely to become involved in delinquent activity. Each of these four elements contributed to building the social bond and, according to Hirschi, if any single element was not present, then it would weaken the individual's bond to society, thus increasing the likelihood of engaging in delinquent activities.

In its earliest formation and presentation, labeling theory is associated with Frank Tannenbaum (1938); it is identification that occurs once an individual has passed through the criminal justice system. Rather than identifying the act as evil, society identifies the individual as evil until there is little or no differentiation between the act and the individual. Tannenbaum referred to this process as the "dramatization of evil." The idea of tagging individuals as criminals is, then, the introduction of the idea that individuals identify with and become the criminal that society has defined.

Labeling theory is most closely identified with Howard Becker, who, in his 1963 book *Outsiders: Studies in the Sociology of Deviance*, described how the process of identification as a deviant occurs. From his perspective, deviants are defined by the dominant culture and are considered outsiders. They are outsiders because they do not conform to group rules. These rules are defined by the group, and therefore, according to Becker, the social group has defined deviancy. From this perspective, acts are not deviant in and of themselves; acts are defined as deviant by the social group. In his work, Becker attempted to describe the transformative process of being identified as deviant.

The social process theory proposed by Erving Goffman was of the dramaturgical perspective. In his 1958 book *The Presentation of Self in Everyday Life*, Goffman suggests that all individuals play multiple social roles. Similar to an actor in a play, a man might possibly have a role of husband, father, son, construction worker, and volunteer. All of these roles must be kept in balance with respect to other players; for the individual, this means proper impression management. Impression management, as defined by Goffman, serves to define the stage

for the players and, ultimately, to decide whose issues become the dominant ones.

Social Conflict Theories

The final group of theoretical perspectives is that of social conflict. These theories challenge the perspectives of the social process and structuralist positions. They claim that, in fact, the very definitions of these sociological approaches are problematic to defining delinquency. These theories trace their heritage to Karl Marx (Tucker, 1978) and propose that those in power made the laws and it is from this position that deviant behavior is defined. While each theory looks at the idea of the power structure differently, at the crux of their commonality is the premise that those who make the laws decide who is deviant. Radical (Chambliss & Seidman, 1971; Quinney, 1974), feminist (Adler, 1975; Simon, 1975b), and social constructionist (Henry & Milovanovic, 1995) models are examples of this belief system.

Female Theories

Since males commit the majority of delinquent acts, delinquency research has traditionally been focused on males, with the assumption being that delinquency theories applied to both males and females. Yet, researchers understood that the focus of concern was male offenders. In addition, the paucity of female delinquents was found to be an obstacle to the collection of meaningful research data. Females were simply not committing as many crimes as males and the official statistics reflected their lower numbers. Yet, within the last 30 years, with the overall rates of delinquency in decline, there has been an increase in the rate of female delinquency. Males still commit a majority of the crimes as listed in the Federal Bureau of Investigation's Uniform Crime Reports (Federal Bureau of Investigation, 2008), but it is noticeable that female delinquency has been increasing.

A number of issues arise with regard to these observations. First, there are more delinquent males than females. This subject alone has been the focus of debate and ongoing discussion. One of the ongoing debates in various theoretical frameworks is whether delinquents are born or socialized to behave as delinquents. This section will provide an overview of the research attempting to explain the differences between male and female delinquency. Second, males and females engage in different types of delinquent behavior. Girls, for example, run away from home at a rate far greater than boys, while boys commit the majority of violent crimes. This section then discusses the differences between the delinquent behavior of males and females, as well as the trends in delinquency based on current official statistics.

Theories of delinquency have discussed societal-norm violation in terms of male deviancy because of the evidence

that juvenile crime is overwhelmingly male dominated. One of the questions that arise is whether the theoretical framework for any theory of deviancy is applicable to female delinquency. The unspoken assumption of researchers is that a general theory of deviancy applies to both males and females with the emphasis on males. Since female delinquency has always been very low in comparison to male delinquency, females were simply ignored in the theoretical framework. Their numbers were just too small to test the validity of a theoretical approach. With the increasing delinquency rate of girls during the last 30 years, there has been an accompanying interest in explanations for female delinquency. The following section is a historical review of the theoretical paradigms proposed for female delinquency.

Masculinity Theory

In his 1895 book *The Female Offender*, Cesare Lombroso proposed that female criminals were biologically and psychologically similar to males. Unlike non-criminal females, Lombroso argued, the female criminal had excessive body hair, wrinkles, and an abnormal cranium. He argued that girls committed fewer delinquent acts than boys for a variety of reasons: their maternal nature, their sexual frigidity, and their low intelligence (Lombroso & Ferrero, 1895/1980). Noting that males were more delinquent than females, Lombroso attributed this fact to the uniformity among females. The female criminal was an anomaly among females.

Lombroso's work influenced subsequent explanations of the biological nature of female criminality. Cyril Burt, in 1925, wrote that female delinquency was linked with menstruation. In his 1950 work, *The Criminality of Women*, Otto Pollak continued Burt's work by discussing pregnancy and menopause in addition to menstruation as links with female criminal behavior.

Chivalry Theory

In addition to offering a biological link to female criminality, Pollak (1950) claimed that female deviancy occurs more often than reported. According to Pollak, women were naturally more inclined toward deceit and concealment. His argument was based on the biological differences in the sexes. Since men are unable to hide their sexual arousal but, by their physiology, women can, he deduced that by their very nature women were capable of deceitful behavior. He further reasoned that culturally, women were encouraged to behave in a socially proscribed manner. These socially proscribed manners included feigning behaviors that made it easier for them to commit crimes.

In addition to cultural expectations, the inequality of the sexes also affects the underreporting of female crime. By their nature, he reasoned, males wish to protect females. This desire to protect females, or chivalry, is consequential

to the treatment of females when they are adjudicated in the criminal justice system. With men dominating law enforcement, it is of no surprise that police are reluctant to arrest females, lawyers are reluctant to prosecute females, and judges are reluctant to sentence females. Pollak (1950) attributed this reluctance to chivalry. Females did not actually commit fewer crimes, he reasoned, they simply were treated less harshly than their male counterparts. Furthermore, the types of crimes that females committed were directly related to the roles that society proscribed. These roles made it easier for women to commit and conceal their crimes. As substantiation for his theory, Pollak noted that in their primary role as homemakers, women had easy access to victims of violent crime (i.e., their family members). Child abuse was given as an obvious example of a crime that might escape detection by law enforcement officials. Another crime Pollak identified was stealing. Since the typical shopper is a woman, he reasoned that the store displays were designed to entice women. These displays created desires to attain material goods. If women were unable to satisfy these needs, then they would be induced to commit crimes.

While a good deal of Pollak's original argument has been discarded, the central premise of the chivalry theory—the differential treatment of females in the criminal justice system due to inequalities between the sexes—remains a topic of debate among researchers. Proponents of the chivalry theory argue that law enforcement agencies are more lenient toward female offenders. As an example, when comparing similar crimes, female sentencing has been found to be less severe than for males (Reckless, 1955). The idea that females are central to the nuclear family and their removal from that environment threatens to disrupt not only the family, but also society by leaving children without their mothers, is a key concept underlying the chivalry theory.

As a direct test of the chivalry theory, Corley, Cernkovich, and Giordano (1989) conducted a sociological study to determine if a difference exists between the treatment of delinquent males and females within the family, at school, and in the judicial system. If the chivalry theory is true, they reasoned, penalties for delinquent behavior should be unequal with boys receiving more serious penalties. They found that within the family, both boys and girls were similarly disciplined, primarily through grounding. However, girls indicated parents would be more likely to react negatively to certain behaviors. Within the school setting, they found that males were suspended more often than the females because their offenses were more serious than the females'. Furthermore, when males and females committed similar crimes, it appeared that school officials were reluctant to suspend females. Within the criminal justice system, they found that males were more likely to have contact with the system than females. Males committed more serious crimes than the females as well. However, they did not find support of the chivalry theory within the court system. The factor that was most

relevant to imposed sentences was severity of the crime. They could not find support for sex, race, or age influencing the imposition of sanctions by the courts. While finding limited support for the chivalry theory with respect to the family and school, Corley et al. (1989) found no support for it in the judicial system.

Psychological Theory

From a biosocial and psychological perspective, the reasons for female delinquency are attributed to physical and emotional traits. Theorists in this tradition believe that biology, psychological factors, and the social environment are all factors influencing delinquency. Some of the more prominent ideas promoted by these theorists are precocious sexuality, hormonal differences between males and females, premenstrual syndrome, and aggression.

Precocious sexuality as explained by Glueck and Glueck (1934) linked the early onset of physical maturity with female delinquent behavior. Delinquent girls were viewed as more sexually promiscuous, and their sexual activity was an indicator of their inability to follow societal norms. In a supporting view, Buchanan, Eccles, and Becker (1992) found an association with early onset of puberty and female delinquency. It has also been proposed that girls who mature at a younger age may attract older, adolescent boys who are influential factors in the behavior of these girls. In another sociological study, Caspi, Lyman, Moffitt, and Silva (1993) found that as girls matured, the delinquency gap between the early and late bloomers declined. The importance of the precocious sexuality approach is the recognition that female delinquency is not easily traced to a single biological explanation. If there is a biological basis for nonnormative behavior, then these theorists recognize that it operates within the context of the social and psychological spheres.

Theorists who advocate the hormonal differences between males and females believe that male hormones, or androgens, are responsible for more aggressive male behavior. Walter Gove (1985) found that androgens reduced the effects of environmental stimuli on the brain, which in turn explained the need for males to seek increased levels of stimulation such as that acquired from committing crimes. According to this theoretical approach, lower androgen levels in females explain the lower rates of female criminal behavior. Those females who have higher androgen levels, according to these theorists, will exhibit more male traits, such as aggression, and thus will be more likely to engage in criminal activity.

While relatively rare, female violence has been associated with the premenstrual syndrome (Fishbein, 1971). Fishbein's study of incarcerated females found that a significant number of crimes were committed in the premenstrual phase. In addition, a small number of women appear to be more susceptible to hostility and anxiety due to hormonal fluctuations during the menstrual cycle. However,

Fishbein points out that most of these women who are susceptible to hormonal fluctuations do not engage in criminal activity. While her study remains significant, there has been conflicting evidence regarding premenstrual syndrome and criminal activity (Harry & Balcer, 1987; Horney, 1978), primarily due to methodological considerations. These researchers question the causal ordering of premenstrual syndrome and criminal activity. From their perspective, it is unclear whether criminal activity and the stress of such activity induces the onset of menstruation.

Another theoretical approach with biosocial origins is the idea that males are inherently more aggressive than females (Ellis, 1988). This aggression, according to some psychologists, exists before socialization occurs; that is, it is innate. As evidence, they cite male aggression across all societies (Maccoby & Jacklin, 1974). One explanation given for the difference between male and female aggression is the difference between the male and female reproductive systems. According to this reasoning, males pursue multiple sex partners as a means of increasing their progeny, while females focus on the selection of a partner who will provide the resources necessary to protect and care for their young (Ellis, 1988). Critics point out that aggressive behavior is not exclusively limited to males, and under certain circumstances, females exhibit aggressive behavior (Frodi, Maccauley, & Thome, 1977).

Socialization Theory

From the socialization perspective of female delinquency, sex matters. By studying the differing lifestyles of males and females, socialization theorists hope to find the relationship between females and delinquency. Under this theoretical framework, girls are monitored more closely than boys. Girls' parents are more mindful of girls' misbehaviors than those of boys. Adults treat boys with greater leniency because of expectations that boys are brash and greater risk takers than girls (Farrington, 1992b). Since the primary adult figures in children's lives are their parents, this perspective places a good deal of emphasis on the quality of children's home life. Children from troubled families, including broken homes, or those who lack supervision are at greater risk for delinquency.

As early as 1927, W. I. Thomas noted that female delinquency was linked with the desire for material wealth and excitement. According to Thomas, girls from lower socioeconomic classes had not been schooled with appropriate middle-class values and, in their desire for wealth and thrills, were forced to engage in sexual activity as a means of acquiring material possessions. A reflection of its times, Thomas's assessment of female delinquency was based on an economic, moral, and social differential between the classes.

In *The Adolescent Girl in Conflict* (1966), Gisela Konopka pointed out that love deprivation and isolation were the basis for female delinquency. According to Konopka, an important

aspect of the maturation process for adolescent girls is the need for acceptance by males. If the adolescent girl is unable to develop these relationships with family and friends, then she may turn to sexual relationships as a means of satisfying her need for male approval. Pursuing sexual relationships with males would then lead to disapproval of her behavior by both family and community. This disapproval, in turn, would serve to increase her feelings of isolation from family and friends. Konopka posited that girls who lived in fatherless homes were especially disadvantaged because they had no means to develop the basis of a healthy relationship with a male figure.

Vedder and Somerville (1970) attributed female delinquency to family pressures. They found that 75% of institutionalized females had family problems. In their work *The Delinquent Girl*, they note the impact of unfair social practices on girls, as well as the effects of living in a male-dominated culture. Vedder and Somerville's work proposes that female delinquency originates in the family and, more specifically, with regard to gender role definitions.

Subsequent work of socialization theorists continues to link female delinquency with a troubled home life. In their study of incarcerated girls, Belknap, Holsinger, and Dunn (1997) report that delinquent girls spoke about physical and sexual abuse, as well as degrading and embarrassing social situations. Citing an association with abuse within the home and female delinquency, Chesney-Lind (1987) notes that many of these girls end up running away from home only to become victims of the system that set out to protect them.

Liberal Feminist Theory

The liberal feminist perspective of female criminality argues that economics and sex-role differences are stronger predictors of delinquency than socialization. Liberal feminists such as Rita Simon and Freda Adler argue that socialization alone cannot account for the differences in criminal behavior between the sexes. In her book *Sisters in Crime* (1975), Freda Adler stated that females commit fewer crimes than males because of their limited access to opportunities. By their nature, sex roles are restrictive for women, but as women enter the ranks of male-dominated professions, she predicted, the crime rate for females would begin to increase to match that of males. From the liberal feminist perspective, there is no difference between the sexes in terms of causality of criminal behavior. Rates of criminal behavior would begin to converge as more women gained access to traditionally male-dominated positions.

Rita Simon asserted that as women gained more economic and social power, they would be more likely to engage in male-dominated crimes (Simon, 1975a). Her prediction is supported by the increase in the female crime rate over the past 25 years. In fact, while male delinquency rates still far exceed those of females, the patterns of

crimes between the sexes are more similar than different. Critics of the liberal feminist position argue that the increase of female delinquency may be attributed to the attitudes of law enforcement agencies toward the female offender. Perhaps the arrest rates are rising, they argue, due to a change in police attitudes toward female offenders.

Radical Feminist Theory

Similar to the liberal feminist tradition, the radical feminist position argues that female delinquency is structural in nature. Drawing from a Marxist perspective, it sees the capitalist society as creating an unequal distribution of power with males dominating females. James Messerschmidt (1993) has developed a theoretical model that explains inequities between the sexes as a consequence of power in the patriarchal capitalist system. Female delinquency is created by male exploitation of females, whether through abuse, harassment, or undue influence.

In his power-control theory, John Hagan proposes that differences between the sexes are generated by class differences (Hagan, Gillis, & Simpson, 1985; Hagan, Simpson, & Gillis, 1987). These class differences influence family life. Hagan et al. (1985; 1987) therefore propose that the traits associated with positions within organizations—such as executive, middle management, or staff—are reflected in the family structure. Defining families as paternalistic (i.e., father as breadwinner with stay-at-home mother) or egalitarian (i.e., father and mother have similar positions in the workplace), Hagan et al. argue that the type of family structure influences the family management style. Paternalistic parents give their sons more freedom while limiting their daughters' freedom, thus explaining fewer female delinquents in these types of families. Egalitarian families, while giving their sons and daughters greater freedom, experience similar delinquency rates between brothers and sisters. Egalitarian families are more likely to be found among the upper class, since the parents are by definition managers in the workplace. Paternalistic families are more likely to be found in the lower classes, again due to the definitions that Hagan et al. have developed; that is, there is a single wage earner in the family, usually the father. While Hagan et al. have found support for their theory, critics argue that differences in delinquent behavior in terms of social class are problematic to delinquency theory. As an example, they propose that upper-class youths are greater risk takers and are more likely to engage in petty delinquency than lower-class youths.

Types of Male and Female Delinquency

While girls have traditionally engaged in delinquent acts less frequently than boys, there has been a steady increase in the delinquency rates of girls over the last 30 years. Boys still engage in criminal activity at a far greater rate than

girls, but girls are closing the gap between the sexes. The Uniform Crime Reports (UCR; Federal Bureau of Investigation, 2008), a compilation of crime statistics from over 10,000 law enforcement agencies as reported to the Federal Bureau of Investigation (FBI), confirms that, overall, boys are arrested more than twice as often as girls (U.S. Department of Justice, 2008). The statistics reported by the UCR show that the arrests for girls in 1967 constituted 13% of all juvenile index-crime arrests, and they now constitute approximately 29% (U.S. Department of Justice, 2008). Of particular note are the increased arrest rates of female over male delinquency for aggravated assault (99% vs. 14%), simple assault (258% vs. 99%), and weapons law violations (125% vs. 7%) over the period of 1980 through 2002. Drug abuse violations increased at a comparable rate (42% vs. 47%) for both sexes.

Regarding types of offenses, boys are far more likely to be arrested for violent crimes and serious property offenses. Boys are 5 times more likely to commit violent crimes, including homicide, forcible rape, robbery, and aggravated assault, than are girls. For serious index property crimes, including burglary, motor vehicle theft, and arson, boys are more than twice as likely to be arrested as are girls. Overwhelmingly, boys are arrested more often than girls for drug-law violations. Other offenses, such as stolen property, vandalism, weapons offenses, and "other assaults," are also typically associated with higher arrest rates for boys (Chesney-Lind & Shelden, 2004).

Types of offenses for which girls are typically arrested include running away from home and prostitution (Chesney-Lind & Shelden, 2004). Over half (60%) of the arrests for running away from home are girls. Girls are far more likely to be arrested for status offenses, which in addition to running away from home include truancy, curfew violation, incorrigibility, and loitering. The 2002 UCR reports that running away from home and curfew/loitering account for 18.2% of all girls' arrests and only 6.5% of boys' arrests.

The 2002 UCR reports that 71% of all juvenile property crime-index arrests were larceny-theft, with the most common violation being shoplifting. Girls accounted for 39% of larceny-theft. Overall, the juvenile arrest rate for property crime-index offenses was the lowest since the 1960s with an increase in the arrest rates of girls over the same period of time (U.S. Department of Justice, 2008).

The UCR is not a perfect mechanism for tracking the commission of crimes because it is dependent upon crimes reported to law enforcement agencies. It is a means of gauging general trends in criminal activity, and, if anything, the UCR statistics reflect an underreporting of criminal activity. Nonetheless, the UCR provides valuable information regarding the categorization of crimes that are committed in the United States. Furthermore, it can be argued that the accuracy of the UCR increases with the seriousness of the crime. More serious violations, such as murder and rape, are more likely to be reported to law enforcement agencies than less serious infractions, such as vagrancy.

Furthermore, the information gleaned from the UCR describes several key factors regarding male and female delinquency. First, male delinquents continue to overwhelmingly commit the greatest number of juvenile offenses, with more than twice as many arrests (U.S. Department of Justice, 2008). Males commit most of the violent crimes and females commit the most status offenses (running away and curfew violation). Second, as mentioned, there has been a steady increase in the rates of female delinquency over the past 30 years. Third, when ranking the most common delinquent behaviors, male and female delinquents exhibit similar patterns of criminal behavior. The leading offenses for both male and female delinquency are the categories of larceny-theft, forgery and counterfeiting, and other assaults not included in the violent crime index.

Smith and Visher (1980) conducted an empirical review of studies comparing sex and involvement in crime from 1940 through 1975. In their review, they gathered information such as self-report questionnaires and official reports of arrest, class, age, race, offense type, level of family intactness, and level of urbanization. Their review of 44 studies found the gap narrowing between male and female deviancy in general, and delinquency in particular, depending upon type of offense. In terms of minor offenses, males and females exhibited similar propensity levels while the more serious criminal behaviors continued to be dominated by males. Of particular interest was their finding that African American male and female involvement in criminal activity appears to be converging, while European Americans do not exhibit a similar convergence. They posit that this result is consistent with stratification research; for example, African American females have experienced advancements in educational and occupational attainment relative to African American males at a faster pace than their European American female counterparts in relation to European American males. In other words, African American women have advanced faster than European American women, thus lessening the gap between the sexes and creating a similar propensity toward crime. Finally, they note a convergence of self-report with official data samples in reporting less serious deviant behavior and acknowledge that attitudes of official law enforcement agencies toward more serious offenses may impact agency responses.

Although this study was conducted 25 years ago, the trends of female and male delinquency have continued to the present. Boys continue to participate in the most serious offenses, but girls, by their increasing rates of participation in delinquent acts, have narrowed the gap that existed between the less serious forms of delinquent behavior.

Cross-Cultural Delinquency

One of the most interesting aspects of studying delinquency is that of cross-cultural comparisons. Up until this

point, the discussion has focused on American delinquency, which is unique in its development. But, as has been previously discussed, social structure is fundamental to the perspectives of adolescence and, consequently, to the idea of delinquency within that culture.

Does delinquency exist across all cultures? And, most important, if not, why not? This examination cannot possibly hope to cover all cultural groups, but, instead, it will attempt to provide a brief description of a culture that had witnessed virtually no delinquency but, over time, has seen a metamorphosis of its youth toward deviant behaviors.

In order to answer the question as to whether delinquency exists in all cultures, it is important to recall the original premise of this discussion. Delinquency exists in societies where there are concepts of adolescence. If there are no concepts of adolescence, then the concept of delinquency has no point of reference. If the social structure embraces childhood with an initiation into immediate adulthood, then an adolescence is not conceivable. Children move immediately into their adult roles, meaning that they take on the responsibilities and tasks that their elders have prepared them for. Delinquency, and the attitudes associated with it, is an extension of childhood roles that are eliminated in a culture that initiates children into adult roles. This is not to infer that deviant activity does not occur upon initiation into adulthood, but, rather, that any deviant activity is treated as a social infraction at an adult level. In these contexts, there is no concept of special treatment for adolescents. Upon initiation into adulthood, there is an acceptance of the rights and responsibilities associated with this newly attained status.

How to compare delinquency between different societies becomes problematic for a number of reasons. First, there is a necessary agreement as to the definition of delinquency. Delinquent behavior in one society may not be considered delinquent behavior for another social group. The idea of delinquent behavior assumes a stage within human development that may be a foreign concept in another social setting. Second, criminal behavior in one society may be acceptable behavior in another society. An example of this would be some of the tribes of India who have taught their young to steal as a matter of survival (Cavan & Cavan, 1968).

There are enough variations in differing societies that this piece will attempt a brief comparison of two social groups. In order to contrast the differences between these two groups, a preindustrial society compared with an industrial society will provide an illustration of how delinquency differs in each society. There are, of course, differing cultural norms that will affect attitudes toward delinquency. In addition, while examining the preindustrial society and its transition into an industrial state, there will be the opportunity to describe changing societal patterns of behavior and their effect on the behavior of youth within that culture.

Cavan and Cavan (1968) studied the closed society of the Eskimos as an example of a social group that, at one

time, had virtually no delinquency but has now witnessed the introduction of delinquency to their culture. Eskimos are differing ethnic groups of nomadic peoples who live in the regions of Alaska, Siberia, Greenland, and northern Canada. The idea of delinquency was virtually unknown to the Eskimos until the introduction of European explorers and settlers.

By looking at Eskimos as an example before the arrival of the Europeans, there is a marked difference in the family and its approach to delinquency (Cavan & Cavan, 1968). Prior to the arrival of the Europeans, the Eskimos lived in tightly knit family groups wandering in hunting groups in search of food. Their travels roughly followed their search for food: caribou, seal, and walrus. Their culture had little or no delinquency. Families shared single-room huts in the winter and, in the summer, they would spread out in other dwellings within a general area. To live in one room during the course of the winter months, with no control over an unruly adolescent, could be a problem not only for the family, but also for the entire community. Hence, keeping a tight rein over troublesome youth in such tight household circumstances was essential.

Furthermore, the Eskimos lived in a patriarchal society and the father immediately attended to any transgression. In this society, women were subservient to men and wife lending was customary, relating to lack of children and sexual tension. In addition, according to Cavan and Cavan (1968), these arrangements were agreed to without any problem by the women. Children were kept in close proximity to their mothers and, in fact, were watched by the extended family. In addition, the Eskimos had no social classes. Everything in their society was geared toward survival, and cooperation was essential in order to meet that end.

The greatest problem would appear to be living in close quarters for many months of the year. Yet, this was handled by the separation of each nuclear family unit, during the summer months, from the main group in order to go its separate ways. According to Cavan and Cavan (1968), the simple need to survive, the care of mothers for their children, the authority of the father, and cooperativeness of the family unit as a whole met their overall goals: All contributed to the lack of delinquent attitudes. It is interesting to note that upon the introduction of the European settlers, delinquent attitudes and problems began to creep into the Eskimo culture. As long as the culture remained closed to the outside world, it appeared to be able to keep delinquency at bay. It was when Eskimos came into contact with the outside world that issues of delinquency, such as alcohol consumption and sexual promiscuity, became problematic.

With the introduction of the European immigrants came missionaries and ideas outside of the Eskimo culture. The Christian missionaries discouraged the practice of wife lending, which had been common practice among the Eskimos. Coincidental with the changes that the Europeans brought to the Eskimos came changes to the Eskimo way of

life. The missionaries sought to establish a moral system of beliefs, which the Eskimos absorbed into their system. While accepting the beliefs of the missionaries in addition to their own belief system, the Eskimos found that their way of life was slowly changing.

This transition brought with it a myriad host of difficulties—another culture in which the young were curious and by which they were easily influenced, as well as the realization that there were goods beyond the necessities for survival that could be acquired. In the past, the Eskimo family had been concerned with survival, and now there was the opportunity to obtain supplies to make life easier. While it is easy to place blame for the appearance of deviant behaviors in the Eskimo culture on the European settlers and their introduction of material goods, a few cautionary reminders are appropriate: Nonconformity in the Eskimo culture was not tolerated because of the close living conditions; dealing with those who deviated from societal norms was immediate, and children were initiated into adulthood, meaning that no juvenile culture existed, thus eliminating delinquency.

Future Directions

The development of preventive strategies will necessarily follow from an understanding of delinquency's root causes. If social structure is a key factor in the development of juvenile delinquency, then prevention will entail addressing issues regarding place, identity, or socioeconomic status. For example, if poverty is considered a significant causative factor, then taking steps such as providing jobs, job training, and perhaps additional welfare benefits becomes an important social concern. By eliminating poverty, society will thus work toward eliminating the deviant behaviors that exist as a result of socioeconomic status. If, on the other hand, gender is viewed as contributing to the majority of delinquent behaviors, then a closer look at the roles that are encouraged in society becomes an important factor.

Since males commit more delinquent acts than females, a preventive measure would entail focusing upon males. As an example of ethnicity- and gender-based solutions, mid-night basketball was promoted in the 1990s as a means of decreasing incidents of delinquency (Hartmann, 2001). Its primary intent was to keep adolescents off the streets at night by keeping them occupied, and its target group was inner-city, African American males. Initially seen as a means of addressing crime in the inner city, this program came under intense criticism by its opponents for being racist, as it was directed toward a single ethnic group, and ineffective, as there was a lack of supporting evidence for minimizing delinquency.

From its inception, our juvenile justice system has viewed juvenile delinquency as a problem that, at its heart, is one of redemption and restoration. Our society views the young as easily influenced, adaptable, and with many years

of productive life ahead of them. Unlike the criminal justice system with its primary purpose as retribution, there is a separate juvenile justice system with an entirely different purpose of rehabilitation, although arguably this has changed over recent years toward a more retributive system. As society has witnessed many horrific crimes, such as the school shootings of Columbine and Virginia Tech, there has come to be a growing concern that perhaps youth should be treated as adults. By moving these youth to adult courts, society has, in effect, made a decision to move away from the rehabilitation model and into that of retribution. This movement toward a retributive model is illustrated by the changes in the laws that have lowered the age under which juveniles can be transferred to adult courts, the addition of crimes for which underage youth can be charged, and the modification of prior-record provisions (DeFrances & Strom, 1997). Under these circumstances, society has determined that the seriousness of the crime demands that justice be served regardless of the age of the perpetrator. There are those in the juvenile justice system who would argue that although juveniles may understand the serious nature of their act, they do not have full and clear comprehension as to the meaning of their criminal act.

There is a real need for anthropologists to pursue cross-cultural research in delinquency. There are two primary reasons to pursue this line of research: (1) to provide a better understanding of the transmission of cultural norms including delinquency from one culture to another, and (2) to study delinquency as defined by differing social groups. The benefits would include lowering delinquency rates through an understanding of its causes, increasing the understanding of cultural definitions related to norm violation, and finally providing credible research to influence social policy.

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VIOLENCE AND WARFARE

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Warfare is an organized, socially sanctioned armed conflict that takes place between two independent political units, groups, or communities using military force (Malinowski, 1941; Mead, 1940, 1968; Otterbein, 1994). Otterbein (1994) has categorized warfare into three types: (1) internal war and two types of external war, (2) offensive war and (3) defensive war. While internal warfare is between political groups within the same cultural unit or larger aggregates within society, external war is between culturally different units or between the society under study and other societies (Ember & Ember, 1997; Otterbein, 1994). Of the two types of external war, offensive is attacking and defensive is being attacked (Otterbein, 1994).

Violence, a ubiquitous aspect of warfare, is a part of everyday life in modern times. At present, the war on terror that is being waged in Iraq by the U.S. government was a major issue in the 2008 presidential elections as violence continues to take center stage with the rising number of casualties of American soldiers. Terrorist attacks are also at an all-time high. While the September 11, 2001, attacks in New York City and Washington, D.C., were still fresh in the minds of the people, the terrorists attacked Mumbai, India, in November 2008 for 4 days, leaving the financial capital of the country debilitated. Violence, however, is not unique to the world of today. It can be traced back to prehistoric times. Osteological and archaeological data about

ancient groups from the Americas and Europe point toward this fact. Archaeological data and skeletal remains also show evidence of domestic violence, homicide, ritualized combat, warfare, cannibalism, and human sacrifice (Martin & Frayer, 1997).

Violence in Prehistoric Warfare

Despite lack of concrete evidence, prehistorians believe that violent clashes between different groups were likely since Paleolithic times (Guilaine & Zammit, 2001/2005). According to Leroi-Gourhan (1965), aggression, an integral part of hunting, was essential in prehistoric times as a technique for obtaining food and warfare. Thus, violence, an extension of hunting, was a natural means for survival. Among the few remains that exist of Neanderthal man in the cave of Shanidar in northern Iraq, there appears to have been a high frequency of trauma-related deaths that show a likelihood of aggression (Cunliffe, 2006). Remains found in the Upper Paleolithic cemetery of Gebel Sahaba in Nubia, Egypt, show that at least 50% of those buried died from violence (Cunliffe, 2006). Looking at the aggression shown by the hunting populations of American Indians today, Guilaine and Zammit (2001/2005) surmise that hunting societies of the Upper Paleolithic Age were warring societies.

Burials of the Mesolithic man in Europe show signs of deaths by traumatic injuries, and those found in Bavaria show that heads were severed from the bodies, which could be indicative of either ritual sacrifice or widespread warfare among the hunter-gatherers. Among early farmers of the Neolithic Age from about 6000 BCE, violence and warfare in the form of raids and routs using bows and arrows, along with spears and axes, seem to have intensified as people started competing for resources (Cunliffe, 2006). The reason that warfare was so rampant among the hunter-gatherers and the early farmers is because they enjoyed war and it formed an integral part of their social existence (Clastres, 1997). However, unlike modern warfare, prehistoric warfare had few participants. Adult males, who had no training or strategic war plans, took part in disorganized confrontations with no one leading the warring factions (Guilaine & Zammit, 2001/2005). According to Thomas Hobbes (1588–1679), this lack of leadership—an authority to establish social organization—led to constant warfare.

Hobbes, in his famous work *Leviathan* (1651), noted that human beings adopt means for self-preservation when they perceive danger. As such, Hobbes argued that men have the natural capacity for violence and that war is a social condition that can be averted only when society gives up certain rights to a sovereign who takes over decision making for a long-term good (Cunliffe, 2006). According to Hobbes's theory, in the absence of discipline, human beings are in a state of animosity where a constant mistrust of others leads to rebellion and conflict (Clastres, 1997; Guilaine & Zammit, 2001/2005). Clastres (1997) perceived this constant need for war as a way for primitive societies to retain their individualism and independence and not bow before a powerful authority figure where power would be centralized. Spencer (1896) contended that military efficiency came before the development of centralized political power.

Jean-Jacques Rousseau (1712–1778) believed in the idea of the “noble savage,” asserting that man is gentle in his natural state. He argued that man is led to violence when restrained by social mores (Cunliffe, 2006). The theory of the noble savage is that primitive life was conflict-free and that the peaceful character of man and nature were in harmony with each other (Guilaine & Zammit, 2001/2005). The scientific view believed that primitive life was easy because there was scant population and nature was bounteous. Thomas Malthus (1766–1834) hypothesized that population increases faster than the means of subsistence, and warfare was a means to check population growth, which was later referred to by Julian Steward in the late 20th century as “cultural ecology” (Cunliffe, 2006). Malthus's theory had a major impact on Charles Darwin (1809–1882) in propounding his theory of natural selection, which was the nucleus of both his *On the Origin of Species* (1859) and *The Descent of Man* (1871). Thus, Malthus and Darwin looked at violence and

warfare as natural and positive when it led to the survival of the fittest (Cunliffe, 2006).

Evolution of Violence and Warfare

War as an institution was created at some point of time in social evolution even though less complex collective violence did exist prior to that (Mead, 1964; Meyer, 1990). Wilson (1978), in his book *On Human Nature*, opined that aggression arose in defense of territories where intruders were attacked. Territories defined the control over resources like fruit and water; game and warfare were also an important mechanism to maintain this control (Meyer, 1990). Adding to this, Otterbein (1994) identified 16 theoretical approaches to the anthropology of warfare. The theories currently being advocated were grouped under three components—material causes, efficient causes, and consequences. Material causes included physical environment and social structure; efficient causes included goals of war and military preparation; and consequences comprised effects on social organization, survival value, and origin of state. Theories that are no longer advocated strongly were divided into causes and effects. Causes included innate aggression, frustration-aggression, diffusion, and cultural evolution. Effects included effect on species, ethnocentrism, acculturation, ecological adaptation, and patterns and themes.

Vayda (1961) argued that a community that becomes overpopulated will move into unoccupied areas or take over land of communities that are militarily weak. A major proponent of ecological theories of warfare, Vayda initially looked at warfare as an adaptive mechanism leading to equitable distribution of resources, thus focusing on material causes of war. Later, he looked at purposeful human behavior in its context, which is classified under theories on efficient causes of war. Otterbein (1994) contended that causes of rape, feuding, and internal war were to be found in social structure, and this is a material cause. He pointed out that the efficient causes of war were to be found in the goals of war, and these were usually economic, for example land to obtain land and plunder. Otterbein also examined the third component of the theories of war, consequences or outcomes of war. This included different types of wars, casualties, and changes in territorial demarcations. Later, he came up with a unified theory of feuding and warfare that combined the various theoretical approaches to warfare.

The unified theory tries to bring together the structural and ecological approaches to the causes of war. According to this theory, groups in a region compete for the same resources. This becomes their goal of war. In the case of natural disasters or population growth, people from the areas that have a shortage of resources will attack those with greater resources. Smaller groups that are defeated can form political alliances to become stronger. Thus, social structures merge as a mode of ecological adaptation.

On the other hand, groups that have achieved a high level of military sophistication will try to conquer the weaker groups—both within their region and outside. This therefore reduces competition, expands their territories, and increases their population (Otterbein, 1994).

Examining the evolution of warfare and violence in the northwestern coastal region, including areas between the Pacific Ocean and the coastal ranges of the mountain systems of northwest North America, Maschner (1997) noted that the people of the area had one of the most aggressive forms of organized conflict among hunter-gatherer societies. According to Maschner, the first evidence of conflict in the region dates from at least 3000 BCE, and the injuries were found to be mainly nonlethal. By 200 to 500 CE, a shift in violence and warfare was evidenced by the construction of defensive areas, conglomerations of villages, and a decline in population. By 900 CE, a great increase in the construction of defensive sites was evidenced. Maschner also pointed out that despite a decline in population, the early 19th century saw a rise in conflicts in the area that brought into question the material explanation of warfare and demonstrated that the region had a long history of war.

Views of Ancient Greek and Roman Philosophers

The first Western writer to address the issue of morality in warfare was Thucydides (460–400 BCE) in *The Peloponnesian War*, which contained the historical account of the war fought between Sparta and Athens in 431 BCE (Reichberg, Syse, & Begby, 2006). In *The Peloponnesian War*, the Athenians said to the Melians, a colony of Sparta that refused to submit to Athenian rule, that right was an issue only between those who were equals in power, not between the strong and the weak; the strong could do what they wanted while the weak had to suffer (Strassler, 1998). When the Melians questioned how it would be good for them to serve while the Athenians ruled, the Athenians replied that it would save them from worse sufferings, and the Athenians would gain without having to destroy the Melians. The Peloponnesian war finally ended with the defeat of Athens and the establishment of Sparta as the leading military power in Greece (Strassler, 1998).

Plato (427–347 BCE) wrote little about war, but he believed that to have peace, it was important to be prepared for war. He emphasized that the right kind of education must be imparted to the soldiers so that decisions about when to wage war could be prudent and well guided (Reichberg et al., 2006). Subsequently, Aristotle (384–322 BCE) was critical of the organization of Sparta's political life being geared toward war. According to Aristotle, military power should not be an end in itself but must be a defensive tool to maintain peace. Aristotle berated tyrannies for being more predisposed to violent conflicts than other forms of

government and suggested that leaders must be properly trained in statecraft (Barnes, 1984).

In ancient Rome (7th century BCE–1st century CE), decisions to wage wars were taken by priests or *fetiales* who were essentially responsible for maintaining peace, and a war was considered just if it was carried out in accordance with the religious laws; these were usually in the form of lawsuits (Watson, 1993). Roman statesman Marcus Tullius Cicero (106–43 BCE) was one of the first thinkers to voice the need for developing a legal and normative structure for war and insisted that war should be undertaken only with the objective of peace (Reichberg et al., 2006).

Crusades and Just Wars

Crusades are holy wars fought for the defense of religion. Reichberg and his colleagues (2006) identify at least seven crusades—or Christian holy wars or medieval wars—that were fought against the Muslims between 1095/1096 and 1274 for the liberation of Jerusalem and the holy sepulcher, which is Christ's grave. They contend that the crusades failed to uphold Christian virtues and remained at best a mixture of religious ideals and experiences of brutal violence suffered by the people. Similarly, Muslim holy wars are fought under the concept of *jihad*. Innocent IV, who was the Pope from 1243 to 1254, wrote commentaries on the contemporary papal legislation known as Decretals, which highly influenced Thomas Aquinas (1225–1274) in his development of the concept of the just war (Reichberg et al., 2006). In his Decretals, Innocent IV wrote that the Pope could legitimately take steps to recover and defend the holy land that had been taken over by the Muslims, while also protecting all the faithful inhabitants, but mentioned that the property rights of infidels in other jurisdictions must be respected (Innocent IV, 1535/2006). He argued that the holy land was won in a just war by the Roman emperor after Christ's death, and so it was legitimate for the Pope to take it back from the infidels (Innocent IV, 1535/2006).

Thomas Aquinas wrote that holy wars are to be waged against unbelievers not to convert them to Christianity but to prevent them from obstructing the Christian faith. As for those who had once accepted Christianity and do not believe any more, they should be compelled to keep the faith as they are obligated to do so once they have accepted it by exercising their free will (Aquinas, 1268–1271/1920). The key criteria—princely authority, just cause, and right intention—identified by Aquinas for resorting to armed force in a just war are followed even in today's world (Reichberg et al., 2006). On warfare and violence, Niccolò Machiavelli (1469–1527) wrote in his book *The Prince* (1532/1985) that war was just if it was necessary, that arms were pious if there was no hope in anything else, and that the end justified the means.

Global Conflicts and the World Wars

New patterns of violence and warfare around the world can be attributed to European contact with indigenous peoples and Europeans' territorial expansion as they built their empire across the world and formed colonies (Ferguson & Whitehead, 1992; Rosman & Rubel, 1999). Ferguson and Whitehead (1992) identified three types of responses by the indigenous peoples in the form of warfare as a result of the changes around them: (1) wars of resistance against the state, (2) indigenous peoples enrolled in the armed forces of the states, and (3) war among different factions of the indigenous population as they responded to the changes around them. Before European invasion of the world, the balance of power was maintained among the various groups that took to war. However, since Europeans focused on expanding their rule, power was concentrated in their hands. They also introduced more advanced weapons like guns and had more resources (Rosman & Rubel, 1999).

The island of New Ireland, a part of Papua New Guinea, had its first European contact in the 1880s. This was marked by violent conflicts and intense fighting, which was then accelerated by the introduction of guns and iron axes. In 1884, New Ireland became a German colony as part of German New Guinea. Although it started out as a commercial enterprise, the German government soon took administrative control of the region (Rosman & Rubel, 1999). Although weapons were a major factor in the dramatic escalation of violence and warfare in New Ireland from 1880 onward, Rosman and Rubel (1999) suggest the main factor was the imbalance that was caused by the interference of Europeans in the hostility equation between traditional enemies in the area. Prior to European contact, the indigenous communities around the world had traditional enemies and allies maintaining a balance of power in the region, and so no single group was able to seize power or be in an advantageous position for a long period of time. With European contact, the goal of warfare also changed to control of strategic resources in the region (Rosman & Rubel, 1999).

A similar situation can be seen in Somalia, where the population is divided into several small clans. European contact (colonized by Britain, Italy, and France) gave more powers to some clans recognized by the colonial governments and given stipends (Lewis, 1965). This led to the disruption of the balance of power in the region. After Somalia achieved independence in 1960, these clans emerged as political parties, and the balance of power continued to be disturbed with those in high political positions favoring their clansmen while harassing those from other clans (Rosman & Rubel, 1999). Later, during the Cold War, both the United States and the USSR gave large amounts of weaponry to Somalia, further upsetting the stability in the country. Colonialism unleashed long periods of impoverishment, violence, and conflict in diverse places like India, South Africa, Algeria, and Ireland, and at the present time in Rwanda, Bosnia, and Palestine (Sáenz, 1999).

World War I (1914–1918) was a global war that began in July 1914 with Austria-Hungary declaring war on Serbia. Soon, Britain, France, Belgium, Russia, Serbia, Japan, Italy, and the United States were fighting against Austria-Hungary, Germany, the Ottoman Empire, and Bulgaria. The Great War utilized the powerful weapons that had been invented in the 19th century with heavy gunpowder, artillery, and machine guns; all products of a machine age, these transformed the war into one never seen before—of mass slaughter, death, and carnage, with the dominant cultural image being one of collective ravage and plunder rather than celebration of individual heroism. As the war progressed, aircraft were used strategically to bomb the enemy and destroy vital areas where war arrangements were being made. Aerial bombing had a momentous impact on industrial societies, which were particularly vulnerable (Lawrence, 1997).

By the end of the World War I, the French had lost 1,700,000 men, Germany had lost 2,000,000 men, and the British had lost 1,000,000 (Keegan, 1993). The United States lost 48,000 men in battle and 56,000 from disease (Leuchtenburg, 1958). The war brought about a strong sense of gloom in modern times as thinkers began reflecting on the meaninglessness of modern life and the futility of war, while questioning the possibility of progress that was brought about by the Industrial Revolution. With severe slaughter by machines going out of control and a strong sense of human alienation, World War I turned Europe into a “real charnel-house” (Lawrence, 1997, p. 58). The war ended with the signing of the Treaty of Versailles in June 1919. The League of Nations was created as an international organization to prevent future wars. However, it proved to be a failure as World War II began in 1939.

The Treaty of Versailles resulted in Germany losing parts of its territory. In 1935, Germany under the leadership of Adolf Hitler repudiated the Treaty of Versailles and in 1938 annexed Austria. In 1939, Germany and Hungary occupied Czechoslovakia. While Germany began raiding British cities in 1940, Britain retaliated with aerial attacks that lasted for the next 5 years even though these bombings lacked precision (Lawrence, 1997). Massive raids were carried out in German cities, affecting civilians beginning in 1942. In December 1941, the Japanese Navy attacked the U.S. naval base at Pearl Harbor, Hawai'i. There were two waves of aerial attacks launched by Japan that led to severe destruction of U.S. naval battleships and loss of personnel. This led to the United States joining World War II in 1941. World War II, which began in 1939 and ended in 1945, was divided into two military factions, the Allies and the Axis. The Allied countries were the British Empire, the Union of Soviet Socialist Republics, the United States of America, China, Poland, and France. The Axis countries were Germany, Italy, and Japan.

World War II ended in the defeat of the Axis powers. The Western countries mercilessly used air power and technology to their benefit, killing hundreds of thousands

of civilians by strategic bombing (Lawrence, 1997). The United States dropped atomic bombs developed by their scientists on two Japanese cities, Nagasaki and Hiroshima, in early August 1945 causing complete destruction of the cities and crushing Japan. Surrender by Japan on August 15, 1945, finally ended World War II. After World War II, the United States and the USSR emerged as the two superpowers and the Cold War continued between them until the early 1990s when the USSR was dismantled. The United Nations, an international organization, was established in 1945 to maintain world peace and security.

Genocides

Traditionally, anthropologists were neutral and dispassionate observers of the human condition, not influenced by politics, and therefore kept away from issues like genocide and state-perpetrated terrorism (Scheper-Hughes, 1995). However, recently, genocide has been of interest to certain forensic anthropologists who have made important contributions to the field (Jones, 2006). Anthropologists are now studying areas that were under siege or affected by violence and insurgency rather than just looking at small, stable communities (Hinton, 2002). While studying genocides, anthropologists examine local and cultural dynamics and try to understand factors that lead to such terroristic actions (Jones, 2006).

The term *genocide* was coined by Raphael Lemkin (1900–1959), a Polish-Jewish jurist and refugee from Nazi-occupied Europe. Genocide involves the deliberate destruction of an ethnic group or nation based on their collective identity (Jones, 2006). The United Nations defines genocide as any act including killing members of a group, causing serious bodily or mental harm to members of a group, taking measures to bring about the destruction of a group, or preventing births within a group or forcibly transferring children to another group, done with an intent to destroy a national, ethnic, racial, or religious group.

Rome's siege of Carthage toward the end of the Third Punic War (149–46 BCE), where 150,000 Carthaginians out of a population of 200,000 to 400,000 were wiped out, has been regarded as the first genocide (Kiernan, 2004). Later in the 13th century, Mongolian horsemen under the leadership of Genghis Khan invaded vast territories, exterminating entire populations in search of wealth. In France, following the execution of King Louis XVI in 1789, the new revolutionary government in Paris was faced with opposition and revolt in the Vendée with a rise against the government. As a result, all inhabitants of Vendée, including children, were slaughtered by the government; the death toll was estimated to be 150,000 by 1796 when the genocide waned. Another instance of genocide was the one perpetrated by the Zulu kingdom in Africa. Under the leadership of Shaka Zulu, between 1810 and 1828, large-scale annihilation of populations was carried out in an

attempt at expansion. While Shaka took all the men to increase the strength of his army, he destroyed women, children, and old people, as they were useless to him (Jones, 2006).

Europeans, for over five centuries, have taken genocidal measures in the Americas against the native indigenous population. Jones (2006) describes this as the "most extensive and destructive genocide of all time" (p. 70). The Spanish invasion and occupation of large parts of Latin America in the late 15th century led to the extermination of tens of thousands of native Indians, as the invaders slaughtered men, women, and children alike. Those not killed this way were worked to death in gold mines, reducing the population of a Caribbean island (present-day Dominican Republic and Haiti) from 8 million to 20,000 in 30 years. Soon the Spanish invaders massacred native populations in Mexico, Peru, Bolivia, and Ecuador; a vast majority died as a result of poor working conditions in mines where they were forced to work (Jones, 2006). Besides bringing in diseases that caused a demise in the native Indian population in North America, Europeans began the first genocidal war (the Pequot War, 1636–1637) in present-day Connecticut as an overreaction to a Native American raid, exterminating hundreds of Indians. Several more such wars were to follow in the coming years. The Yuki Indians of California were reduced from an original population of 20,000 to 168 by 1880 (Jones, 2006). In Guatemala, a military coup overthrew the reformist president in 1954 and started military rule. In the 1970s, a guerrilla army rose in revolt against the military regime to which the military reacted with a holocaust that befell the Mayan highlands. Within a span of 6 years, 440 Indian villages were razed and 200,000 Indians tortured and killed. Forensic anthropologists in Guatemala studying exhumed victims in recent years have given significant input in determining that the mass slaughter carried out by the military in Guatemala against the Mayan Indians was indeed genocide (Jones, 2006).

Both the Aborigines of Australia and the inhabitants of Namibia, at the hands of Britain and Germany, respectively, suffered fates similar to that of the Native Americans. The Aboriginal population in Australia was 750,000 when the British colonists first arrived in 1788, and was reduced to 31,000 in 1911 (Jones, 2006). In addition, German colonists almost exterminated the Herero nation in Namibia. German colonists arrived in 1903 and began pushing the native people out of their territories. In 1904, the Hereros rose in revolt against the Germans, killing 120 Germans (Jones, 2006). Another tribal nation, the Namas, also revolted against the Germans. The Germans crushed both the Hereros and the Namas, killing almost half their population. In 2004, 100 years later, the Germans formally acknowledged the genocide and apologized to the people of Namibia, offering development aid after the Hereros filed a suit in the United States for \$4 billion in compensation from the German government and German companies who profited from those lands (Jones, 2006).

The first truly modern genocide was the Armenian holocaust, where over a million Armenians were killed in Turkey between 1915 and 1923. In April 1915, the Turkish army assaulted Armenians, who were Christians, as opposed to the Turkish, who were Muslims, and who were thus seen as supporters of Russia, Turkey's enemy in World War I. On April 24, 1915, hundreds of Armenians were imprisoned and later killed, or tortured to death (Jones, 2006). Some Armenians were stripped of their arms and made to work until they died; others were shot in cold blood; 200,000 Armenians were exterminated in this way by July 1915 (Jones, 2006; Mann, 2005).

In Russia, during the Russian Revolution, Lenin's Bolshevik party, which followed the Marxist socialist ideology, seized power, overthrowing the tsarist regime in 1917, and founded the Soviet Union. Stalin was appointed the general secretary of the Communist party. After Lenin died in 1924, a struggle for power ensued and Stalin successfully became the Soviet leader in 1928. The Bolsheviks hated a class of peasants called the kulaks, as they were seen as slightly better off than the others (a peasant who owned just a cow or hired a helper would be labeled a kulak) (Jones, 2006). The Soviet regime forced the kulaks onto collective farms. Thousands of heads of families were shot and killed; over a million were sent to concentration camps with most of them dying on the way (Jones, 2006). The number of inmates in the concentration camps rose from 212,000 in 1931 to almost a million by 1935; about 2 million kulaks were sent on internal exile to distant corners of Russia (Applebaum, 2004; Werth, 1999). After destroying the kulaks, the regime next started the practice of forced collectivization and grain seizures, resulting in widespread famines in Ukraine, the Volga region, Kazakhstan, and other territories (Jones, 2006). Between 1930 and 1933, 5.7 million people are estimated to have died from famine in the USSR (Jones, 2006). According to Werth (1999), 4 million of these victims were Ukrainians.

The Jewish Holocaust, the most well-known genocide, took place between 1941 and 1945; in it, 5 to 6 million Jews were systematically exterminated by the Nazi regime in Germany (Shermer & Grobman, 2002). The Nazi Party was founded by Adolf Hitler and his colleagues, and Hitler, a decorated veteran of the First World War, envisioned German domination over all of Europe. Hitler also had an extreme hatred for Jews, who had allegedly rejected and killed Jesus Christ. Hitler became the chancellor of Germany in January 1933. Once in power, he began a systematic boycott of the Jews in Germany, forcing large numbers of Jews to flee the country. In November 1938, several Jews were killed, and about 30,000 male Jews were rounded up and put in concentration camps, while hundreds of thousands of Jews were confined in ghettos with the intent of genocide (Jones, 2006). In 1941, following the German invasion of the Soviet Union, 1.2 million Jews were rounded up and killed by point-blank rifle fire (Rhodes, 2002). The Germans then came up with the idea

of the death camps, in which the victims were killed in gas chambers, thus allowing a distance between the killers and the victims. In Auschwitz, 1.25 million Jews were killed this way (Jones, 2006).

Other known genocides were carried out in Cambodia by the Khmer Rouge (1975–1979), in Bosnia and Kosovo (1998–1999), and in Rwanda (1994). In Cambodia, between 1975 and 1978, the ruling party at the time, the Khmer Rouge—composed of communist revolutionaries—carried out a spree of killing all those who were perceived as their enemies in Cambodia. Approximately 1.9 million people, constituting about 24% of the Cambodian population, died during this period (Jones, 2006). The Khmer Rouge imposed forced labor and conducted mass executions and internal purges similar to those in Stalin's Russia. In 1989, the Serbs, under the leadership of Slobodan Milosevic, started repressive measures in the Albanian-dominated province of Kosovo, throwing thousands of Albanians out of jobs. Kosovo's Albanians revolted with guerrilla warfare from 1998 through 1999, leading to the killing of about 10,000 ethnic Albanians by Serbs and the mass deportation of about 800,000 Kosovar Albanians to Albania and Macedonia. In February 1992, when Bosnia-Herzegovina declared independence from Yugoslavia, Bosnian Serbs broke free. Wars ensued, with the Bosnian Serbs persecuting the Bosnian Muslims. Muslim men and some women were detained in Serb concentration camps where thousands died in conditions similar to the Nazi concentration camps. In Rwanda, about 1 million Tutsis were killed in 1994 by the Hutu regime within a span of 12 weeks (Jones, 2006).

Internal Conflicts and Terrorism

Internal conflicts are violent, armed clashes that are a result of domestic political disputes including power struggles, ethnic conflicts, secessionist movements, and revolutions; they range from guerrilla warfare and terrorist attacks to civil wars and genocide (Brown, 1996). Brown (1996) identified five reasons internal conflicts are important: (1) They are widespread, (2) they cause extreme suffering, (3) they usually involve neighboring countries, (4) they weaken the stability of the region, and (5) they might draw the attention of international organizations and countries farther away as their nationals might be in the affected regions. The international community is now taking an increasing interest, and efforts are on to handle these issues as they take on international dimensions. Reviewing the scholarly literature on internal conflicts, Brown identified four different clusters of factors that were responsible for causing internal conflicts: structural, political, economic/social, and cultural/perceptual. Structural factors include weak states, intrastate security concerns, and ethnic geography; political factors include discriminatory political institutions, exclusionary national ideologies, intergroup politics, and elite politics; economic/social factors include

economic problems, discriminatory economic systems, and modernization; and cultural/perceptual factors include patterns of cultural discrimination and problematic group histories.

An example of the political factors can be seen in India, a political entity that was artificially created as a result of British colonialism, and as such, the different parts of India are constantly trying to secede. This has been accentuated by the perception that while the interests of some groups of the population are catered to by the central government, certain ethnic groups and states that are further away from the center resent the neglect shown to them over the years, resulting in the mushrooming of armed insurgent groups (Barua, 2006). Spear (1996) has suggested that availability of weapons has not only been a proximate and permissive factor in armed internal conflicts, but also a way to maintain and intensify these revolts. Around the world, internal conflicts have also begun between the government and insurgent or rebel groups (see Barua, 2006; Brown, 1996).

Terrorism drew the world's attention on September 11, 2001, when Al Qaeda attacked the twin towers in New York City and the Pentagon in Washington, D.C. On November 26, 2008, terrorism raised its ugly head once again, drawing the world's attention when Mumbai, the financial capital of India, was in the grip of terrorists for 4 days, resulting in the deaths of 188 people, including 22 foreigners. This technique of inflicting mass killing both in the United States and in other countries poses an urgent need for the international community to quell this threat.

Conclusion

Ancient Greek and Roman philosophers professed that being prepared for war is the way to ensure peace. However, with Al Qaeda carrying out its holy war in terror attacks around the world, the war is already on. The United States, under the presidency of George W. Bush, started the "war on terror," attacking Iraq and Afghanistan in an attempt to wipe out terrorists (although terrorists generally do not indulge in "conventional" war on the battlefield, making it extremely difficult to contest them). After two world wars, the United States was engaged in a Cold War with the USSR until the Soviet Union was dismantled in the early 1990s. In this millennium, the United States is invested in a war against terrorism.

An examination of the anthropology of warfare suggests that the current violence and warfare in the form of internal conflicts and global terrorism can be classified under all three clusters of theories as categorized by Otterbein (1994): material causes, efficient causes, and consequences. Material causes include physical environment and social structure. In this case, the rebel groups and terrorists are attacking the physical environment in an attempt to dismantle the current social structure against which they have grievances. Efficient causes include goals of war and military

preparation. Here, the rebel groups and terrorists are trained militarily in the use of firearms and sophisticated bombs, with their goals of war being to have their demands met; draw attention to their issues; and, in the case of *jihad*, convert people into believing in their religious ideals. Consequences include effects on social organization, survival value, and origin of state. Dissatisfied with the current social organization and afraid of losing their ethnic identities, several secessionist groups around the world are demanding their own separate states or countries.

Otterbein's (1994) unified theory of war, where structural and ecological approaches reconcile, suggests that it is time for a new kind of ecological adaptation, in which the established social structures that are present in the form of nations combine and achieve the highest possible level of military sophistication and make the defeat of terrorism a universal goal. The United States is already showing support to India and talking with Pakistan to end the reign of terror. The day may not be far off when the forces that are creating havoc around the world will be quelled as a result of the ecological adaptation of the affected nations.

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PART XIV

ANTHROPOLOGY TODAY

FOLK CONCEPTS

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Anthropology is strongly concerned with conceptual analysis in that a large part of its purpose is to penetrate and interpret cultural meanings. Unlike philosophy and psychology, both of which devote considerable attention to theories and techniques for studying concepts (which may be defined as “units of thought”), anthropology’s approach to concepts stresses cultural particularities or contingencies rather than universals. Anthropology’s distinct contribution to conceptual analysis lies in its method of eliciting concepts and meanings from people through participant-observation, which ideally involves extended and fully committed absorption into their community, during which the anthropologist not only conducts formal interviews but also aims to learn a culture at a personal level by observing and participating in community life.

This methodology, along with anthropology’s intellectual heritage in studying traditional, often nonliterate societies, makes the anthropological approach highly suited to the study of folk concepts. A folk concept is a notion that has a general, popularly understood meaning particular to a sociocultural grouping, but which has not been formally defined or standardized. Folk concepts are encoded in discourse, nonverbal behavior, and social practices rather than in published texts (such as newspapers, magazines, or books) or other media. They could, however, arise from folk interpretations of texts or other media. Folk concepts and other kinds of concepts penetrate each other in many

ways. For example, the practice of saying grace before meals may combine culturally specific folk practices with textually based religious teachings. The important point is that ethnographers discover and interpret folk concepts based on the study of human behavior rather than on texts. Once folk concepts are recorded in writing or other media, they are no longer undocumented; but unless such documentation causes a change in meaning and affects the way people know the concept, they remain folk concepts.

The folklorist Alan Dundes uses the term *folk ideas* and defines such ideas as “traditional notions that a group of people have about the nature of humanity, the world, and life in general,” “unstated premises which underlie the thought and action of a given group of people” (Dundes, 2007, p. 185). They are “part of the unconscious or un-self conscious culture of a people” (Dundes, 2007, p. 189). Such folk ideas are the building blocks of a worldview. Since people are not fully conscious of them, they must be “extrapolated” from folkloric data. Dundes overlooks the fact that many unstated traditional notions underlying thought and action do not directly concern the nature of humanity, the world, or life in general, but are significant only in some more limited sphere of life.

Folk concepts may be embedded in oral tradition or spoken discourse, but it is important to realize that many concepts are not verbalized, for example, knowledge about making craft items or tying knots, or the practice of saluting the flag as a sign of respect for the country. Since interviews

are carried out in language, nonverbal concepts are more difficult to interrogate than verbal concepts, and thus, they present a special challenge for ethnographers.

Emic Versus Etic and Related Distinctions

The emic/etic distinction refers to the distinction between the subjective or internal viewpoint on the one hand and the objective or external viewpoint on the other hand. This distinction, which can be most simply glossed as “insider” (emic) as compared to “outsider” (etic) outlooks, has been pondered by many anthropologists, most notably Kenneth L. Pike (who coined the terms) and Marvin Harris, and it underlies much anthropological work (Headland, Pike, & Harris, 1990). It is useful in locating the position of folk concepts in anthropological inquiry. Folk concepts are *emic*, meaning that they represent the insider’s viewpoint. The concepts anthropologists use to ground their inquiries come from an external perspective. The external perspective is called *etic*. Etic concepts are also objective, scientific, and operational, and they may yield measurable and falsifiable data. The etic perspective concerns behavior rather than folk concepts. But the etic approach is usually the starting point for the effort to elicit and explicate emic folk concepts. The emic/etic distinction underscores the need to differentiate between observed realities and informants’ statements. This does not mean that etic data are more important than emic data. Both approaches are needed in field studies, and they provide complementary data. Emic analysis of concepts is the linking of concepts to other concepts in a domain. Etic analysis is the linking of concepts to behavior and to outcomes.

Emic concepts emerge from data that are obtained initially through etic inquiries. For example, an anthropologist studying folk concepts concerning property will begin with anthropological notions about the characteristics and associations of property, such as those defined in detail in *Outline of Cultural Materials*, published by the Human Relations Area Files (Murdock, 2004). The starting definition of property must be shared by other researchers and based on objective characteristics. By asking questions about property in a vernacular language, it is possible to work up folk concepts about property in vernacular terms. These notions and definitions may express ideals, such as norms for the inheritance of real property. By observing transactions, the ethnographer may see how much these concepts guide behavior and whether actual behavior diverges from definitions and concepts. Descriptions of actual behavior pertaining to property (as locally defined) use etic terms. Emic data concerning unstated assumptions about property are treated to both emic and etic analysis.

Emic and etic knowledge are parts of different models of reality. Rappaport’s distinction between the cognized model and the operational model of reality is identical to the emic/etic split. The operational model includes

elements of which the actors are unaware (such as microorganisms and trace elements) but which affect them in important ways. The cognized model, on the other hand, may well include components, such as supernaturals, whose existence cannot be demonstrated by empirical procedures, but whose putative existence moves the actors to behave in the ways they do. (Rappaport, 1979, p. 98)

Related, too, is the distinction made between beliefs and knowledge, since knowledge is that set of beliefs that are objectively true, universally applicable, and can be verified empirically. In the context of health, for example, *knowledge* might refer to concepts such as the role of the mosquito in causing malaria, while *belief* might refer to ideas about malaria being spread by “bad air” or “miasma.” In environmental anthropology, too, there is a movement to document indigenous knowledge, which refers to factual, empirical knowledge of the environment and means of managing resources and to a differentiation between belief and knowledge.

Calling something a belief rather than an instance of knowledge suggests an etic perspective and implies that the phenomenon or statement represents something that is untrue or does not exist. The term *folk belief* suggests that something is erroneous and a potential obstacle to development. For example, thinking that a child’s illness is caused by a spirit attack may induce parents to seek help from a spiritual healer rather than a clinic. Pelto and Pelto (1977) pointed out that differentiating between knowledge and belief based on truth value puts the ethnographer in the uncomfortable position of having to judge whether a belief is true or not, whereas the ethnographer’s focus should be on the relationship between belief/knowledge and practice. For this reason, Pelto and Pelto think it may be useful for ethnographers to lump belief and knowledge into a single notion, belief/knowledge. To the extent that one wishes to emphasize that a folk belief is false, one might call such a belief a *folk fallacy*, as Dundes (2007) did. Other anthropologists, like Ellen, Parkes, and Bicker (2000), want to emphasize the content of folk concepts as practical knowledge.

Yet another important distinction of interest to anthropologists studying concepts is between cognition and affect. Belief and knowledge refer to the cognitive side. Affect refers to the emotional charge and associations that may involve the five senses. The affective side includes opinions, attitudes, and levels of emotional commitment to or rejection of something. To the extent that a folk concept has any affective dimension, part of conceptual analysis is to uncover that aspect.

The Ethnographic Method

Ethnography, the chief methodology of cultural anthropology, combines interviewing with observation and participation. The ethnographer is usually an outsider, and in many cases ethnography proceeds without an exact plan;

or, if there is a plan, then it is revised or even scratched as one discovers salient topics. Ethnographic research is often undirected (at least at first), because it may be impossible to know in advance which areas will come into focus. The informal, ad hoc quality of ethnographic research permits flexibility to focus on problems of which the ethnographer was initially unaware and to constantly revise and adapt techniques of inquiry. Through the discovery of salient concepts, the ethnographic project of explaining these concepts in depth emerges.

The ethnographic method generally aims for total cultural immersion, participation, and observation in addition to interviews and any other measures or tests. To the extent possible, and depending on the topic, the ethnographer lives in the community under investigation and thus can observe or join in activities whenever they occur, rather than going by the ethnographer's schedule. The practically unattainable ideal of total immersion underscores the goal in anthropology of accounting for the total culture.

The ethnographer begins with conversations and the informal asking of questions, and only later moves on to more formal methods. One of the first considerations is to establish relationships with interview subjects (informants) who will be sources of information throughout the study. Depending on the needs of the study, a sample representing different constituents of the community needs to be recruited. In any case, it is important to have good demographic data (age, sex, marital status, etc.) and to link all interview data to informants. Typically, a few informants will stand out as persons who can help explain data obtained from other informants. Some informants may stand out as "experts" in a given domain (hunting, for example). In such cases, it is useful to know by what standard the person is an expert and whether many others in the community agree with such an assessment. The variation in knowledge among individual persons, for example between experts and laymen, can be tested by using structured interviews. Garro used illness terms she had previously elicited and sentence frames ("Does ____ come from eating lots of 'hot' foods?") to examine consensus and variation in knowledge (or belief) between curers and non-curers in a Tarascan village.

Choice of informants is an important part of ethnography and needs to be analyzed rather than taken for granted, since informants are rarely selected randomly in a community study. One should check how representative of the community an individual is. One way to do this is to work with a broad variety of persons along with one's key informants.

Concept Elicitation

The goal of ethnography, as far as the study of folk concepts is concerned, is to explain how these concepts are understood and used by participants in their context of action and in relation to other concepts. Before they can be analyzed, concepts first must be identified. In a naturalistic

setting, concepts may come to the ethnographer's attention without direct interrogation. Once these concepts have been discovered and identified, the ethnographer can develop hypotheses about them that can be tested through interviews or conversations with informants.

For topics that rarely come up in normal conversations, it is possible to start with interviews only if one already knows which concept one wants to study. Naomi Quinn (2005), who studied American folk concepts concerning marriage and commitment, used such an approach. As an American woman, she already knew a great deal about her chosen topic. But her interviews were open-ended and undirected, with the only directive being that interviewees talked about their marriages. From these interviews, a small number of themes emerged that Quinn analyzed as metaphors.

Quinn used interviews to elicit information that would come out in ordinary talk but where regular participant-observation was not feasible, since marriage is not a subject that ordinarily comes up in public discourse. Interviewers took note of keywords and phrases used by interviewees along with paralinguistic and kinesthetic cues. They let interviewees talk with a minimum of interruptions or questions, with the hope of getting people to open up about their reasoning processes as shown in notions about cause and effect. Afterward, they guided each subject through a checklist of questions about all aspects of marriage in general, and their own marriages in particular, that had come up in the previous interviews.

In such an approach, concepts emerge through conversation and the informal asking of questions. The informal approach moves to a more formal method when terms or expressions are compiled that encapsulate what the ethnographer thinks are concepts, and interview subjects (informants) are asked questions about each term. In taking notes on the interview, the ethnographer records observations about nonverbal behavior as well as verbal answers. In many cases, it is useful to obtain information on affect and personal experiences relating to a concept.

Part of elicitation, beyond casual interviewing, is to get at those aspects of concepts that are below the surface of consciousness. Complex concepts are not explained just through words; one is informed about them through observation, practice, and sometimes participation. Anthropologists must strive to maintain objectivity in documenting not only their informants' subjectivity but also their own in this learning process, accounting for the effects of their presence in the mix.

The ethnographic method is chiefly descriptive and observational rather than experimental. However, certain experiments can be done with informants by having them perform a certain task or respond to a list of questions. The more formalized an ethnographic approach is, the closer it approximates experimental science procedures. An example of a semiexperimental approach is to have an informant name every plant he knows, while counting the number of

plants he cannot name within a circumscribed plot of land (Bernstein, Antaran, & Ellen, 1997).

A methodological problem is that a vocabulary is needed to elaborate a concept, even though the concept may not be a verbal one. For example, concepts about food involve the five senses as well as actions and behaviors involving food preparation, storage, eating, and so forth. The terminology of food may not reflect the full richness of the concepts. Yet, this vocabulary is an opening-up point for interrogation about food concepts.

Holy and Stuchlik (1983) maintained that the study of folk concepts (“notions”) is rather straightforward in terms of data collection but that the interpretation of these notions poses problems in terms of relating them to actions. People use and know about many concepts that they cannot define. The concepts’ meanings are obscure and inscrutable, even though they are used in actual practice. These complex concepts may be “fundamental notions.” Boyer (1990) gave as an example in the Fang concept of *evur*, which is generally glossed as “witchcraft substance” or “witchcraft organ” but which he says is far more complex, since “people have extremely vague views on what *evur* actually consists of and the mechanism of the action” (p. 26), even though they are clear about the effects of *evur* and the social relations revolving around *evur*-related actions. Boyer finds that these vague kinds of concepts, which he considers “vacuous,” tend to be the focus of traditional symbolism and practices. He notes that there are three kinds of discourse in which such concepts occur: common discourse, gossip, and expert discourse; only the last is both definite and reliable. Most people use such a concept and its verbal label without knowing what it really means. The same can be said about technical knowledge that is not mystified: For example, people use notions of electricity and telephony without knowing or understanding the science and technology underlying them. The “anthropology of experience” (Turner & Bruner, 1986) takes into account the processes by which concepts are learned and the feelings associated with learning and transmitting them.

When starting research, the ethnographer knows neither the criteria nor the limits of a domain. The “free listing” approach can be used to elicit terms that can provide information on the domain. By asking different kinds of informants to list all the kinds of X they know, it is possible to determine the salience of certain items and how knowledge of them is distributed within the society. This may help the ethnographer map the concept. More formal analysis can be used to determine the perceived similarities and differences between terms within a conceptual domain using sorting. Through successive sorts, it is possible to discern the clustering of data into taxonomies (Weller & Romney, 1988).

Informal interviews can be used to ask about the extent of a concept. In asking about spirits, for example, one might ask the informant to name every spirit known to him or her, along with the spirits’ attributes and locations and any other information about them. If the ethnographer can

obtain a comprehensive list using this technique, then the process is reversed by asking informants about each item (in this case a spirit entity) on the list. Such a method, when given to a range of informants, will provide a sense of the extent of a concept in its domain.

Symbolic and Cognitive Anthropology

A focus on cultural meanings spawned movements in cognitive and symbolic anthropology, both of which led theoretical developments and ethnographic practices in the 1960s and 1970s. Present approaches to the anthropology of folk concepts and meanings are descended from these earlier schools of thought. (Indeed, certain anthropology departments were closely identified with either cognitive or symbolic anthropology.) Cognitive anthropologists zeroed in on language usage, but their aim was to uncover the classificatory principles such as taxonomies and paradigms underlying identifiable domains such as property, kinship, or the spirit world. While the terms just used are etic, cognitive anthropologists sought to lay bare emic domains using linguistic models. Cognitive anthropologists viewed ethnographic description as specifying what one needs to know in order to function appropriately within a given role in a society as well as what is appropriate knowledge for behavior.

Agar (1966), a cognitive anthropologist, advised that to obtain information on folk concepts, one should get informants to contrast terms or sort them into categories or give them values (e.g., numbers on a scale, rank order based on a given criterion). The field of meanings of concepts is based on relations between terms. For example, A is a kind of B, A is used for B, A is part of B, A is a process of B. Questions are asked in the form of a frame, a sentence with a blank word to be filled in, for example, “A _____ is a kind of car,” or “A father’s sister’s husband is called _____.”

The symbolic anthropologists had a somewhat different agenda. The field of symbolic anthropology emphasized salient concepts that were thought to symbolize other things and have pervasive meanings relating to core values and ultimate realities. A classic example is the *mudyi* (“milk”) tree, which has a variety of emotionally compelling but contradictory significations in Ndembu culture, as analyzed by Turner (1967). Pointing out that the *mudyi* tree combines two polar aspects of meaning (natural/biological and sociomoral), he identifies the *mudyi* tree as a dominant symbol. Similarly, Ortner looks for focal, master, or “key” symbols in a society. As for how we would know that a symbol is salient, Ortner provides some helpful guidelines: (1) The natives tell us X is important, (2) the natives seem positively or negatively aroused by X rather than indifferent to it, (3) X comes up in many different contexts, (4) X is culturally elaborated through vocabulary, folklore, and so on, and (5) numerous cultural restrictions surround X. The symbols of interest to symbolic

anthropologists sum up and condense pervasive cultural themes and may metaphorically extend to views about life and the world.

Early cognitive anthropology was heavily linguistic, with language categories assumed to be equivalent to conceptual categories. Subsequent anthropologists in the cognitivist tradition, such as Maurice Bloch (1998), warn against a view of cognition that relies mainly on language, and they recommend the theory of connectionism, in which thought is seen to occur in clumps with multiple interconnections working simultaneously rather than sequentially. Bloch uses such an approach to explicate Zafimaniry concepts of the person, gender, and the natural environment, arguing that this knowledge, which “goes without saying” in Zafimaniry society, is best learned through ordinary participant observation rather than interrogation. Cultural knowledge is only partly lexical and is also tactile, visual, aural, gustatory, and olfactory. This view is shared by William Merrill (1988) in his study of Rarámuri (Tarahumara) religion, particularly concepts of the soul. Merrill found that folk concepts were tacit rather than explicit and were transmitted mainly through nonverbal practices such as community events, drinking parties, and healing. Depth psychology techniques akin to psychoanalysis may also be used to elicit folk concepts that are not verbalized. Ultimately, even these techniques rely on verbal statements. As a result, some ethnographers have attempted to learn techniques themselves through apprenticeship. Such an approach seems appropriate in gaining access to knowledge about arts such as weaving, sculpting, or dance.

The nonverbalizable concept is perhaps a material object, either crafted, like the Hopi *kachina*, or occurring in nature, such as the aforementioned mudyi tree in Ndembu culture. The ideology surrounding such objects can be complex. Among the Taman, the stones used by shamans in curing patients are supposed to be neither natural nor manmade but to have been transformed from pathogenic spirits during initiation ceremonies. These stones are central to healing practices in Taman society; their individual identities are revealed to practitioners in dreams (Bernstein, 1997).

Symbolic anthropology, previously concerned with abstract and disembodied meanings, has evolved into interpretive anthropology, with an eye open to practices, embodiment, and power relations. But the notions of symbolic and cognitive anthropology have both come to seem outdated, as succeeding generations of anthropologists search for fresh approaches to cultural meanings that will avoid the shortcomings of those fields: for cognitive anthropology, an exposition of trivial domains; and for symbolic anthropology, a sense of self-indulgence and unclear demarcations between folk concepts and the ethnographer’s own ideas and interpretations. Symbolic and cognitive anthropology have at times joined forces, and both fields can be revitalized by expanding their horizons

(Colby, Fernandez, & Kronenfeld, 1981), but future research on folk concepts will probably draw on theories of meaning and knowledge originating outside anthropology.

The Breadth of Topics

Anthropology’s involvement with folk concepts has spanned the gamut from “exotic” to “mundane” topics. Many scholars have observed and complained about anthropology’s stress on peculiar, exotic phenomena in the cultures they study and particularly on the conceptual systems underlying behavior. Keesing (1985) maintained that the tendency in anthropology to translate folk concepts as nouns rather than verbs gives them a mystical aura they would not otherwise have. This has the result of attributing to people’s belief systems invisible beings and mysterious substances. Folk concepts can get reified as well, because they are considered “traditional,” which implies that they do not change over time. Ethnographic studies carried over a given stretch of time cannot show whether or not a concept ever changes.

The more exotic areas of inquiry have involved concepts of illness in which folk terms for illnesses do not correspond to a single illness as defined in scientific medicine. This is often because the principles by which illness is defined are different from those used in scientific medicine. A classic study by Frake (1961) on Subanun concepts and vocabulary about skin ailments reflected classificatory principles of diagnostic criteria and levels of specificity. Through interrogation, Frake was able to reveal the structure of Subanun concepts about these illnesses. Even more exotic are culture-bound syndromes, which are specific to certain ethnic groups. These include *amok* in the Philippines (“running amuck”), *susto* (“magical fright”) in Hispanic America, *latah* in Malaysia, and *windigo* psychosis among North American Indian tribes. Although these may be said to be psychiatric disorders, they do not translate into any standard psychiatric categories and have culturally specific, often paradoxical, symptomatologies. An illness like windigo psychosis, which involves humans who are transformed into monsters who have cannibalistic urges, can only be understood in terms of folk concepts. Other culture-bound syndromes also have bizarre characteristics: *Koro* is characterized by a fear that the genitals or breasts will retract into the body, resulting in death, and *latah* is characterized by the blurring out of obscenities upon being startled (Simons & Hughes, 1985). These illnesses raise questions not only for anthropology (in the interplay and entanglement between emic and etic) but also in psychology and psychiatry about the ability to generalize cross-culturally about psychological processes and mental illnesses.

Another classic field for the study of folk concepts is the explanation of misfortune, including illness and death, in terms of magical human causation. This is obviously

connected to the work on folk medical concepts. Many have wondered whether a belief in witches and sorcerers is rational or whether it expresses an alternative rationality. The study of the rationality of beliefs in witches led to the question of whether foreign cultures can be understood at all. E. E. Evans-Pritchard's 1937 study of witch beliefs among the Azande people of the Sudan set off a long-standing debate among philosophers about the rationality of such beliefs and the comprehensibility of foreign cultural belief systems (Horton & Finnegan, 1973; Wilson, 1970). In addition to concepts about magical causation through witchcraft and sorcery, folk concepts about time have received considerable attention (Munn, 1992). These investigations reveal folk metaphysics.

A more mundane area for investigation of folk concepts has been the area of kinship studies, with anthropologists studying the principles whereby people were reckoned to be related to one another, and the meaning of vernacular kinship terms in both theory and practice. Here, too, anthropologists have sought to define dimensions of contrast and components of meaning. Much of the main research in the "ethnoscience" tradition of cognitive anthropology used componential analysis to account for levels of contrast used to define kinship terms. Any given language's list of kinship terms is small enough that an entire vocabulary can be identified, and one can study the dimensions of contrast between terms. The study of kinship concepts extends outward toward research on concepts concerning gender, age, and interpersonal relations, and inward toward concepts of the person or self.

As with conceptual analysis itself, the concept of the person or self is most frequently approached from the angles of philosophy and psychology. Anthropologists have challenged the supposition that the concept of the self is universal, noting that it is culturally shaped in many ways. Anthropology's role in studying the concept of the person is to reveal cultural patterns in these notions. One of the first such studies was A. Irving Hallowell's (1967) work on the Ojibwa Indians. More recent work has paid attention to notions about emotions, intentionality, action, hierarchy (as in race or caste), thought, and consciousness. Some, like Howell (1989), have linked concepts of the nature of the human being to larger cosmological systems and notions about life in traditional societies.

Biographical interviews, as well as folklore and origin myths, can yield data about culturally specific senses of the self. In some theories, the self is a social construct rather than a psychological one, and in some ways, the self is culturally constituted. According to Hallowell, culture provides multiple orientations through language: self-orientation, object-orientation, spatiotemporal orientation, motivation, and norms. Concepts can also relate to interpersonal relations, as with jealousy and commitment.

Another area for investigation of folk concepts has been the understanding of the natural environment, including concepts about plants and animals—how they are perceived,

categorized, and classified. While ethnobiology includes some exotic topics, such as supernatural characteristics associated with plants and animals, it is more frequently concerned with utilitarian issues, such as the usability of trees in construction or firewood. Most significant in ethnobiology has been the study of the hierarchical ordering of concepts and vocabulary about plants and animals from the most general to the most specific levels (Berlin, 1992). The study of ethnobiology also encompasses empirical knowledge about the natural environment and traditional means of managing resources (Ellen et al., 2000).

Mention should also be made of studies of sociopolitical folk concepts: value systems and notions about race, ethnicity, and other social groupings. A classic groundbreaking ethnographic study of sociopolitical concepts in a nonstate society is Edmund Leach's *Political Systems of Highland Burma* (1954), which looked at contrasting ideologies and theories of rival groupings about themselves and their enemies within a single larger society, the Kachin.

Folklore is an obvious source of data on folk concepts. Besides stories, legends, folktales, myths, proverbs, and axioms, data also come from jokes, riddles, songs, superstitions, and other genres. In addition to verbal and narrative arts, there are games, charms, handicrafts, and other nonverbal genres that come under the larger category of folklore. All of these involve conceptual systems.

Schema Theory

In understanding a cultural concept, it is not enough to know only what it identifies; one must also know the expectations, feelings, and motivations regarding it. In other words, part of the meaning of a cultural concept concerns associations causing happiness, anxiety, and other emotions. The full meaning of a concept is situated in a larger semantic field. In studying folk concepts, one also wants to know how much what it means or represents is valued, how much it is shared, whether it is considered true (e.g., Santa Claus is a ubiquitous and well-defined folkloric person representing many things, but he is not believed to be a real person), whether it is thought to represent the whole society, and whether it is associated with any restrictions or prohibitions.

The contemporary anthropological view of the meaning of concepts concerns schemas (or schemata), or cultural models. Schemas are the way people understand whole scenes. They are the unspoken meanings embedded in cultural models, and they include not only what a concept identifies but also the expectations, feelings, and motivations surrounding it. A schema is a simplified scenario; it may be well theorized, inarticulate, or somewhere in between. To understand the notion of schemas, one can imagine observing a high school setting and seeing students dressed in various ways, wearing different kinds of

accoutrements and accessories, and having different styles of behavior and speech. A knowledgeable informant might identify numerous subcultures among the students, each associated with certain television shows, kinds of music, preferences in food, automobiles, and many other things. These associations are the schemas. Schemas enable us to make sense of artistic works, such as paintings and photography, since they provide narrative stories implicit in a scene. The association of ideas in schemas works automatically in members of a culture (or subculture) but must be explained to outsiders and those who, like ethnographers, visitors, or journalists, are learning the culture. To master a kinesthetic procedure (such as weaving), it is necessary to practice it rather than just have it explained.

From interviews, it is possible to develop schemas. Agar and Hobbs (1985) gave an example of how such analysis might proceed in the case of a person telling the story of how he became a burglar. Their analysis shows causation and action in terms of behavior and identifies elements of the schema: hustling, fencing stolen goods, being ratted out, getting busted, and so forth. Quinn (2005), as noted above, also discovered and formulated schemas that she found embedded in narratives. She found the work to be highly laborious, since it required the collection of extended interviews, all of which needed to be transcribed. Only when she pored over multiple transcripts did the schemas emerge. In her analysis of schemas, Quinn reconstructed implicit, culturally shared assumptions from statements.

Psychological and anthropological approaches to schemas are complementary. Unlike the psychological study of mental models, the anthropological approach used by Strauss and Quinn (1997) among others (Casson, 1983) looks for shared cultural models that underlie and affect an individual's constructs. Psychologists, unlike anthropologists, examine the concept-formation process at an individual level.

In Shore's (1996) complex taxonomy of *cultural models* (his term for what others have called schemas), conceptual models, which he combined with expressive models, are but one of several functional forms of models, the others being orientational, spatial, and task-oriented. Conceptual/expressive models he divided into classificatory models, ludic models, ritual and dramatic models, and theories. For Shore, the most important cultural model is the foundational schema, which organizes and links other schemas together.

D'Andrade (1984) presented a readily accessible example of a cultural construct: the concept of "success" in American culture. D'Andrade asserted that success can be understood as a domain that can be elucidated through an explication of related terms that are components of success: accomplishment, recognition, hard work, prestige, self-satisfaction, and others. The model of success is used in many schemas, in that we can think of things that lead to success in a given domain of life. Within the domain of success itself, we can find putative causal relationships among terms. For example, hard work leads to recognition and is accompanied by self-satisfaction.

Future Directions

As an older, established academic field, anthropology is being swept up in a movement of new interdisciplinary formations and is being absorbed by other disciplines more than it absorbs other disciplines. As such, the future of anthropology is in its contributions to emerging fields of knowledge. The ethnographic approach to concepts fills a gap in a broad multidisciplinary science of cognition by focusing on culturally shared meanings and models. Possible contributions lie in science and technology studies, environmental science, and health studies, along with more traditional applied fields such as management and education. The ethnographic approach to folk concepts also has applications in consumer research and in settings such as offices, hospitals, and libraries, and in city and regional planning.

The emerging field of knowledge organization, which grew out of library and information science, is in a position to take advantage of the anthropological approach to concepts. Knowledge organization research not only tends to focus on documented knowledge but also recognizes undocumented modes of knowledge. Hjørland's (2009) survey of concept theory, in connection with frameworks for the theory of knowledge (empiricism, rationalism, historicism, and pragmatism), illustrates how the documentation and study of folk concepts fit into broader intellectual movements.

The growth of social networking over the Internet presents new opportunities and challenges for the ethnographic study of folk concepts in cyberspace. Sites such as Second Life create virtual worlds in which users interact through the use of avatars. These sites provide opportunities for persons to communicate, collaborate, and present themselves in ways never before possible (Turkle, 1995). In doing ethnography in such a space, anthropologists might choose to create their own avatars and interact with users in the virtual environment rather than try to meet informants in the flesh. Such an unorthodox approach can be justified by reasoning that the entire user community exists online rather than in "real life" and may never meet face to face.

In addition, many Web sites allow users to tag objects and ideas and to relate to others interested in the same domain (Weinberger, 2007). Web 2.0 technology has spawned social networking sites, such as Delicious and Flickr, that encourage users to label content with their own tags. Such tags have evolved into *folksonomies*, user-driven classification systems that bring out nonhierarchical relationships between individual tags. The concepts emerging from such environments are part of new cultural formations that transcend fixed locations. Such environments lend themselves to ethnographic research strategies, even though the particular techniques are vastly different from those of traditional ethnography. In a remarkable study, Jenkins (2001) was able to observe the underground culture of pedophiles entirely by gaining access to online child pornography bulletin board systems and reading messages posted by participants without downloading illegal images. Of course, the study of

cyberculture can also be integrated in to, or added on to, more traditional research methods. Ethnographers can also participate in emerging forms of interaction based on new information technologies, such as text messaging, instant messaging, and the exchange of digital audio, image, and audiovisual files.

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MIGRATION AND GLOBALIZATION

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Throughout the history of humankind, people have migrated. From ancient peoples crossing oceans in wooden or even reed boats to entrepreneurs traversing the globe on jet planes, migration is part of human existence. People have migrated to find food, safety, or shelter. They have migrated to flee enemies, to find work, or to practice their faith. Some migrations are local; others are within a country, across national borders, or from one continent to another. Once viewed as a sign of crisis, migration is now viewed as a normal element of human society. In a 1959 paper delivered at the 11th International Congress of Historical Sciences in Stockholm in 1959, Frank Thistlethwaite wrote that migration is central to the general human pattern, essential for the functioning of families, and crucial to the operation of the labor market. He went on to state that migration streams are as much a part of the history of the American people as Frederick Turner's frontier policy. To study history is to take into account the causes and effects of migration. Continually, humans have looked to improve their lives by taking the often dangerous but always wrenching step of leaving their homes and seeking a new place to live. Some people experience several migrations in their lifetimes; others never leave their homes.

Migration and Anthropology

Just as migration is not a new human activity, the study of migration is not a recent concern for scholars. Social

scientists have long recognized the importance of migration as a factor in social change. Geographers, historians, political scientists, sociologists, economists, and others have studied the causes and effects of migration for years. In 1885, E. G. Ravenstein published his laws of migration; this is the earliest systematic study of migration. These "laws" are generalizations on the characteristics of migrants as well as on their origins and destinations. Migration streams (flows) and counter-streams (return migration) are also included within Ravenstein's laws.

These laws have stimulated researchers over the years. Since the mid-1960s, the focus has been on migration as a system, examining migration streams and counter-streams as well as the effects of migration on sending and receiving societies. What is comparatively recent in the study of migration is the interest expressed by anthropologists. As a discipline, anthropology was a latecomer to the study of migration as a social and cultural process. Caroline Brettell (2003) stated that anthropologists did not write about what was happening in front of them, since the social and cultural aspects of migration did not appear to fit their modes of study. However, by the late 1950s and early 1960s, many anthropologists felt that migration should receive more attention as a source for research. Thereafter, studies of people moving from rural villages into cities as well as other migration streams began to populate the literature of anthropology.

Some Theories

In addition to developing an interest in migration, anthropologists worked toward developing a theoretical approach that would suit their discipline. Part of developing a theory was answering key questions as to why people move, who these people are, and what happens to them after they move. Political scientists and economists are generally interested in the migration flows that exist between countries and how they are shaped by policy or by labor markets. They and others have used the *push-pull* theory, showing how overpopulation and environmental deterioration in rural areas is the “push” toward migration, and the allure or attraction of the city is the “pull” aspect. Push can explain migration for income betterment. The pull may be job opportunities in addition to a desire to see a new place or try one’s wings. Sociologists tend to look at broader issues, the macro approach, concerned with the integration of migrating people into the existing population of a place. They focus on general studies of population, using categories such as race, sex, and occupation as the units of analysis. The microapproach looks at individuals and the reasons they choose to migrate. Anthropologists look at both the causes and effects of migration for sending and receiving societies and the effects of migration on the individual.

A recent viewpoint on migration that is appealing to anthropologists is the *meso* (societal) approach, looking at household and social networks as units of analysis. Rather than being strictly an economic decision, the decision to migrate is often shaped by social and cultural contexts, as was pointed out by Brian Du Toit (Du Toit & Safa, 1975). Individuals do not act on their own; families and households often shape decision making. This mesolevel, detailed by Thomas Faist (1997), encompasses social relations between individuals, families, neighborhoods, and friendship circles. These relationships form networks central to social relations. Many anthropologists see the network approach to migration as preferable to the economic, labor-needs approach. Migration is seen as embedded in social relations. The choice to migrate is determined by the experience of others, and the decision is made within a family. The move is assisted by relatives and friends. Douglas Massey and others suggest that networks promote migration, as each migration creates the social structure necessary to sustain it (Brettell, 2003). Over the years, different theories to explain migration have been used, amended, and sometimes rejected by anthropologists. Some of these are described below.

Modernization Theory

Much of the early work on migration within anthropology, up to about the mid-1970s, was influenced by the modernization theory. Originally developed around the turn of the 20th century, it was focused on development, as people flowed into the cities. An anthropological approach, developed by Robert Redfield in 1941, included a model

that opposed city and country and contrasted two distinct ways of life: traditional and modern. Within this theory is a focus on migrants making rational and progressive economic decisions with respect to leaving where they are and choosing where to live. Migrants were viewed as progressives who would bring new ideas to their communities. The main unit of analysis was the individual migrant. Modernization theory splits causes of migration into the push factors associated with a traditional society and the pull factors of developed areas. It encompasses a model of development in which the forces of resources and population pressure are equal, relying on the push-pull concept. However, research by M. P. Todaro found that migration was not entirely progressive and that high urban unemployment was an unlooked-for result of rural to city migration (Kearney, 1986).

Dependency Theory

Dependency theory relates economic relationships and processes at national and international levels. The focus is on a single world capitalist system and is not seen as progressive in that it results in the impoverishment of less-developed countries. Since this theory does not focus on distinctive local communities but is instead broad (macro) in scope, it has not been useful for anthropologists for specific fieldwork projects. Dependency theory is concerned more with the extraction of surplus and less with the flow of cash and goods in the opposite direction. It has generally been incorporated into the world systems theory, a global system, based on an international division of labor, producing commodities traded worldwide.

Historical-Structural Theory

Another theory to explain why people migrate is the historical-structural approach, framing migration in the context of global economy. With its intellectual roots in Marxist political economy, this approach stresses the unequal distribution of economic and political power in the world economy, and migration is seen mainly as a way of mobilizing cheap labor for capital. The unit of analysis in this theory is not the individual migrant but the global market, and the theory explicates how national and international economic and political policies have disrupted, displaced, and even attracted local populations, developing different migration streams. Within this theory, the individual is not an active agent but is manipulated by the world capitalistic system. This theory does not take into account cultural factors.

Articulation Theory

Originally formulated by Marxist anthropologists in the early 1980s, this theory rejects the world system to focus on the community and household. This theory is more useful to the anthropologist doing fieldwork, as it identifies

and isolates the domestic community. It theorizes how such communities are inserted historically and economically into the global world and narrows its focus to households. Concern with culture is central to this theory.

Transnationalism

A new theory is based in the concept of transnationalism, a social process whereby migrants operate in social fields that transcend geographic, political, and cultural borders. From this perspective, migrants are no longer uprooted by crises and forced to move; rather, they move freely back and forth across international borders and between different cultures and social systems. These migrants bring both social and economic changes to local communities. Nina Glick Schiller, Linda Basch, and Christina Blanc-Szanton (1992) described transnationalism as a way to view globalization.

Types of Migrants

A basic way to study a discipline is to look at the types within that discipline. Since its beginnings as a comparative and cross-cultural science, anthropology has relied on typologies to develop theories on similarities and differences. There are numerous types of migration: national and international, voluntary and involuntary, legal and illegal, return migration and transmigration, seasonal and nonseasonal, and that represented by sojourners and settlers. In 1961, Nancy Gonzalez described six types of migration by laborers: seasonal, temporary, nonseasonal, recurrent, continuous, and permanent (Gonzalez, 1961). Different types continue to be differentiated. In 1989, Gonzalez added another type to her 1961 list: conflict migration, describing migration prompted by violent conflict at home (Gonzalez & McCommon, 1989). Economic conditions, political situations, environmental issues, and even gender determine the different types of migrants.

Voluntary

Types of migrations can be broadly classified as voluntary and involuntary. This type generally encompasses those who migrate for financial reasons, such as for jobs.

Seasonal

The most common migrant is the seasonal worker who travels, both nationally and internationally, to work, mostly in agricultural industries. Generally, the migration is temporary and driven by crops to be harvested. Such seasonal migrations have continued over the centuries. For example, through much of the 19th century, northern Italians migrated to nearby countries in the spring and returned home in the fall. This type of migration can be viewed as voluntary despite

the fact that the migration is dictated by environmental and/or economic reasons. Seasonal migrants may also be described as recurrent, reflecting the generations of families who have traveled to pick crops.

Temporary

Brian M. Du Toit discusses three types of temporary migrants, including the weekly commuter, the seasonal migrant who returns home, and the sojourner whose point of reference is back home in his village despite years spent in a city (Du Toit & Safa, 1975). Temporary migrants aspire to return home. A type of temporary worker is the guest worker, also called the *gastarbeiter*. In the post-World War II economic boom, almost all northern European countries actively recruited contract labor migrants, mostly men—Portuguese, Italian, Spaniards, Turks, and Yugoslavs—who traveled to northern European cities. These blue-collar migrants worked mainly in manufacturing and construction. The host countries expected that these workers would remain for a short period of time and then go home.

In the 1960s, to assuage a labor shortage, Turkish guest workers were recruited by the Foreign Labor Office on behalf of industries in West Germany. The program, which resulted in one of the largest migrant populations in western Europe, was supposed to be a temporary fix. Migrant workers were regarded as temporary labor units, which could be recruited, used, and sent away again once they were not needed by employers. In reality, many did not return home, and although the practice was discouraged by the West German government, their families joined them. Their presence caused a major problem as the “guests” began to establish ethnic communities. What started as a temporary migration resulted in a permanent residence. However, the social costs for providing housing, education, and health care for the migrant families became burdensome on the host communities. By 1974, such contract worker migrations to western Europe had ceased.

Permanent Migrants

Although originally these migrants plan to return home, they do not. If they are not successful in their new community, they may be ashamed to return home. Some marry local residents, and others may prefer the host society to home. Permanent migration might involve never returning to the home country or returning often and maintaining strong family and friendship networks. Some permanent migrants hold dual citizenship. These temporary-turned-permanent residents may be essential to social networks, providing support to newcomers. As these networks are established, so are communities of ethnic minorities, fueled by new arrivals and stabilized by permanent migrants.

Sojourners

These migrants plan to return to their home, but frequently this is postponed. Unlike those who migrate for a season, usually for agricultural work, those working in commerce or industry generally have no need to coordinate their length of stay with the seasons and may stay abroad for a number of years, depending on their purposes. In her study of Brazilians in New York City, Maxine Margolis (1995) noted that they see themselves as sojourners, temporarily in the United States to save money to fill a specific need back home, whether to buy an apartment, start a business, or return to school. Sojourners include technicians, engineers, and businessmen. Others are small retailers and middlemen who follow the migrants from their countries to supply them with goods and services. Many sojourners spend their working years abroad and return home to retire. Others do not return home, because they have made permanent homes abroad or because they fear oppression and violence in their home countries. Sojourners may have a major economic impact on their countries of origin by sending money home.

Returnees

In 1977, the “new” topic of return migration was proposed for the annual meeting of the American Anthropological Association, to develop a conversation on Donald Bogue’s statement that for every migration stream there is a corresponding counterstream flowing in the opposite direction. The proposal was rejected, but a few years later the topic had become important in the discipline. George Gmelch, in 1980, defined *return migration* as the “movements of emigrants back to their homelands to resettle” (Gmelch, 1980, p. 136). Others, such as Nina Glick Schiller, discussed the relationship between return migration and the transnationalism of a global economy (Schiller, 1997). Return migrants do go back to live in their sending communities. Most studies show that strong family ties, rather than financial factors, determine the desire to return. Bad times at home can both push the migrants away and bring them back home. Sometimes the decision to return is influenced by negative or push factors in the host country. For example, Jamaican migrants in Britain encountered extreme racial prejudice and discrimination. Others decide to return due to an inability to adjust to a new climate. Those used to warm climates may be unable to adjust to the cold North American winters. When the economic prospects do not materialize and the migrant finds the streets are not paved with gold, he or she may be forced to return home.

On the positive side, returnees not only bring back money but may also bring back new skills, ideas, and lifestyles. Some settle with other returnees, being unable or unwilling to resume their place in their home country. Other returnees who were not financially successful in the

host country return home to resume the life they had led before. Those who worked lower-level jobs abroad had no higher skills upon returning and generally will not migrate again. Returnees who move frequently between two or more places, such as in seasonal labor migration, may be referred to as circular migrants.

Involuntary

Involuntary migration, also called forced migration, is caused by human-made or natural disasters. National disasters may be crop failures, such as the one that resulted in the 19th-century potato famine in Ireland, earthquakes, floods, or volcanic eruptions. Human-made causes include war and the persecution of racial, ethnic, and religious groups, as well as political dissenters. In previous centuries, both indenture and slavery were types of forced migration. Even though those migrating as indentured servants or laborers may have been given the carrot of freedom after a number of years or signed a contract to receive a sum of money, often their lives were more like those of slaves. Slavery was forced migration; after the abolition of the slave trade in the early 19th century, this type of forced migration generally ended. Unfortunately, it still exists in the sex trade “industry.” By the time of World War II, the indenture system had basically ceased.

Refugees

A continuing type of forced migrant is the refugee. Although most refugees decide to leave their countries of birth because of oppression, unlike slaves, they can choose where to go. Often that choice is linked with labor opportunities and/or existing social networks. In 2002, Ted Lewellen described the 20th century as the Age of Refugees, estimating that 100 million people have been uprooted by war and the threat of political violence during this time. Since the mid-1980s, the number of refugees has dramatically increased. According to the 1951 United Nations Convention Relating to the Status of Refugees, a refugee is a person living outside of his or her country who either is unable or unwilling to return to the home country due to fear of persecution principally because of race, religion, or nationality. Once these types of migrants are officially recognized by the United Nations as refugees, they have a legal status and are protected by the United Nations High Commissioner for Refugees, making them better off than other forced migrants.

In some instances, mass migrations of refugees may present a military threat to the host country. They certainly create a demand on the resources of host countries. The strain on a country’s social services and physical infrastructure as well as the impact on local economic conditions may destabilize developing countries. Gil Loescher, in 1995, noted that the great majority of refugees seek safety in the world’s poorest states (Cohen, 1995). There is also a concern that

mass migration will alter the ethnic, cultural, religious, and linguistic composition of the host country.

The study of refugees by anthropologists is relatively recent. In 1988, the Committee on Refugees and Immigrants was established within the General Anthropology Division of the American Anthropological Association. Some scholars equate refugees with politics and others with environment, making the study of refugees complex.

Legal and Illegal (Undocumented)

Most migrant streams are “legal.” Migrants have permission to leave their regions and/or countries and to relocate to a new region and/or country. Yet there is a group that may be regarded as either legal or illegal. Between the early 1970s and the late 1990s, the numbers of people seeking political asylum increased greatly. Although many seeking asylum are rejected, a large share of those who apply for asylum are able to remain in the countries where they had applied for legal status. Some say the asylum seekers are “economic” migrants, looking for work rather than political asylum and abusing the asylum systems. Others argue that asylum seekers are genuine refugees. Appeals for legal status as a refugee may take years, leaving the seekers in a type of limbo. In some countries, they are not allowed to work. Illegal (undocumented) migrants are a growing concern, particularly for host countries. The potential for illegal flows is greatest in the areas where poor countries are near or share a common border with rich countries, such as between the United States and Mexico. Illegal workers tend to be low skilled and tend not to bring their families with them, for fear of increasing the probability of their illegal status being detected. With globalization, there has been an increase in illegal movements and people smuggling.

Chain Migration

Of increasing interest to anthropologists is chain migration, particularly the resultant social networks. Chain migration involves social arrangements that aid people moving from one place to another. It is the process by which prospective migrants learn of opportunities in a new place, are provided with transportation, and have initial accommodations and employment arranged by previous migrants. Complex networks provide information and support all along the line and are self-perpetuating as new networks form and expand through marriage and friendships. Some equate the network to a spider web rather than a chain, and many of these networks are extensive. One study of migrants in a single pueblo in Mexico found no less than 110 destinations in the United States. The linking of people from specific places of origin in one country to specific destinations in another can be viewed in the development of ethnic clusters in various neighborhoods. Studies have shown, for example, that Jewish immigrants from Poland settled in streets on the

lower east side of New York different from the streets occupied by Jews from Russia, Hungary, and Romania. More than 90% of the immigrants to Australia during the first half of the 20th century came via the chain migration process. As labor markets expand beyond the boundaries of a particular nation, both companies and governments may look abroad for employees, skilled and unskilled. The migration policies of industrial democracies have given priorities to close family ties in selecting migrants for admission. Therefore, chain migration has become a dominant pattern in long-term migration.

Globalization and Transnationalism

Migration is part of the human story. It can be seen in stories of ancient peoples crossing the sea and in the 20th-century research of Thor Heyerdahl detailing the voyages of those traveling from South America westward on the *Kon Tiki* and those traveling eastward from Africa on the *Ra*. Within countries, people migrated from rural lands into developing cities. After 1870 and the development of the steamship and steam railroad networks, migration increased dramatically. This era of mass migration ended in 1914 with World War I. Following that war, there was a decline in migration, but after World War II, due to rapid and sustained economic growth, a new age of migration began. By the end of the 20th century and into the 21st, migration flows became more global in scope as well as more complex and diverse. The word *globalization*, as defined by Michael Kearney in 1995, refers to “social, economic, cultural, and demographic processes that take place within nations but also transcend them” (p. 548). Globalization relates to behaviors and to institutions that affect more than one state. It describes an intensification of worldwide social relations, linking distant places, with the result that local happenings are shaped by events occurring many miles away and vice versa. One of the central aspects of globalization is the growth of cross-border flows of people and the proliferation of social networks connecting migrants to their home communities.

National (Rural to City)

Some of the earliest waves of human migration in modern history were from the countryside into the developing cities or from one rural area to another. Past migrations have nearly depleted the countryside in industrialized countries. Some years ago, two thirds of the population in Latin America, Asia, and Africa lived in rural areas. A little more than a generation later, two thirds would be urban residents.

International (Global)

Modern international migration differs from that of previous centuries; in the 19th century, for example, migration

was usually a one-way movement, with major streams of migrants leaving Europe and Asia for North America. Since the end of the Cold War, migration has taken on a more global aspect, partly due to the ease and speed of transportation as well as global communication. With the global explosion in mass communications since the late 1980s, particularly satellite television, many people in third world countries have become aware of the supposed affluent lifestyles of rich countries. Many are attracted to the consumer culture that appears available to them, and the costs of long-distance moves are within the reach of poor families, which was not the case 150 years ago.

Stephen Castles, in the book *The Age of Migration*, commented that international migration is “part of a transnational revolution that is reshaping societies and politics around the globe” (Castles & Miller, 1998, p. 5). International migration is also seen as a consequence of global inequalities in the distribution of wealth and power, and international migration flows are almost always from poor to richer countries. Types of migrants include not only permanent migrants, seasonal workers, and refugees but also students, military personnel, businessmen, and even tourists, since such short-term movements may lead to subsequent long-term ones. Unlike earlier waves of migration, current migrants are reflecting the worldwide shift from a rural agrarian base to an urban-industrial base in the economies of most third world countries. With the growth of multinational companies and international capital transfers, international movement of labor within firms and their foreign associates has become possible and basic to globalization.

Transnationalism

In the 1960s, the word *transnational* referred to corporations with established bases in more than one state. The word evolved to also represent ideas and political institutions that went beyond national boundaries. Now, the meaning of the word *transnational* overlaps that of *globalization* but with a more limited scope. In the 1990s, the study of transnationalism as a system of migration became a focus of a group of anthropologists. In anthropology, transnationalism describes the flows of culture and population across national borders. It not only explores how immigrant populations adapt in new cities but also how they maintain connections with their societies of origin. Previous generations of migrants generally attempted to make a clean break from their home societies, but transnational migrants continue to maintain ties with the communities they left. With the rapid improvement in the technologies of transport and communication, it has become relatively easy for migrants to stay in touch with those back home. These developments also facilitate the growth of circular or repeated migrations, in which people migrate regularly between different places where they have economic, social, or cultural ties. Transnationalism also involves questions relating to ethnicity and ethnic identity.

Basically, it updates the older assimilation model in which newcomers worked to become part of the existing culture. But it also addresses the potentially serious consequences for national identity, as some migrants are not willing to let go of their own ethnic identities and merge into or adopt into those of the receiving society.

Schiller, Basch, and Blanc, in their 1995 study of transnationalism, have detailed forces in the global economy that lead people to live transnational lives while migrating to countries that are centers of global capitalism. One such force is deteriorating social and economic conditions in both labor-sending and labor-receiving countries; another is racism in the host countries. A third force is nation building in both home and host societies, where political loyalties are encouraged in each nation-state where a migrant maintains social ties. Sometimes migrants become “long distance nationalists” in their devotion and connectedness to their “home” country.

Globalization and the New Migrants

Within a global world, migration is similar to the streams of the past, yet different. The former waves of mass migration were more a continual stream of people, traveling usually from underdeveloped third world countries to countries in which they could improve their economic and sometimes social status. Globalization has created a new migration market, organized by labor recruiters and migration agents who can make a profit from migration, whether legal or not. With globalization, new types of migrants have emerged.

Transmigrants

Studies of globalization look at the connections that migrants maintain and build across international borders. As defined by Schiller, Basch, and Blanc, transmigrants are those whose “daily lives depend on multiple and constant interconnections across international borders and whose public identities are configured in relationship to more than one nation-state” (Schiller, Basch, & Blanc, 1995, p. 48). Transmigrants may hold dual citizenship in two or more countries. They maintain ties with their home countries and become involved with the economic, social, religious, and political spheres of both their sending communities and their host societies. Some home countries, such as Portugal, actively encourage the loyalty of their citizens abroad because of the benefits these migrants bring to the home country. Benefits include not only money sent to those back home but also the investments of citizens abroad in businesses and real estate in their home countries.

Brain Drain

Characteristic of globalization, migrant types include more skilled labor. These are the professionals, executives,

technicians, and other highly skilled personnel who travel around the globe, sometimes on their own, marketing their skills for lucrative returns. Large international companies transfer skilled employees to different locations. Because some large employers have shifted production to places where production is possible at lower wage levels, usually in third world countries, they transfer managerial and technical staff to supervise operations. These migrants are usually university-trained people who move from less-developed to highly developed countries, and their leaving may lead to shortages of skilled personnel at home. Being a student is often a precursor to migration of skilled workers. Those students who leave their home countries for educational opportunities in developed countries stay on following graduation. Many students in developed countries are from Asia and have concentrations in business or information technology. Sometimes educated people migrate because they cannot find work in their home countries. Employers in receiving countries are eager to welcome skilled migrants; the reverse is generally true for the unskilled.

Middlemen

Although middleman minorities have been following migrant streams for decades, this type of migrant is particularly significant in a globalized world. These migrants include small retailers and international merchants. They are small-time money lenders, loan sharks, and international financiers. Middlemen facilitate the movement of goods between the producer and a specific set of consumers within a community in which others are the majority of the population.

There is a cultural difference between the middlemen and those they serve. Middleman minorities do not represent a particular race or culture. Some are Middle Eastern; some are Asians. Many live in cities, and their high levels of concentration in one or a few cities in each country suggest a social need for contact with their fellow middlemen. With the passage of time and acculturation of later generations to the world of the host society, these concentrations lessen.

Some believe middlemen are parasites, preying on those ignorant to the ways of their new communities. Many feel that making money by simply transferring a product to the consumer without changing the product but charging more for it is morally wrong. For example, money lenders who demand to be repaid more money than they lent have been condemned through the ages.

Diaspora

Diaspora is a term used to describe practically any population that is considered “deterritorialized” or transnational. This word often implies a forced dispersal of people, as well as an emotional relation to the homeland. These populations have originated in lands other than those in which they currently reside, and their social, economic, and political networks cross the borders of nation-states and

may even span the globe. At one time the term *The Diaspora* referred almost exclusively to the experiences over the ages of the Jewish people, exiled from their homeland and dispersed throughout the world, with always the dream of return. More recently, the term has been applied to other populations, such as the Armenians and even the Palestinians. Although globally dispersed, diaspora populations are self-identified ethnic groups. In some cases, the sense of commonality on a worldwide scale provides a key to their success in the new global economy as they pool resources, transfer credit, and invest capital within the organizations they create and within families and extended family. However, the people maintain a collective memory or a dream of their ancestral home to which they long to return. If the homeland no longer exists, they are committed to restore it. They are generally not accepted within the countries where they have settled.

Further Directions

Because of the rising significance of migration in political, economic, and security concerns, interest in migration theory and research has increased. Current research is less focused on migration flows and more on how people react to a global society and how globalization has impacted adaptation and cultural changes. Such research in the field of anthropology has focused on questions of identity and ethnicity as well as community and social networks, kinship structure and family migration strategies, and gender as it relates to migration.

Networks

Networks are a relatively new topic of study for migration scholars and are important in that they play critical roles in a person’s decision to migrate and his or her success in the host country. Not simply groups of family and friends who provide information, resources, and assistance to migrants, networks are more far reaching. Migration networks can consist of institutions as well as individuals and be national as well as transnational in scope. Networks can include multinational corporations, recruitment and travel agencies, government institutions, and financial institutions. The networks help with expenses, they aid the migrant in adaptation into the new society, and they maintain links to the original society. Douglas Gurak and Fe Caces (1992) have studied the various functions of migrant networks, including linking communities of origin and destination, serving as channels for information, and insulating migrants from the negative aspects of living in the host society as well as aiding in their adaptation to it.

Migration has become an industry due to these developing social networks and transnational links. Many people make their living organizing both legal and illegal movements of people. Travel agents, labor recruiters, brokers, and lawyers specializing in immigration law focus on

legal migrants. Others who smuggle humans across borders focus on the illegals. Some institutions, such as banks that set up special transfer facilities, help migrants to send earnings (remittances) back home. Shopkeepers, priests, teachers, and other community leaders work to facilitate the well-being of the migrant.

Yet there are those who prey on migrants. Part of the migration industry is organizations devoted to smuggling and trafficking migrants. The difference is that smuggling is illegal and for profit, yet the migrants are knowing partners in a commercial transaction: paying exorbitant fees to be secretly moved across borders or landed on foreign shores. Human trafficking implies sale of a person's sexual services or labor in the country of destination. The trafficking of women and children for the sex industry is a global enterprise.

Gender

In the 1960s, feminists declared that women were hidden from history. This is also true with the study of migration, and a major new focus in anthropology relates to gender, specifically the migration of women. Historically the study of migration related to the movement of men. It was assumed that women migrated as wives or daughters or as the second of a two-step male-female process: The man migrated first, established himself, and then sent funds enabling his wife and family to join him. Some women waited at home for husbands or fiancés working somewhere else, trying to improve their finances.

The reality is that some women migrated alone, as adults, seeking jobs or land. Some, once established in a new place, refused to return home because of personal gains they had made in the new country. Such is the case with Christian nurses from the state of Kerala in India. There, traditionally, the profession of nursing for women was considered "dirty" because it was forbidden to speak with unrelated men. Yet nursing has become a path of upward mobility and independence for women. Rather than remain in India, subject to low status, low pay, and dismal working conditions in Indian hospitals, nurses have migrated to the United States. Such a migration is a reversal of gender roles, because the woman moves first to become the breadwinner. Husbands and families follow.

Brettell (2003) noted that in the late 20th and early 21st centuries, migration patterns have changed. Often women are the first to migrate, and in some international migration streams, they outnumber the men. She cites studies of Caribbean women migrating to the United States to illustrate her point and mentions that the increasing numbers of women involved in both internal and international migration flows have led some scholars to write extensively on the feminization of migration. Women who migrate may become domestic workers, may work on assembly lines for multinational industries, or may labor as garment workers, and young women may become prostitutes as part of the growing global sex industry.

Another aspect of gender and migration has to do with those women who remain at home and become the heads of households in the absence of their men. They are empowered by having to deal with issues of daily life as well as crises, and they have a break from childbearing. When the husband is sending back money, their economic situation improves.

Conclusion

For thousands of years, migration has been a major social phenomenon. Although modern migrations are not as dramatic as the earlier migrations when people took often terrifying journeys, forced and by choice, migration during the 21st century is vital to the globalization of the world. Yet moving continues to have many and often heavy costs that are not just financial. To go to a new place searching for work or a new home involves severing ties to family and familiar places. Dangers today are not those encountered in previous centuries as people were crammed into wooden ships that were at the mercy of storms and rough seas. Today's migrants are subjected to increasingly stringent immigration policies, and they are scrutinized and often feared by residents of the host country.

Migrants, in addition to their varied aptitudes for labor, bring their culture from their countries of origin. Yet over the years, migration has continued to be from poorer countries to more prosperous ones. Few American engineers and doctors migrate to poor countries. India sends engineers and physicians to the United States, but lower-skilled contract labor goes to the Middle East. The political and economic impact of migration on both sending and host countries is substantial. As some countries lose a vital, skilled labor force, other countries are impacted by unskilled labor forces in need of jobs. Politically, migration policies have been developed and rewritten because of changes in the types of migrants.

Migration is no longer limited to shifts of families from country to city but now involves wholesale population movements across national boundaries and into different cultures and economies. By the end of the 20th century, worldwide, there were about 100 million people residing outside their countries of citizenship. The causes and consequences of migration have changed since before World War I. And unlike in the past, migration flows now go mainly between countries in the global South. Flows toward the global North face increasing restrictive immigration controls from governments.

The 21st century has been called the Age of Migration. Migration has changed the world and many of its societies. Both developed and less-developed countries have become more culturally diverse. Ethnic diversity, prompted by migration, has been welcomed in some areas and seen as a threat in others. The extreme example is ethnic cleansing. Although many saw the emergence of international migration as a force for social change, others saw it as a source of conflict. Problems of diverse ethnic groups living together and

increasing difficulties with immigration policies and security are also characteristic of this age. One aspect of this problem is that modern migrants reject assimilation as a mode of adaptation. They do not want to be part of a melting pot, like those of previous centuries; they wish to maintain their own ethnic identity within a new multicultural world.

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GLOBALIZATION

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Globalization is an inconsistent concept, and definitions of it abound. However, most anthropologists agree that, experientially, globalization refers to a reorganization of time and space in which many movements of peoples, things, and ideas throughout much of the world have become increasingly faster and effortless. Spatially and temporally, cities and towns, individuals and groups, institutions and governments have become linked in ways that are fundamentally new in many regards, especially in terms of the potential speed of interactions among them. Examples of these interactions are myriad: The click of a mouse button on a Wall Street computer can have immediate financial effects thousands of miles away on another continent, and events like the fall of the Berlin Wall in 1989 or footage of the 2005 tsunami in southern Asia can be televised internationally, whereby millions of viewers interpret the same images concurrently.

Beyond these shared perspectives on and approaches to globalization, anthropologists disagree with one another in important regards. The first concerns the “what”: Does globalization name a more-or-less singular and radical transformation that encompasses the globe, in which technoeconomic advancements have fundamentally reorganized time-space, bringing people, places, things, and ideas from all corners of the world into closer contact with one another? Or, is globalization a misnomer, even a fad, a term too general to describe a vast array of situated processes and projects that are inconsistent and never entirely “global”?

A second discussion concerns the “when”: Is globalization new—do we currently live in the “global era”? Or, has the world long been shaped by human interaction spanning great distances?

These debates are not limited to two opposing sides. Some scholars feel that these very questions blunt meaningful analysis of the contemporary world and all of its nuances. By focusing largely on absolutes—that is, what is entirely singular versus wholly chaotic, what is radically new versus something predicated largely on the past—important questions are passed over. For example, what are the specific mechanisms of human interconnection and the particular histories in which they are embedded?

Anthropologists do agree, however, on how to best go about investigating globalization: through long-term, intensive fieldwork, either in a single locality or in several linked analytically together. This fieldwork is ethnographic; that is, it seeks an intimate understanding of the social and cultural dynamics of specific communities, as well as the broader social and political systems they negotiate. In a world of intensifying social relations, ethnography requires engagement in both empirical research and critical theory.

Anthropological attention to ethnographic detail is an important rejoinder to a vast globalization literature centered on macro phenomena, such as the relations between large-scale political and economic bodies like nation-states, political unions, trade organizations, and transnational corporations. Undoubtedly, these “translocal” entities

are of great anthropological interest as well. Yet the discipline has taken as its goal the understanding of how specific subjects respond to and act within these large-scale processes, institutions, and discourses through culturally specific lenses. Thus, anthropology's contribution to this literature lies in its assertion that social change, viewed in both distance-defying connections and inequitable disconnections within the world, can be compellingly grasped in the daily practices of individuals and the groups, institutions, and belief systems they inhabit.

It bears emphasis that a researcher cannot simply board a plane to "the global." The empirical aspects of human social interaction—while facilitated by the "placelessness" of systems and structures like international finance networks, religious chat rooms, or television broadcasts—are produced, interpreted, and negotiated by people in particular places. It is for this reason that the ethnographic method has continued to define anthropological research, even as it pertains to globalization. The ethnographic emphasis has long been to follow the question, the person, the commodity, or the idea—all things that are continually mobilized or constrained by human activity. As will be argued in further detail below, anthropologists have tended to warn against the erasure of human agency in depictions of such interaction, and the discipline's commitment to research continues to inform this warning. Some anthropologists have gone so far as to argue that empirically thin accounts of globalization, especially those that embrace it as a natural and ultimately unavoidable force in the world, actually obscure the means by which unequal relations of power are forged. The argument is significant, as anthropologists generally agree that the ability to define globalization and steer discussions pertaining to it greatly informs the decisions of wealthy and influential policymakers.

Earlier Attempts to Grasp Translocal Phenomena

While often understated in current anthropological scholarship on globalization, early anthropological attempts to grasp translocal phenomena greatly influenced the discipline's development. Indeed, anthropology has a history of engagement with translocal phenomena and has long argued that exchange across sometimes vast distances has been and is common to human social interaction. Arguably the first incarnation of such a notion is seen in the works of late 19th- and early 20th-century diffusionists, who held that cultural change was a product of initially distinct cultural traits being appropriated and dispersed among individuals and groups over great geographic distances. Franz Boas, often called the father of American anthropology, saw diffusionism as a corrective to unilineal evolutionary conceptions of culture change, which articulated the development of cultural traits as a product of independent and isolated trial and error rather

than as a product of permeable social worlds facilitating cultural exchange. Boas argued as follows:

It would be an error to assume that a cultural trait had its original home in the area in which it is now most strongly developed. Christianity did not originate in Europe or America. The manufacture of iron did not originate in America or northern Europe. It was the same in early times. (Boas, 1932, p. 609)

A fellow critic of cultural evolution perspectives during Boas's time, Bronislaw Malinowski spent over two years in the Trobriand Islands examining the kula ring, a regional system of exchange that Malinowski (1922) claimed functioned to maintain social solidarity and enhance status among males bestowing necklaces and armbands upon one another. Malinowski is most widely renowned as an early practitioner of participant observation, but Malinowski's study also required him to practice multi-sited research, which is now seen as a sometimes necessary mode of fieldwork to "follow" translocal phenomena.

Two other anthropologists informed by functionalism and influenced by Malinowski's study of nonmonetary exchange were Mauss and Ortiz, both of whom produced works that challenged readers to think beyond the local. Mauss's *The Gift* (first published in 1923) explored the historical beginnings of translocal systems of exchange that often brought about social cohesion through gift giving and reciprocity. Mauss cited examples of this exchange among groups in the South Pacific region, as well as in North America. Originally published in 1940, Ortiz's *Cuban Counterpoint* developed the concept of "transculturation" to describe the different phases of cultural hybridization between ethnically diverse groups (many of whom were arriving from foreign lands) in Cuba under colonialism. Ortiz further argued that the production and export of Cuban commodities like sugar and tobacco came to be deeply entangled with European and U.S. interests.

While the above works demonstrate early insights into the relationships between relatively small populations and an outside world, it is common to read of early 20th-century anthropology's insular emphasis on closed, internally coherent cultural systems. Leach's *Political Systems of Highland Burma*, first published in 1954, was a powerful response to the "bounded" conceptions of cultural change, as he took a regional scale as his point of entry into the indeterminate dynamics of identity formation in Burma. Leach also emphasized the power and creativity of individual actors to shape culture beyond local contexts.

The 1960s and the two decades that followed were formative in the history of anthropology's engagement with large-scale processes. The political turmoil of the "liberty," anticolonial wars, and rising nationalism in the global South during the 1960s are commonly cited as the greatest impetuses of this engagement. In addition, a principled dissatisfaction with the trajectory of anthropology and social science disciplines in general informed the

reanimation of the Marxist approach known as political economy. Much of this dissatisfaction stemmed from a lack of engagement with political economy's most central concerns: the nature of material production, class, and power.

Broadly conceived, the political economic approach within anthropology was utilized to understand the relations between large-scale processes of economic and political change and specific (usually subaltern) communities. The anthropological approach was heavily influenced by the "world-systems" theory of sociologist Immanuel Wallerstein and "underdevelopment" perspective of economist Andre Gunder Frank. Both of these thinkers emphasized the imposing gravity of the European- and American-dominated world economy. Concisely, this world economy provided a framework by which Western, or "core," economies could systematically exploit the non-Western, or "peripheral" nations of the world through the appropriation of their economic surpluses and labor. This perspective laid out a significant critique of economic modernization theory, for both Wallerstein and Frank stressed the causal relationship between worldwide capitalist expansion and subaltern subjugation, or development and underdevelopment.

A common perception among anthropologists sympathetic to political economy was that the "periphery" category was too generalized and unnuanced. Anthropologists believed that their disciplinary proclivities could bring the diverse reactions of "micropopulations" to capitalist penetration into clearer focus and thus provide a more detailed, if not more realistic, explanation of unequal relations of power. Eric Wolf and Sydney Mintz were exemplary in their efforts to conjoin the broad focus of world systems theory with anthropology's long-established object of study, the social dynamics of the subaltern.

Wolf demonstrated his materialist approach in his influential and ironically titled *Europe and the People Without History* (1982). The book sought ambitiously to trace the history of capitalism's expansion and eventual penetration into precapitalist societies, and thus account for the means by which particular non-Western localities were transformed into production sites of primary goods—gold and diamonds in South Africa, coffee in Mexico, and rubber in the Amazon, to name only a few of Wolf's examples—for Western consumption and profiteering. Wolf's analytic brush was decidedly broad, as he sought to outline patterns of this expansion and penetration on a massive geographic scale.

Mintz's *Sweetness and Power: The Place of Sugar in Modern History* (1985), while geographically narrower in its focus, was nevertheless an ambitious anthropological investigation of the politics of production and consumption between a metropole and colony during the 17th through 19th centuries. Mintz argued that slave labor in the Caribbean was a means for sugar to become a highly valued and common commodity in England. His work is important because it demonstrated that the Caribbean producers of

sugar were crucial actors in the shaping of the lifeworlds of metropolitan centers of global capitalism.

Contemporary Anthropological Approaches to Globalization

Methodology

Much the same as intellectual forebears like Boas, Malinowski, and Mintz, anthropologists today are apt to favor specificity and variation over generalization and central tendency. Anthropology has, subsequently, tended to shy away from grand theories that can essentialize peoples and characterize histories as predetermined. Indeed, a continued interest of anthropologists is to investigate how individuals and groups negotiate their social worlds in creative and unexpected ways. However, this has not prevented anthropologists from using macro theories as frameworks for inquiry nor from intimating how ethnographic detail is indicative of broader social configurations. The main point is that empirically supported arguments are paramount. This is where long-term, immersed fieldwork has been and remains a central element of anthropological contributions to the scholarship on globalization.

Yet the disciplinary interest in globalization has sparked debate about the future of fieldwork methodology. Indeed, while the ethos of anthropology continues to privilege single-sited fieldwork (as this has long been considered the best means to become versed in the social processes of a given community), many argue that a world of intensifying human relations has left traditional fieldwork approaches outmoded. In an effort to address this challenge, George Marcus (1995) outlined two strategies. The first argues for the use of archival data, as well as macro theory, to situate specific communities or individuals in larger socioeconomic processes. Ann Stoler's *Carnal Knowledge and Imperial Power: Race and the Intimate in Colonial Rule* (2002), as well as Fernando Coronil's *The Magical State: Nature, Money, and Modernity in Venezuela* (1997) are prominent examples of this approach.

The second method involves moving out from single sites to conduct "multisited" ethnography in order to examine movements of ideas, peoples, and things. Carolyn Nordstrom's *Shadows of War: Violence, Power, and International Profiteering in the Twenty-First Century* (2004) takes this as its task, using ethnographic methods to track the mobility of goods and money throughout large-scale extralegal exchange systems fueling conflict, marginalization, and profiteering.

The Global Political Economy

While definitions of globalization abound, the greatest differences in such definitions are typically a matter of

emphasis. Modern-day political economic anthropologists, for example, clearly emphasize political and economic processes that structure and are structured by landscapes of human interaction. Like Wolf and Mintz, these anthropologists view the political economic approach as a necessary corrective to scholarship that historically turned interconnected people and places into distinctive and disconnected phenomena. A great number of medical anthropologists, for example, call for anthropologists to cast light on the historical and contemporary connections and disconnections within the capitalist world system that bring about human affliction. Both Paul Farmer and Nancy Scheper-Hughes are archetypes of this contemporary political economy of health approach. Paul Farmer's "An Anthropology of Structural Violence" (2004) outlines the historically deep and geographically broad exploitive relations between Haiti and the United States that have predestined the deaths of Haiti's impoverished to AIDS and tuberculosis. Nancy Scheper-Hughes's "The Global Traffic in Human Organs" (2000) argues that economic globalization has facilitated the creation of an extensive market for the illicit harvest and trade of human body parts. Within this market, impoverished populations are targeted by brokers who, with the help of surgeons, turn high profits by selling these human organs and tissues to wealthier consumers in the global North.

Phenomena like these, political economists assert, are associated with the advent of late-modern capitalism—now commonly called "neoliberal globalization." Neoliberal globalization refers to the predominate theory of free market capitalism, which these analysts argue continues to be the primary engine of globalization. The term *neoliberalism* itself underscores an important element of the political economic argument—that globalization is a human-made and ideologically driven set of processes.

The focus on neoliberalism is also one manner in which scholars have come to conceptualize how the contemporary moment is fundamentally different from the past. The most clearly articulated and influential starting point for many scholars of this school of thought is David Harvey, a Marxist geographer who in his significant work *The Condition of Postmodernity* (1989) argued that economic restructuring and associated social and political changes in Western economies in the early 1970s sparked a fundamental reorganization of global commerce that sped up the turnover times of capital. These changes were characterized, according to Harvey, by an increasing sense of spatial attenuation and temporal acceleration in human economic and social relations. Harvey referred to this sensation as *time-space compression*, which was brought on by the collapse of significant geographic and temporal barriers to commerce. This collapse was a byproduct of an economic experiment promoted during a crisis of capital accumulation and subsequent recession that existing Keynesian fiscal and monetary policies could do little to stop. The experiment involved the transition from the Fordist model of standardized

commodity production and its related system of political and social regulation (the dominant mode of capitalism since the end of World War II) to the post-Fordist model of flexible accumulation. The increased velocity and reach of market transactions this new regime of accumulation prompted were realized through substantial innovations in transport and information technologies. Harvey's 2005 book, *A Brief History of Neoliberalism*, traces the neoliberal influence behind this shift, arguing that the transition was a political project intended to reinvigorate elite class power and capital accumulation mechanisms.

Perhaps the most recent and representative anthropological effort to further develop this perspective is Jean and John Comaroff's "Millennial Capitalism: First Thoughts on a Second Coming" (2000). The Comaroffs argue that neoliberal globalization at the turn of the millennium is a process that alienates capital from labor and marshals consumption as the primary shaper of social and economic phenomena like popular civil society discourses, occult economies and religious movements, and global youth cultures.

Much of the anthropological literature on neoliberalism thus far has focused less on the logic and mechanisms of its production and administration (though this is increasingly a field of study, as some anthropologists turn their eyes to understanding the inner workings of institutions like the WTO, IMF, and World Bank), and more on the impact of, and resistances to, neoliberal globalization. June Nash's *Mayan Visions: The Quest for Autonomy in an Age of Globalization* (2001) is a representative ethnography of this focus, as is Jeffrey Juris's *Networking Futures: The Movements Against Corporate Globalization* (2008).

The Global Cultural Economy

A second approach to globalization, coming to prominence in the early 1990s, places greater emphasis on anthropology's most common focus of attention: culture. (See Kearney, 1995, for an excellent summary of perspectives during the early 1990s.) Many proponents of this cultural approach, while acknowledging the world's deep history of social interaction, tend to stress the fundamental newness of the present, going so far as to describe a new global era. One of these proponents, Arjun Appadurai, writes a radical reply to center-periphery models of political economy and proposes that any framework emphasizing order in the present globalizing world is deluded. Appadurai's *Modernity at Large* (1996) understands the new global era as having been brought about by a complex and rapidly changing global cultural economy of exchange. The birth of this new era was facilitated by phenomena like media and migration, and both of these have served to reorganize nation-states and mobility on a global scale. Appadurai proposes that this chaotic world be grasped through five dimensions he calls *scapes*, or the landscapes across which cultural flows travel: ethnoscares, mediascares, technoscares,

financescapes, and ideoscapes. These scapes overlap to constitute the particular lifeworlds of individuals across the world—each lifeworld being wholly individualized. In short, Appadurai posits a disorganized, centerless world in which no single view yields any grasp of larger processes—the ubiquitous flows of ideas, technologies, objects, and images constituting the global cultural economy are nonisomorphic and indeterminate.

A perspective similar to Appadurai's, and borrowing from Ernesto Laclau, is that of Inda and Rosaldo (2008), who describe the contemporary world as "dislocated." The use of this term is intended to emphasize that a plurality of centers serve as the hubs of cultural traffic across the globe. This perspective, as well as Appadurai's, draws on ethnographic examinations of movements of commodities, people, and images and how these movements are perceived, translated, or appropriated by specific groups with whom they come into contact. At first glance, such movements suggest a significant imbalance in international exchange between the global North and South. Indeed, many Western, and indeed American, products like Coca-Cola, McDonald's, and films are promptly visible in a variety of contexts far from Europe and North America. It is from these and other observations that analysts have often come to consider cultural imperialism as a force of homogenization that levels cultural difference throughout the world (see Tomlinson, 1991).

Yet cultural homogenization assumes that the essential meaning of a commodity or idea is consistent and universally legible—meaning that, for example, a Sri Lankan teenager will interpret an *Indiana Jones* film the same way a German teenager might. Subsequently, it could be inferred that the circulation of Western commodities or ideas will have predictable local effects. Anthropologists argue that there is little inevitability in such exchanges. Rather, a consumer applies her or his own cultural perspectives to the interpretation of objects and ideas, culturally tailoring them in the process. Laura Bohannan (1966) discovered as much in the 1960s when she observed a West African production, and subsequent interpretation, of Shakespeare's *Hamlet*. Liebes and Katz's *The Export of Meaning: Cross-Cultural Readings of Dallas* (1990) is a modern retelling of Bohannan's experience, demonstrating how the popular American television program *Dallas* was quite variously received among Moroccan Jews, Russian Jews, and Arabs.

The cultural tailoring described above has, in many instances, become a rather common element of cultural interaction across the world, especially in light of myriad technological advances and their ability to radically compress time and space (see Harvey, 1989). Due to this, many researchers have come to see culture as less stabilized and more diffuse, going so far as to claim that globalization has "deterritorialized" culture.

As argued earlier, many anthropologists have historically mapped culture onto territorially demarcated places,

understanding distinctiveness as a product of social structures within supposedly locally bounded spheres. Said differently, place was the container of culture. (For example, the nation-state of China contained "Chinese culture.") Gupta and Ferguson rebuke these analyses and call for anthropologists to examine how such conceptions produce difference and reinforce unequal relations of power. They further argue that cultural forms cannot be conceptualized as being fastened to specific geographic locations. Rather, the contemporary world is characterized by the freeing of culture from specific localities, and the notion of deterritorialization captures this process.

Deterritorialization also stresses the tension central to the commonly articulated local/global dichotomy. Indeed, as individuals and groups engage with and are shaped by processes that connect their local worlds with others, cultural forms can come to have an impact regardless of whether they originate in the global North or South. Thus, the significance of non-Western cultural forms circulating in contexts outside of their origins should not be underestimated. Examples of this are everywhere visible, from the ethnic cuisine consumed in the global North, to popularly imported and exported religious beliefs like Buddhism, to non-Western modes of dress like headscarves that have engendered much debate in some European countries. This is due to the fact that while cultural forms become unfastened from one locality, they simultaneously fasten themselves to new contexts and can become highly relevant. Anthropologists cite examples like these to suggest that cultural and even political-economic exchange between the North and South can be mutually significant, or "relational" in its character. Hannerz (1996), borrowing from linguistics, referred to this relationality as the "creolization" of the core and periphery.

Further examples of this exchange are human migration and trafficking, which have left many culturally uprooted peoples "reterritorialized" in foreign lands where they navigate new ways of living with aspects of their cultural identity they have carried with them. Analysts often refer to such individuals and groups as *transnational*, as they move across and between national boundaries. At times, the connections between these "old" and "new" communities are so strong that anthropologists have argued they should be understood as single communities scattered in multiple localities.

Ultimately, the arguments and examples outlined above suggest that the world be viewed as a complex global society composed of interweaving cultural, political, and economic processes and forms. This is not to suggest that globalization engenders a homogenous global population, but rather to recognize the untethered nature and intensified potential of interactions between populations. Anthropologists argue that only continued heterogeneity within this global society can be assumed.

Of course, the discipline has been careful not to assume that movements are experienced by all peoples, things, and ideas or that all experience movements in the same way.

Indeed, many have argued that such processes have left areas and peoples excluded and marginalized. David Graeber (2002) made the point that processes of economic globalization like the North American Free Trade Agreement (NAFTA) have in fact tightened many national borders, and he cited numbers suggesting that since NAFTA's inception in 1992, the number of guards along the border between the United States and Mexico has more than tripled. Moreover, anthropologists like Escobar (2001) have argued that too great a focus on the deterritorialization of culture can obscure processes of place making, as well as the fact that people continue to imagine and build cultural forms that are situated in specific localities.

Questioning "Globalization"

As intimated earlier, the anthropological commitment to fieldwork has led many researchers to avoid nonempirical assumptions as to what globalization might be or what effects it might engender. Subsequently, the concept of globalization has been disputed by some anthropologists frustrated with its imprecise and assumptive nature. This view is summarized by Cooper (2005), who separates "global" from its affix "ization" to call attention to the term's problematic insinuations.

The first of these pertains to the scale of globalization—namely, that it is singular and worldwide, that it is something that encompasses the earth. Cooper argues that empirical truths about the world do not reflect the notion of global interconnection. Indeed, vast stretches of the planet, most notably in sub-Saharan Africa, remain largely disconnected from the wider world. As Ferguson (2006) has noted, movements of commodities, images, and ideas tend to hop over these geographic expanses, rather than smoothly envelop them. Equally problematic, according to Cooper, is the fact that a process that is global is everywhere and immeasurable, and therefore of little analytic value.

Second, the affix suggests the "when" of globalization—that it is currently happening, that this is the "global era." Cooper contends that one must be cautious in asserting that such mobilizations and exchanges are historically novel—or an original product of a contemporary global framework. Such an assertion ignores the fact that massive labor migrations (forced or otherwise) in the past engendered the diverse cultures with which we currently identify. In fact, Cooper has argued that movements of laborers in the 19th century were in fact more substantial than those of the present day. It is therefore more accurately stated that human mobility and interaction have been processes long defining cultures across the globe, though contemporary movements of people continue to create novel cultural dynamics and milieus. Similarly, Tsing (2000) has asserted that theories contending the absolute newness of a global era tend to obscure historical happenings that offer insight into both the past and present.

These analysts call attention to the fact that, due to its magnitude, globalization is a concept that must be imagined rather than directly experienced. Yet this is not to suggest that a singular system is out there—that it is simply a matter of lacking the proper tools to see it in its entirety. A metaphor commonly invoked to describe globalization imagines several blind men examining the extremities of an elephant. One man touches the trunk, another a tusk. Several stroke the elephant's legs. Each man will argue that he knows what the elephant is, or how the elephant in its entirety appears. Yet due to the size of the elephant and the sensory limitations of the men, none has the ability to know it fully. The problem with this metaphor is that it assumes a singular entity—the elephant—or a coherent framework that one claims to know is there but cannot fully experience. The consensus among critical anthropologists like Cooper and Tsing disputes this, arguing that globalization is an analytic construct, not a coherent world-making system. Moreover, they argue that collecting the variety of exchanges shaping relationships in the world under a single moniker makes for an inadequate analytic category, for it fails to capture the specific mechanisms of interconnection and the histories in which they are embedded. This is a view that rejects a singular world-making system in favor of a pluralization and inconsistency of agendas, projects, and processes. These international projects may be grand in scale, but they are not uniformly consistent or all encompassing. They vary according to the terms of their creation as well as their sites of origin.

These anthropologists call for examining globalization from a critical distance, paying attention to the arguments and mechanisms by which theories of globalization are mobilized. One example of this would be to challenge the exclusively celebratory espousals of globalization—what is often referred to as the "globalist" perspective—that, through popular media information, attempt to influence ideas of wealth and mobility. The power in this information lies in its ability to reproduce a specific logic that many globalist pundits advance—that of globalization's huge potentiality. This can be misleading, however, as the life of a farmer or laborer in the global South may be so socially and economically constrained as to prevent her from traveling to the closest major city, much less jet-set about the world.

Moreover, the critical distance approach is especially important in light of the fact that influential discourses defining globalization inform the decisions of the world's powerbrokers, especially transnational governing bodies like the World Bank, IMF, and WTO, as well as powerful nations whose leaders read popular political pundits. It is important to emphasize here that talk about difference can move quickly about the world, mobilizing individuals and institutions to act upon it for the purposes of security, economic profit, stability, and other aspirations. In this sense, talk about globalization, when wielded by actors embedded in complex relations of power, can have very real effects in people's everyday lives.

By way of example, a number of recent dialogues in North American academic and public circles have focused less on the homogenization of culture (or cultural imperialism) and more on cultural difference, while maintaining that a more or less singular global framework brings about foreseeable effects. This talk articulates a gray zone between globalization's positive and negative consequences, sketching a context in which cultural heterogeneity and increasing global mobility create both opportunity and threat. These claims to know a singular global system can have powerful effects. On the one hand, recent national best sellers by popular political pundits hail globalization as a force that flattens the world, creating an even playing field for those "willing" to participate. They inform international policy at the World Economic Forum and chastise governments resisting privatization and deregulation of large industries. On the other hand, these works instill a sense of fear in the post-9/11 world, as many nations and groups are depicted as foils to global connection—their own development complicated by dated cultural beliefs and traditions that ultimately threaten to violently derail the future. Thus, while globalization has brought us closer to allies, it has also compressed the world in such a way as to make it more vulnerable to conflict and resistance. Ultimately, these are fears of difference in which cultural heterogeneity, rather than the worldwide "McDonaldization" of societies, is emphasized.

A number of anthropologists have felt compelled to respond to these conceptions of globalization. Besteman and Gusterson's *Why America's Top Pundits Are Wrong: Anthropologists Talk Back* (2005), for example, takes its inspiration from public anthropologists like Boas and Mead and wields an anthropological sensibility with ethnographic evidence to challenge the destructive myths of America's most popular pundits writing about globalization. The volume's chapters are written in clear and compelling language, and are thus geared toward a general audience.

Finally, some anthropologists have cast a critical eye on the theoretical underpinnings of anthropological approaches to globalization, calling attention to the problematic gendering of epistemologies attempting to capture large-scale social change. Freeman's "Is Local: Global as Feminine: Masculine?" (2001) provocatively examines the implications of the partition of masculine macro theories of globalization (which largely ignore gender) and ethnographic approaches to globalization emphasizing locality and gender.

Development

Globalization is a term that has, in many instances, come to replace the older and no less complex notion of "development." In fact, Edelman and Haugerud (2005) have argued that *globalization* has replaced the term *development* as the new action word of contemporary international governance discourse. Not simply a term that describes an

inevitable process that is shaping the modern world, globalization, when conflated with development, is a metapolicy guiding the way to social and economic well-being in the global South.

The replacement of development by globalization is also evident in South American contexts like Venezuela and Bolivia, where supposed antiglobalization social movements and nationalization policies have been viewed by many Northern countries and transnational organizations as detrimental to international peace and global economic stability. In contrast, these Northern governing bodies espouse state-led implementation of globalization-friendly principles for the sake of individual nations' prosperity, as well as prosperity for the world. Thus, it is by ultimately opening up borders and financially connecting to the wider world that nations soar themselves out of poverty and into the global marketplace, developing in the process.

The two most influential anthropological works on development, Ferguson's *The Anti-Politics Machine* (1994) and Escobar's *Encountering Development* (1994), challenge this widespread thinking. Ferguson argued that in fact such development schemes usually fail and in the process further embed countries in the exploitative systems that were intended to help them. Ferguson also faulted these schemes for overlooking the social and historical specificities of countries and favoring techomanagerial solutions that are generally applicable to all "developing" countries.

In his influential book, Escobar attempted to denaturalize "development" by situating it in the political aftermath of World War II, when, in 1949, President Harry Truman argued for "developed" nations of the world to systematically restructure the global South, reconfiguring the world in the image of "advanced" nations. Following Walt Whitman Rostow and his work *The Stages of Economic Growth* (1960), many policymakers and social scientists in the years following Truman's speech came to view development as the establishment of preconditions for the "take off" from traditionality to modernity. Escobar examined how this language and categorization of development problems becomes the official knowledge of international development experts and how this expertise subsequently becomes unanchored to any political, cultural, or historical context. He ultimately argued that this categorization, or naming, of peoples and places as objects of development interventions has devastating material effects: Targeted "underdeveloped" communities are often left worse off than they were prior to the intervention, and in addition, increasingly reliant of foreign aid.

Governance, Sovereignty, and Citizenship

To what extent can it be said that recent transformations have changed how states govern and with what efficacy? Globalist claims have often declared the demise of the state with the

dissolving of national borders and the rise of international governing institutions like the WTO, World Bank, and IMF. Yet, as Tsing (2000) noted, this idea assumes that nation-states have been historically consistent and omnipresent.

There is little doubt that the development of international law and institutions upholding it have changed the means by which many states govern their populations. However, proclamations of the global dissolving of nation-states are exaggerated, according to anthropologists. This does not mean that states have not changed at all. Indeed, contrary to the traditional doctrine of sovereignty, many states are now held accountable by international authorities and in many instances are forced to comply with their policies. The degree to which such states are actually constrained and reshaped by international institutions varies, of course, from context to context. (Merry's 2006 overview of anthropology's engagement with international law is instructive on the above points.) Thus, one could argue that the sovereignty of states in the present has been to a large degree reorganized, if not in many instances greatly circumscribed. Sharma and Gupta (2005), in their important volume *The Anthropology of the State*, argued that "sovereignty can no longer be seen as the sole purview or 'right' of the modern state but is, instead, partially disentangled from the nation-state and mapped onto supra-national and non-governmental organizations" (p. 7).

The shifting nature of governance and states at present comes to heavily bear on conceptions of citizenship within countries. Many anthropologists argue that globalization has reformulated many notions of and policies pertaining to citizenship. Ong (1999), for example, used the term *flexible citizenship* to grasp how individuals and groups deploy various strategies to evade, as well as profit from, various national regimes of citizenship. Ong argues that the elite, flexible Chinese citizens have discarded traditional notions of nationalism in favor of a "postnational ethos" that transcends national boundaries for the sake of participation in the global capitalist market.

Conclusion and Future Directions

When considering the various viewpoints outlined above, it is important to remember that anthropologists' commitment to fieldwork and the empirical evidence it produces significantly informs their perception of the global. Said succinctly, where anthropologists work shapes their perspective on globalization. It is not surprising to find, then, that the most influential anthropologists working in sub-Saharan Africa talk of global disconnection, while many working in the metropolitan cities of India stress the interconnection brought about by a global cultural economy. Due to this, it should equally be stressed that every view of the global is always a view from somewhere. There is no perch from which an analyst can ascertain the world from an objective, comprehensive position.

Yet the contrasts in the above perspectives are highly positive in that they produce a creative tension that thwarts stagnation in favor of fresh approaches and directions for the study of globalization. One product of this tension has been an active emphasis on "studying up," or turning a critical eye to national and international institutions and actors whose projects aim to influence social and economic change. The recent anthropological concentration on the predominate economic philosophy of the present—neoliberalism—is laudable in this regard. Important recent works—like Ong and Collier's *Global Assemblages* (2005); Petryna, Lakoff, and Kleinman's *Global Pharmaceuticals* (2006); and Fisher and Downey's *Frontiers of Capital* (2006)—take states, transnational governing bodies like the World Bank and WTO, human rights NGOs, corporations, and even powerful individuals like the U.S. chairman of the Federal Reserve as objects of ethnographic analysis.

Furthermore, the means by which anthropologists go about examining these objects, as well as the way they write about them, is changing. The fact that anthropologists are increasingly turning their focus to the world's powerbrokers means that they take the discourses and policies of these powerbrokers very seriously. This is all the more important because anthropologists tend to disagree with these discourses and policies and subsequently wish to dispute them. Yet in order to successfully dispute them, anthropologists must write for audiences outside of the discipline. Two works already mentioned, *Why America's Top Pundits Are Wrong* and *Global Shadows: Africa in the Neoliberal World Order*, are prominent examples of this endeavor.

All told, the above discussion signals a much more general development in which anthropologists are increasingly seeking to bring their disciplinary perspective to bear on public discussions of globalization. Anthropology is one among many disciplines that can greatly contribute to this ongoing discussion.

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EDUCATION AND ANTHROPOLOGY

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In the 1970s, education became an academic subfield of applied anthropology as it applies to different communities and cultures existing within education systems. From that perspective, students, parents, faculties, and school administrators represent different communities, and, by using anthropological theories, these groups can understand current conditions of education and conceive applications for the future. The importance of applied anthropology to education is spotlighted as we gain understanding of classroom dynamics with respect to increases in student diversity, in numbers of special needs students, and in the use of technology in the classroom. Concepts of race, gender, ethnicity, and nationality are especially relevant as students develop their sense of identity as members of groups. More than ever, these concepts are critical, as schools look to deal with conflict and promote positive intergroup relations.

As Charles Darwin cut across disciplinary boundaries and questioned conventional wisdom, teachers also cut across curricular boundaries to make cogent connections that enable students to achieve an understanding of and an appreciation for the human experience. One goal of today's teacher is to both understand and influence individuals so that they may become whole, rational, and productive citizens. An overall goal of education is to assist learners to construct meaning. Negotiating meaning requires an understanding of the prevailing culture, whether the subject is literature, music, social studies, science, or religion.

Effective education is based upon positive social interaction among all those involved in the school community. Teachers who build their practice on anthropological understandings and methodologies will leverage knowledge to improve student attitude and achievement.

Using this perspective, education and anthropology will work together to alleviate behavioral difficulties, drop-out rates, violence, and other negative influences that have the potential to impact the school and, ultimately, the individual. With Darwin-like insight, teachers assist learners to recognize the "internal logic" of classroom society. They foster a cooperative environment where students' similarities and differences are accepted and their interdependence is recognized. They encourage the sharing of ideas, experiences, theories, discoveries, and expertise. Teachers arm students with global information and thinking skills critical to following various career paths to success in 21st-century business, research, government, agriculture, advocacy, and public service.

While reflecting on the influence of Darwin on education, key skills that originated with Darwin are apparent. These include seeking multiple perspectives, rational speculation, observation, dialogue, analytical reading, data collection, comparing and contrasting information, testing hypotheses, drawing conclusions, and applying theories. Other pedagogies derived from Darwin include research methodology, logic and reasoning, detailed record keeping, clear thinking, and scientific inquiry.

The complexity of humanity directs anthropologists and educators to work in concert. Equipped with a satchel of scientific armaments initiated by Darwin, professionals are prepared to crack the smallest kernel of misinformation. Together, anthropologists and enlightened educators deploy such devices as scientific inquiry and logic to go about “solving” the problems that we face in our lives, studies, and classrooms. A huge mutual goal is to determine how we can consistently and successfully manipulate such tools, challenging America’s youth and changing how American youth process their inherent positions and perceptions. A typical U.S. public school classroom houses many nationalities. It is of utmost importance to educate all students to understand differences: cultural, socioeconomic, psychographic, and demographic. By expanding the horizons of our students, we are likely to invest in the notion that we are all similar despite being different in appearance, ability, or wealth.

Prejudice and ethnocentrism are the products of fear caused by a historic lack of both knowledge and understanding of differences. These conditions have shaped society. Throughout the ages, an attitude of “banish or perish” has launched attacks of humanity upon humanity. In the middle of the 20th century, the development of third world countries was seen as hopeful, a precursor to positive interethnic relations. Melting pot theorists predicted that as poor nations advanced in their development, ethnicity would become less important and peace would follow. This view was challenged by the conflictual modernization theory, and development was seen for a time as a cause of conflict. However, as the world approached the 21st century, development was more strongly considered to be a precondition for peace. To this day, bias, prejudice, bigotry, conflict, marginalization, and ethnocentrism continue to contaminate society, and these hazards trickle down into the schools.

The teaching of scientific inquiry, therefore, is significant when students learn to question circumstances and problems as they arise. Students need to be taught to question and respond profoundly—beyond transactional or procedural questions or the typical short answers to teachers’ questions. It is suggested that a learner’s questions can identify whether the learner’s thinking is naive or whether it is complex, depending on whether the questions focus on conceptualizations or minutiae and detail. Helping children to question situations may help a student achieve, but bringing students to understand that different people think of different ways to question is the greater lesson. This lesson brings with it an appreciation that people of other ethnicities and cultures may bring drastically different questions to bear on a given situation. Situations of small or large consequence may be solved collaboratively and skillfully when teachers accept and appreciate the contributions of others.

Why is there so strong a resemblance between anthropological methodology and educational methodology?

Was it coincidental that educational practice underwent a revolution after the publication of Darwin’s *On the Origin of Species* in 1859? Is it probable that Darwin’s evolutionary framework had an intense and powerful impact upon scholars throughout time—scholars who influenced their protégés who, in turn, influenced others?

It is possible to put forth the premise that Darwin was the originator, indeed, the true father of educational pedagogy and methodology throughout the world in the late 1800s and throughout the 1900s. Furthermore, one may contend that his effect upon education has been extended well into the 21st century. An evidentiary trail may be blazed from Darwin directly to John Dewey, and from Dewey to Tao Xingzhi from China, Maria Montessori from Italy, Lev Semenovich Vygotsky from Russia, and Howard Gardner, who is presently teaching at Harvard University in the United States. Each of these giants in the field of education and psychology has made his or her theories felt by others. For example, Vygotsky impressed the world-famous Jean Piaget, his contemporary from Switzerland, as well as Arthur Appleby, born in 1946 in the United States. Gardner brought his influence to bear on Spencer Kagan, who in turn influenced David Johnson and Roger Johnson (all from the United States, and all of whom we credit with extensive research into cooperative learning). The line does not, of course, ever end. All of these people have gone on to shape the thinking of scores of others worldwide who define education as a profession. Several will be discussed in this chapter, and it all began with Darwin!

In the Beginning

To understand the impact of Darwin upon the global educational community, it is necessary to understand the man. Known today as England’s greatest naturalist, Darwin—geologist, biologist, anthropologist—had a unique and replicable approach to learning. His joy in discovery and attention to observation, notation, comparison, and evaluation underlie his greatest discoveries and serve as an overarching model for educational pedagogy and methodology. With Darwin in mind, the connections between anthropological and educational procedures become apparent, and the fields of anthropology and education reflect more in common than might be realized at first glance. Key skills and dispositions that were used and refined by Darwin have been integrated into what is termed educational *best practice*. Darwin himself was open to change; the analytical categories and processes that he employed are useful in understanding the culture of today’s school children, for example, how teachers teach and how students learn.

The application of anthropology to education dates back more than a century, to when Hewitt published his thoughts on education in the *American Anthropologist*. However, it is here theorized that the connection between education and anthropology preceded Hewitt, originated

with Darwin, and moved in succession to Dewey, Vygotsky, and others down through the years. To some degree, historically, the education profession revised old programs and practices, renewed and renamed them, and implemented them in what was hoped to be a better way. A more Darwin-like approach to change is to study the old programs and practices in light of their relative success, break old molds, design innovations, and implement new and revolutionary practices, all based on research. Clearly, this approach indicates that it is the responsibility of the educator to teach social skills and to interact with cultural and ethnic groups other than their own. In turn, this allows students to study in collaborative situations leading to social acceptance, self-discovery, and the ability to take risks within the learning environment. Through the example of Darwin, education and anthropology aspire to similar goals and to utilize similar methods of research and discovery.

Charles Darwin

Charles Darwin (1809–1882) recalled his father once telling him, “You care for nothing but shooting dogs and rat-catching, and you will be a disgrace to yourself and all your family” (Barlow, 1958, p. 28). It was an inauspicious indictment of one of history’s greatest thinkers. Born in Shrewsbury, England, Darwin did poorly in traditional school settings and preferred to collect specimens of animals, plants, and minerals that he would experiment upon in his brother’s chemistry laboratory. He was, by today’s definition, a hands-on, tactile-kinesthetic learner. At age 16, with urging from his father, Darwin entered the School of Medicine at Edinburgh University, where he found lectures boring, cadaver dissections horrible, and surgeries, without the benefit of anesthesia, gruesome. After graduation, Darwin reluctantly enrolled in the University of Cambridge with the idea of becoming a clergyman. While at Cambridge, Darwin was inspired by the *Personal Narrative* of Alexander von Humboldt, the German naturalist, who wrote about his travels in South America and his discoveries in geology, geography, and mineralogy.

Having been invited to set sail on the HMS *Beagle*, a frigate designed for scientific research, Darwin embarked on a five-year expedition to chart the coastlines of South America. On board ship, he read intently and was influenced greatly by the geological ideas and perspectives presented by Charles Lyell. The *Beagle* reached Brazil in February 1832, and Darwin began to answer destiny’s call. He spent months observing and collecting plants, animals, minerals, and fossils and keeping careful and detailed records of his discoveries. He was astounded to find marine fossils high in the Andes Mountains and hypothesized that the land had once been covered by water. Darwin satisfied his belief that the earth’s topography is always changing when he lived through earthquakes in Chile.

Arriving in the Galapagos Islands, he discovered many life forms that were not found anywhere else in the world. Darwin was intrigued by the numerous species of birds found there and noticed how various species of finch had developed specialized beaks that aided them in gathering and consuming food. He further noted that organisms on the island seemed similar to, yet different from, those organisms on the mainland.

From his experiences on HMS *Beagle*, Darwin began to question the idea of creationism and the belief that a supreme god created immutable organisms to populate an unchanging world. He used the now-very-popular comparative method to challenge concepts and to introduce new facts and values. His constructivist methodology resulted in a most extraordinary evolutionary framework. To brief: All living things compete for space and sustenance while being constantly challenged by threats from their changing environment. Later, in *On the Origin of Species* (1859), Darwin explained his theory of natural selection as “grounded in the belief that each new variety, and ultimately each new species is produced and maintained by having some advantage over those with which it comes into competition; and the consequent extinction of the less-favored forms almost inevitably follows” (p. 93). Essentially, he implied that all life on earth, including the human species, is the result of evolution over millions of years of adaptations to changing environments. Darwin concluded as follows:

Having been originally breathed by the Creator into a few forms or into one, and that, whilst this planet has gone cycling on according to the fixed laws of gravity, from a simple beginning endless forms most beautiful and most wonderful have been, and are being evolved. (1859, p. 114)

As Darwin looked with awe upon Creation, the convergence of his evolutionary framework pointed ominously to the precarious position of our species and the essential need for mutual respect, global understanding, and planetary interdependence. As a species, humans are constantly competing for space and support. Opposing forces such as insurrection, disease, poverty, ethnocentrism, and racism threaten us. Shifts in the environment, climatic changes, depletion of natural resources, and pollution challenge us. For these reasons, educators have been influenced profoundly by Darwin, his research, his methods, and his theory of evolution. Far from being the disgrace his father predicted, in the 200 years since his birth, Darwin has become a model of optimism, unification, and hope for the future. He saw the magnificence of all living things, including humankind, and his theory of evolution impels us to respect one another despite any or all differences. For these reasons, we must come together as one diversified but unified species, evolved from a common ancestor, and aware of the interconnectiveness of our global society. Darwin told us the following:

It is a world of wonderful similarity and change among all living things; where the tiniest flea is directly, organically related to the most massive elephant; where struggle and even death make for progressive evolution in which good useful characteristics develop to benefit every species. (1859, p. 115)

Thanks to Darwin, present-day educators respect both the similarities and differences among their students and view them as an “evolving species,” which will grow and develop into productive adults. Teachers also consider themselves to be an “evolving species,” capable of adapting teaching styles and strategies to meet the diverse needs and wants of their students. Through the intersection of education and anthropology, humanity has its greatest hope of survival as we advance scientifically, morally, philosophically, technologically, and academically.

John Dewey

Education is a social process; education is growth; education is not a preparation for life, but is life itself.

—John Dewey (Boydston, 1972, p. 50)

In the same year that Darwin published his seminal work, *On the Origin of Species* (1859), John Dewey was born into a Burlington, Vermont, family. Son of a Civil War veteran and an evangelical Congregationalist mother, Dewey grew to become the most influential philosopher of modern times. His influence is most viable in political and educational forums. The founder and renowned “father of progressive education,” Dewey built his philosophy around his own life experiences as well as the emerging philosophy and scientific thought of the times.

Upon graduation from the University of Vermont in 1879, and unsure of his future, Dewey was tutored in philosophy for three years while he earned his living as a high school teacher. He then applied to and matriculated at Johns Hopkins University for graduate work. Studying under George Sylvester Morris, who followed Hegelian philosophy, Dewey wrote his dissertation on Hegelian idealism and earned his doctoral degree in 1884. In time, Dewey rejected absolute idealism, which suggested that fact and thought are connected in that facts develop from thoughts. However, he evolved a more naturalistic and pragmatic philosophy that was refined and supremely influenced by the works of Darwin. His theory of natural selection provided form for Dewey’s naturalistic approach to the theory of knowledge. *On the Origin of Species* (1859) introduced Dewey to a mode of thinking that would ultimately transform the logic of knowledge and hence his treatment of morals, politics, religion, and education. Rejecting supernatural explanations for the origin of species, Dewey adopted Darwin’s naturalistic account and then considered the development of knowledge as an adaptive response, that

is, as the product of the interaction between humankind and its environment. Dewey saw knowledge as having a practical instrumentality in the dominion and administration of that interaction. He termed his new philosophical approach *instrumentalism*. Clearly stated, if problems are constantly changing, then the instruments for dealing with problems must change. It follows, then, that if truth is evolutionary in nature, it does not have an eternal reality. In a collection of essays by Dewey (1910), the longest essay is titled “The Influence of Darwin on Philosophy”; it is an in-depth discussion of the impact that Darwin had on modern thought.

The influence of Darwin on Dewey’s philosophy of education was immeasurable. In his own practice, Dewey taught at the University of Minnesota and then at the University of Michigan. He achieved greatness as chairman of the Department of Philosophy, Psychology, and Pedagogy at the University of Chicago. He became president of the American Psychological Association in 1889, and he was the president of the Philosophical Association at Columbia University from 1905 until his retirement in 1930.

Dewey’s Darwinian philosophy of education has had far-reaching effects on other philosophers, on teaching, and on learning. He maintained a pragmatist stance that schools should prepare individuals for participation in community life and overcome barriers between school and community in order to provide education that satisfies the needs of a truly participatory democracy. Dewey favored practice over theory, based on his belief that learning best occurs when students are free to generate their own experiments, experiences, questions, and creations. He believed that under the direction and guidance of a good teacher, children could learn ways to cope with situations and conditions that may occur in the unfathomable future. Dewey believed strongly that schools should take on societal responsibilities. He was convinced that the acculturation of immigrants was the responsibility of the schools. Therefore, like Darwin, Dewey showed respect for diversity and saw individuals as valuable contributors to society.

In 1896, Dewey established laboratory schools where he highlighted the scientific method for problem solving and where students, in workshop settings, took ownership of their own learning. The role of the teacher was that of a facilitator, not director or instructor. An advocate of “the child-centered school and the school that gave full emphasis to real interests and to learning through doing” (Dewey, 1956, p. viii), Dewey believed that teachers were the designers of educational experiences. His pedagogy contrasted sharply with traditional teacher-centered methods of isolation, study, and recitation.

Dewey’s theories became very popular. However, progressive education began to take on tangential forms. Dewey’s Laboratory School in Chicago and Manhattan’s The Lincoln School both closed, primarily because progressive education was misinterpreted and secondarily

because the Cold War advanced conservatism and the rigorous and rote study of math and science. Today, applications of the progressive movement are flourishing in many American schools, as well as international schools, and action research, open classrooms, schools without walls, multiage groupings, looping, block scheduling, and cooperative learning are integrated forms of this movement. Emphases on multiculturalism, hands-on learning, and participation in authentic learning experiences with real-world audiences reflect the pedagogical contributions of Dewey. Notably, as Darwin inspired Dewey, so have Dewey's contributions inspired other movements of import to education, for example, contextualism, empiricism, humanism, and naturalism. A study of Darwinian methodology is especially relevant in the postmodern age, as we come to terms with immigration, globalization, and extensive cultural diversity. Clearly, Dewey stands with Darwin as one of the greatest intellects of our time. It is not surprising, then, that they had direct and intense impact on Xingzhi, Montessori, Vygotsky, and Gardner.

Tao Xingzhi

Primary education is the base of a nation's education, and so the quality of primary teachers can decide a nation's future.

—Tao Xingzhi

In 1914, at the age of 23, Tao Xingzhi, then known as Tao Wen Tsing, left the family farm in Anhui, China, to study political science at the University of Illinois. Upon earning his master's degree, he enrolled in Teachers College, Columbia University. There, he studied under the auspices of William Kilpatrick and Paul Monroe. However, the professor with the greatest influence on the young scholar was none other than John Dewey, a strong proponent of Darwinian methodology and pedagogy.

Armed with a substantial Western education, Xingzhi returned to his homeland to reform and restructure the educational and social systems in China. Like Dewey, Xingzhi saw education as an agent of change. Having achieved a teaching position at the prestigious Nanjing Teachers College, he taught his students that school must be intrinsically connected to society in order to play a meaningful role in social reform. He encouraged students to be constructivists and activists, and he related his instruction to prior knowledge and hands-on, real-world experiences. Unfortunately, when Xingzhi applied his principles in the traditional Chinese university, he was limited by what little the school had to offer his students in terms of reinforcement. Disillusioned, Xingzhi alternatively rejected his Westernized perspective, resigned his post, and retreated to the countryside to live the simple life.

It is noteworthy that at the very time Dewey visited China in 1919 on his world lecture tour, Tao Xingzhi

simultaneously became more acutely aware of the poverty and illiteracy that plagued China. Over 80% of the Chinese population was poor; 77% was illiterate. What followed for Xingzhi was a great deal of experimentation integrating Dewey's theories with then-modern Chinese history, specifically issues of importance in the 1920s. After much thought, Xingzhi reversed Dewey's notion of "school as society" to "society as school." The thought of "education as life" became "life as education." Xingzhi's "unity of teaching, learning and reflective acting" was directly precipitated by Dewey's theory about "learning by doing" (Dewey, 1956).

The outcome of this experimentation was the founding of the Morning Village Normal School. Basic elementary education was taught at the school, but the doors were open to adults as well as children. Rural teachers were trained in Xingzhi's philosophies, and school became the hub for all social, political, economic, and educational activity within the community. Self-defense classes and health care services were provided. Educational opportunities were made available to the masses. At last, the school and the community were interconnected.

As successful as this first "experiment" was in improving education, economic production, and living standards, the school was forced to close by the Chinese Nationalist Army. Nonetheless, "the school had gained national recognition as a significant force in teacher education and rural education reform and this was a great beginning to China's modern and contemporary history of education" (Anhui Provincial Society for the Study of Tao Xingzhi, 1993, p. 4). The Morning Village Normal School was reopened in 1949 upon the formation of the People's Republic of China. Its founder did not live to celebrate the occasion. But the man originally named Tao Wen Tsing, meaning "the hopes and dreams of his parents," renamed himself to reflect changes in his philosophy over time. Tao Wen Tsing became Tao Zhixing, "knowing by doing," and finally, Tao Xingzhi, "doing, then knowing." A true disciple of Dewey, Xingzhi will be remembered as the man who introduced both progressive, child-centered, experiential pedagogy and a democratic educational system into Chinese schools.

Maria Montessori

Scientific observation has established that education is not what the teacher gives; education is a natural process spontaneously carried out by the human individual, and is acquired not only by listening to words but by experiences upon the environment. The task of the teacher becomes that of preparing a series of motives of cultural activity, spread over a specially prepared environment, and then refraining from obtrusive interference. Human teachers can only help the great work that is being done, as servants help the master. Doing so, they will be witness to the unfolding of the

human soul and to the rising of a New Man who will not be a victim of events, but will have the clarity of vision to direct and shape the future of human society.

—Maria Montessori (1946, pp. 3–4)

If John Dewey was the father of progressive education, Dottressa Maria Montessori was the mother. Montessori was born on August 31, 1870, in Chiaravalle, Italy, to well-educated and prosperous parents. A precocious child, at age 13 she began a seven-year study of science and engineering at Regia Scuola Tecnica Michelangelo Buonarroti. Uninspired by the curriculum or the instruction there, Montessori determined to study medicine at the University of Rome. Initially she was denied entrance because she was a woman, but eventually she was allowed to enroll, and finally, in 1896, she received her degree and became the first female physician in Italy. After postdoctoral study of psychology and philosophy, Montessori went on to become a professor of anthropology at the University of Rome in 1904.

In 1906, Montessori began to study and teach mentally and emotionally retarded students in Rome. Her interest in what we now term *special education* lured her from higher education. She said, “I felt that mental deficiency presented chiefly a pedagogical problem rather than a medical one” (1946, p. 4). As director of the state-run Scuola Ortofrenica (School of the Disabled), Montessori’s effectiveness with special needs children was termed the “Montessori Miracle.” Montessori soon founded Casa de Bambini (Children’s House) in Rome, where the Montessori method developed (Shepard, 1996). Simplified, the method is progressive: The teacher pays attention to the child, not the child to the teacher; imaginative and authentic teaching materials and student-sized furniture are used; activities are generated to develop children’s social skills, emotional growth, physical coordination, and cognitive acuity; and baric, chromatic, motor, and other sensory exercises promote the “self-creating” process. Moreover, the child proceeds at his own pace in this controlled environment, and materials are self-correcting, so that students check and revise their own work.

Montessori’s popularity brought her to the Netherlands, where she founded the AMI—Association Montessori Internationale in Amsterdam, and to England, where she met Mahatma Gandhi, who asked her to “Indianize” her method of “controlled chaos!” It is interesting that Montessori was invited to share her methods with over 1,000 teachers in Madras, Ahmedabad, Karachi, and Bombay, all in India, during World War II. Montessori Schools multiplied, and Montessori’s lecture tours found her in Europe, South America, and Africa. Early on, she brought her vision to the United States, where she was awarded celebrity status. Montessori lectured twice at Carnegie Hall in New York City. None other than John Dewey made the introductions to standing-room-only audiences.

Montessori was a disciple of Dewey. They both believed that learning is best achieved by doing, and growth is achieved through purposeful interaction with the environment. Montessori wrote, “We especially need imagination in science. It is not all mathematics, nor all logic, but is somewhat beauty and poetry” (Mitchell, 1896, p. 205). In the same vein, Dewey wrote, “Every great advance in science has issued from a new audacity of Imagination” (Dewey, 1929, p. 310).

Yet, despite their similarities, Dewey and Montessori had differences that put a cloud over her theories. He criticized her methods as being too rigorous and urged that children not be taught to read before age eight. He was concerned that homework was not regularly assigned in Montessori Schools and that, if it were given, it would be hard to design, as students’ homes might not have the apparatuses available at their schools. Arguments on either side may be drawn, but today Montessori Schools exist all over the world. She retired to Noordwijk Aan Zee in Holland and died in her garden, at age 82, from a vascular incident. It is ironic that Montessori and Dewey both died in 1952.

Lev Semenovich Vygotsky

Learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers.

— Lev Semenovich Vygotsky
(1978, p. 90)

In 1896, when Dewey was opening the laboratory schools where group work was fostered as a meaningful way to learn, another teacher was born in present-day Belarus, a place that would later become part of the USSR. A Russian educational psychologist, Lev Semenovich Vygotsky was recognized early on to be a brilliant and original thinker, and his novel ideas about teaching and learning were respected by the intelligentsia within the Soviet Union. At that time, progressive educators were attempting to reform education in prerevolutionary Russia. *School and Society*, Dewey’s masterpiece, had been translated into Russian and was widely read by progressives, who drew on him for inspiration. This, in itself, provides a foundation for a Dewey-Vygotsky connection. Further, in 1928, Dewey visited Second Moscow University, where Vygotsky was a highly respected young psychologist. Prawatt (2004) made a strong circumstantial case that both Vygotsky and his compatriot, Blonsky, actually met with Dewey at the university. To strengthen the connection, we may take into consideration that Dewey posited that humans are only human through their social interconnectedness, and Vygotsky and Dewey concur that the human condition is based in social interactions. Moreover, their combined major works are Darwinian in research methodology and pedagogy.

Vygotsky spent his short life in Marxist Russia, but his theories did not conform to the Communist ideology. The Soviet government banned the publication of Vygotsky's work after his untimely death from tuberculosis in 1934. Unfortunately, Vygotsky's work remained in obscurity until his books were discovered at Harvard University and printed in the West during the 1960s.

Vygotsky's views on teaching and learning are founded on the Darwinian premise that human intelligence is not a fixed characteristic but, instead, a dynamic entity that can be enhanced by social interaction and collaborative work. Central to Vygotsky's views on learning is the belief that knowledge is not directly transferable from teacher to learner. Rather, through social interaction, the learner constructs his own meaning. This constitutes the theoretical basis for cooperative learning, a method that has now found favor throughout the United States, Canada, and many other countries around the world.

To comprehend Vygotsky's views as they relate to cooperative learning, it is necessary to understand his concept of the zone of proximal development (ZPD) (Lee & Smagorinsky, 2000). The ZPD may be described as the dynamic range of intelligence that characterizes any individual. If we were to envision two concentric circles, or double rings, then the large space in the center of the inner ring would represent an individual's current developmental ability to solve a problem while working alone. This area or zone may be likened to what would be measured by an intelligence test. The space between the first and second rings represents where an individual solves a problem when being guided or coached by a more capable peer or a teacher. This, according to Vygotsky, represents the ZPD. As individuals solve problems with assistance, this zone is expanded, and another ring encircles and defines a new ZPD. What did lie within the original ZPD has been subsumed into the center, and now the expanded, current developmental level of abilities (the widened center of the circle) is encircled by a new and enlarged ZPD. Naturally, there are problems that cannot be solved despite the best help from others, and some tasks lie outside of the individual's current zone of development. However, those tasks remain proximal and may or may not be completed with more assistance.

Howard Gardner

My mind was really opened when I went to Harvard College and had the opportunity to study under individuals . . . who were creating knowledge about human beings.

—Howard Gardner
(Schaerer, 1999, p. 6)

A prominent leader in the field of education and brain research, Howard Gardner has investigated extensively

and documented cross-cultural studies on human intelligence. Gardner employs anthropological methods, and his research reflects a respect for scientific inquiry, the value of experience, and an acceptance of change that was intrinsic in the work of Darwin and Dewey. Considered to be a “new” progressive, Gardner has revealed, “My universe was framed by Dewey” (1991, p. 314). Currently a psychologist and professor at Harvard University's Graduate School of Education, Gardner developed the theory of multiple intelligences. In *Frames of Mind*, published in 1983, Gardner theorized that there were seven equally important components of intelligence. In 1999, an additional component of intelligence was introduced, and recently Gardner revealed a ninth intelligence.

Traditionally, intelligence has been seen as cognitive capacity, established at birth, fixed and uniform across a lifetime. Like Darwin, Dewey, Vygotsky, and others, Gardner disputes that intelligence is fixed, and his research illustrates that individuals exhibit unique variations of intelligence. If we were asked who is most intelligent—William Shakespeare, Albert Einstein, Salvador Dali, Barack Obama, Jesse Owens, Igor Stravinsky, or H. James Bix—we would be prone to name Shakespeare or Einstein. Our own thinking, however, tells us that all of the individuals listed are gifted in their respective fields, and they exhibit superior mental abilities in the areas of language, mathematics, art, leadership, athletics, music, and philosophical anthropology. Inappropriately, intelligence was and continues to be measured in terms of verbal-linguistic and logical-mathematical concepts. Most schools test students' competencies through the administration of short-answer standardized tests. Often, students qualify or fail to qualify for gifted programs on the basis of these largely verbal and mathematical scores. However, Gardner suggests that educators broaden their traditional and narrow conception of giftedness.

Gardner conducted his research through intensive interviews and in-depth analyses of the brain function of hundreds of subjects, including stroke victims, prodigies, autistic individuals, and individuals who are classified under the heading of “autistic savant.” While involved in Harvard University's Project Zero, Gardner studied the cognitive development of average, gifted, and brain-damaged children. As a result, Gardner views intelligence as consisting of three specific components: (1) ability to invent a useful product or offer a service that is valued within a culture, (2) skill to solve real-life problems, and (3) potential to find or postulate new problems for consideration in the light of new knowledge.

Gardner delineates his theory of pluralistic intelligence into ways of knowing. Criteria for identifying the existence of intelligence are grounded in neuroanatomy, developmental psychology, cognitive psychology, anthropology, and education. An intelligence, therefore, has a developmental pattern and a base in the physiology of the brain; it

is ignited by stimuli native to the particular intelligence, and it depicts ideas in a universally symbolic manner, as with music, words, or formulas. To date, Gardner has revealed nine intelligences, of which two, intrapersonal intelligence and interpersonal intelligence, are person-related. Four others—mathematical-logical, visual-spatial, naturalist, and bodily-kinesthetic intelligences—are object-related in that they are activated by objects in the environment. Three others, verbal-linguistic, musical-rhythmic, and existentialist intelligences are not connected to objects or persons.

Gardner hypothesized that individuals are born with and possess a unique compilation of all nine intelligences that may be enhanced through experience and effort. Realistically, students learn more readily when instruction is geared to their strongest intelligences. Gardner's understandings have had an immediate and dramatic effect on how curriculum is designed and delivered. Educators are internalizing a more flexible and progressive perception of intellectual development, and they are striving to incorporate some of the intelligences into each of their lessons as entry points to facilitate learning. Teachers who construct brain-compatible classrooms anticipate making future contributions resulting from the research of Gardner, who theorized that intelligence is definitely not fixed at birth.

According to Gardner (1983) himself, "Much of what I write about can be identified with the educational tradition of John Dewey—with what has been called progressive or neo-progressive tradition" (p. 3). Simply stated, where Dewey argued that problem solving is the essential of thought, Gardner frames intelligence around solving real-world problems and creative production.

A believer in cooperative learning as a mechanism for understanding, Gardner would agree that, when assigning problems for cooperative learning groups to solve, it is essential that they be at the outermost area of Vygotsky's ZPD for the most capable students in the group, thus allowing everyone on the team to be challenged to devise a solution. The newly discovered knowledge is shared within the group by a process that is often termed *scaffolding*. Scaffolding involves reaching out and sometimes down to assist another member of the group. Cooperative learning groups are progressive, and students are encouraged to share experiences and participate in their own learning. In effective cooperative learning settings, thought is continually being expressed through language, and students are engaged in a social-constructivist process, creating concepts through conversation. Teachers fill the role of facilitator, circulating among the learners to provide assistance as needed. Cooperative learning classes minimize the time that students spend sitting passively and taking notes while their teacher solves problems for them. Conversely, cooperative learning classes maximize the time that students spend interacting to solve problems for themselves. Gardner would concur that a sense of

optimism, hope, and power is infused in us when we realize that what children can do with assistance today, they can do independently tomorrow.

Conclusion

We might ask again, why is there so strong a resemblance between anthropological methodology and educational methodology? Was it coincidental that educational practice underwent a revolution after the publication of Charles Darwin's *On the Origin of Species* in 1859? No, it was not a coincidence. It is evident that Darwin's evolutionary framework had intense and powerful impact upon scholars throughout time, scholars who influenced their protégés who, in turn, influenced others. "The influence of Darwin upon philosophy resides in his having conquered the phenomena of life for the principle of transition, and thereby freed the new logic for application to mind and morals and life" (Dewey, 1910, pp. 8–9). The new logic inspired John Dewey to invest in schools as centers for social responsibility and interaction, thus providing the intersection of education and anthropology. Darwin's understanding of the earth and its populations as ever evolving and never fixed in nature underlie the philosophies of Dewey, Xingzhi, Montessori, Vygotsky, and Gardner. Darwin's philosophies are found at the heart of anthropological and educational thought and practice. Both anthropologists and educators enthusiastically welcome change. Instead of debating the legitimacy of their theories, they progress. As researchers, they are task specific, and they anticipate the further evolution of science and technology, as well as psychology and neuropsychology. Educators are cognizant of the impact that Darwin has had upon their methodology and pedagogy down through the generations.

It stands to reason that if humankind evolves, then its intelligence will evolve and expand through experience. Anthropology is both a mirror and a window for education. The mirror reflects our common humanity: our wants, our needs, our desires, our conflicts, and our resolutions. As such, anthropology reflects the human condition and offers the tools to ensure our survival as a species. The window opens to the future. *And it all began with Darwin!*

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HISTORY AND LITERATURE IN ANTHROPOLOGY

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This is a review of the works that have influenced and reflected anthropological thought from its earliest day to the present—and perhaps into the future. Of course, any substantial review of anthropological literature will include coverage of basic trends in the field, as well as references to major social and cultural currents in society. Anthropology did not develop in a vacuum. For better or worse, it is always a product of its times, reflecting those times as well as entering into dialogue and debate with them. In addition, anthropology is not a monolithic entity. It is better viewed as a many-headed hydra. Moreover, its development has not been in a straight line. It has not only gone in many directions but also often circles back to earlier ideas, rediscovering almost forgotten or neglected concepts and scholars. Nevertheless, there have been some basic concepts that help unify the field. This review attempts to express the unity in diversity, which marks the field and makes it among the most exciting intellectual fields in academic life.

Early Literature in Anthropology

Some scholars trace anthropology back to the ancient writings of Herodotus, Aristotle, and others. Certainly, the Greeks and Romans influenced anthropology as they did other later fields of study. There can be no doubt that the 19th-century founders of anthropology drew inspiration

from classic authors. Nor can there be any doubt that they were at least equally influenced by the great thinkers of the Enlightenment, such as Voltaire, Montesquieu, and Jefferson, among others. Moreover, the spread of the European Empire and exploration to the far reaches of the world, leading to contact with peoples whose appearance, customs, and traditions differed so greatly from European ways, sparked attempts to understand them in a systematic way.

People in the United States regularly encountered what people now term “the other.” American Indians were there to greet Europeans when they landed on the continent and began to establish what became the “American way of life”. Relations between them ranged from intermarriage to bitter hostility. Whatever a particular settlement’s current relationship was with Native Americans, the fact of Native American existence and otherness was never far from the American consciousness. Even those who had little to do with American Indians in the 19th century encountered Indians, in popular cultural representations and historic stories. Indeed, their presence inspired early American anthropologists like Lewis Henry Morgan. Morgan and others who were interested in understanding and chronicling earlier societies and their cultures found themselves adapting a framework from biology, namely, Darwinian evolution.

Although he was a biologist, Charles Darwin’s influence went well beyond that he had on biology. He was not

the first person to posit a theory of evolution. The ancients had people who advocated the idea, including Democritus and St. Augustine among them. Indeed, as Darwin noted in his *On the Origin of Species* (1859), his own grandfather Erasmus Darwin had put forth a theory of evolution as had many other scholars. Darwin even mentioned others who had anticipated his own contribution, natural selection, and notes the role of Russel Wallace in coming up with the idea of natural selection, or “descent with modification.”

Darwin was a shy individual who resisted controversy. Thus, he allowed others to carry on the struggle to establish acceptance for his ideas. Therefore, Thomas Henry Huxley (1825–1895) became “Darwin’s bulldog.” Huxley loved to argue and took on clergy who believed that Darwin’s ideas were antithetical to religion and the creation story in Genesis. In the social sciences, the concept of social or cultural evolution had made progress before Darwin published his works. Herbert Spencer (1820–1903), for example, had put forth his theory of “survival of the fittest” for societies, justifying colonialism and imperialism. He, and others, ranked societies on various ladders, with Victorian England always being on the highest rung. Not every social or cultural evolutionist regarded the evolutionary system as being a value judgment. Indeed, there was often more than a hint of the “noble savage” nostalgia in their writings, in which they felt something had been lost in the movement toward technological complexity. That something was always something moral, something natural. The artificiality of modern life left much behind in human social life that was precious and natural. This dichotomy between the “rational” and “romantic” is still very much a part of American anthropology.

This dichotomous characteristic is part and parcel of the manner in which modern anthropology developed and of its origins in the colonial context mentioned above. Field anthropologists found themselves in the midst of the colonial world of the imperialist powers. At one and the same time, they were able to conduct their work because of imperialism, but they tended to side with those people subjected to colonial rule. Stanley Diamond (1974) commented that anthropology was “the study of people in crisis by people in crisis” (p. 1). There has been a steady reflection on this dilemma in the discipline, a process that has accelerated in recent years, reflected in the studies of Kathleen Gough (1968a, 1968b), Dell Hymes (1969), Talal Asad (1973), and Stanley Diamond (1969, 1974) among others who recognized that there was a strong connection between repression in the United States and abroad, the spread of trade, and the development of anthropology.

Early Writings in Physical Anthropology

Certainly, Darwin had an enormous influence on physical anthropology as well as in cultural anthropology. The primary theoretical orientation for physical anthropology, in particular,

is Darwinian evolution through natural selection, just as it is for biological science in general. Of course, there were antecedents to Darwinian evolution, as Darwin noted in *On the Origin of Species* (1859). Indeed, the antecedents go back to the eras of classical learning, early Christian and Islamic periods, the Renaissance, and the Age of Reason.

Although the institution of slavery and Greek condemnation toward manual labor hindered the advance of empirical science, there were exceptions to the generally abstract nature of Socratic and Platonic thought, which reached its peak in the fifth century BCE. Aristotle (384–322 BCE) combined the talents of a theorist with the curiosity of an empirical observer. He conceptualized a ladder of nature, on which all living things were related to one another but also differed in degree from each other. The degrees were miniscule from one step to the next and yet were significant. Some scholars argue that Aristotle’s belief in a divine final cause hindered the full development of his evolutionary ideas. Other Greek scholars advanced his work, and it spread during the period of the Roman Empire. With the fall of Rome, the general task of preserving and building on Greek ideas fell to Islamic scholars.

The major advances in scientific thought, even though antievolutionary in nature, helped build the foundation upon which Darwin built. Thus, the work of the Reverend John Ray (1628–1705) in taxonomy led to the classificatory system of Carl Linnaeus (1707–1777). Ray’s system was built upon his interpretation of the biblical account of creation, holding that all current living things are fixed after the sixth day of creation. He further stated that species are fixed forever and that all individuals belong to the same species if they descend from the same parents. In sum, species are indivisible. His work became the primary source on taxonomy.

Linnaeus built on it. His system used binomial nomenclature, designating both genus and species. He discussed his system in *The System of Nature* (1735); its 10th edition (1758) is the standard for scientific naming based on anatomical characteristics. Linnaeus moved from the idea of the fixity of species to the development of new ones through observing the effects of hybridization and the viability of the offspring of hybrids to reproduce. However, so firmly established was the concept of the fixity of species that even his posthumous 13th edition, in which he embraces the idea of the fluidity of species, could not change scientific opinion. Indeed, the 18th-century notion of the great chain of being coming down from God through man to woman and all other lesser forms of being seemed to establish the fixity of creation for all time.

The field of geology offered material to challenge the notion of the fixity of the great chain of being and species. So troubling were the data of geology that the clergyman John Ray had to take them into account in his work. He had to try to find an explanation for fossils, for example, that fit with his notion of creation. He termed this *catastrophism*,

using the Bible to map the catastrophes that led to the creation of fossils buried deep in the earth.

However, legitimate scientists began to offer other explanations. The French botanist Jean-Etienne Guettard (1713–1786) was interested in the distribution of plants and discovered that certain plants were always found with particular minerals and rocks. This interest led him to map out the distribution, and he concluded that rocks were always found in bands, and these bands followed an orderly and predictable pattern from one area to another. His 1751 map of the distribution of rocks in France and England is taken as the beginning of scientific geology.

James Hutton (1726–1797) took the next few steps in the development of geology. Hutton not only promoted the idea of uniformitarianism, the notion that past geological processes have the same agencies as contemporary ones, but also held that the world is more than just a few thousand years old. He argued that geological time is vast and that the rocks prove it.

William Smith (1769–1839), a surveyor, developed the technique of stratigraphy. Stratigraphy identifies the layers of earth according to their fossil contents. Others adopted the technique, which became essential to the development of geology as well as archaeology. This principal of superposition provided a dating technique with the assumption that fossils in any particular stratum are older than those above them and younger than those beneath them.

During the same period, George Louis Buffon (1707–1788) produced a 44-volume work, *Natural History*, the first amalgamation of European biological information. Unfortunately, the Catholic Church was very influential in France and saw it that Buffon's work was heavily censored. At times, his work and innate humor got him into trouble. Nevertheless, Buffon made significant use of Linnaean taxonomy.

Buffon also provided material pointing to the age of the earth. He indicated that some sort of major cataclysm, perhaps a collision of a comet and the sun, led to the formation of the earth. He also concluded that other planets resulted from this collision. Buffon conducted a number of experiments, seeking to provide proof of his ideas. These strengthened his support of uniformitarianism. His attacks on the various biblical flood theories led to strong opposition from the theological faculty at the University of Paris. These attacks forced him to offer a public recantation.

Not the least of Buffon's contributions was his support of the work of Jean-Baptiste Pierre de Monet Lamarck (1744–1829). Buffon hired this ex-soldier to teach his son. Lamarck impressed Buffon with his system for naming botanical specimens. Lamarck used a system of giving each specimen a genus and species name. Buffon sponsored Lamarck's admission to the French Academy and subsequent position as a professor in Paris. Lamarck made significant changes in the Linnaean classificatory system.

Alas, all of the major scientists affiliated with Buffon except Lamarck died during the French Revolution, at the

end of the 18th century. Lamarck, however, carried on their work, arguing openly for evolution. He argued for the antiquity of the earth while proposing animal evolution. He arranged a ladder of animal evolution in steps from the simplest to the most complex. His major works were *Philosophie Zoologique* (1809) and *Natural History of the Invertebrates* (1815). Although Lamarck's various laws are no longer held to be true, they did provide an impetus for other biologists, including Darwin, to develop a more comprehensive system of evolution.

One of Lamarck's protégés, Georges Leopold Cuvier (1769–1832), became the most brilliant comparative anatomist of his day. Unfortunately, he reverted to the older notion of the fixity of species and opposed evolutionary thought. His work in comparative anatomy, nonetheless, proved essential to the development of evolutionary thought.

Charles Lyell (1797–1875) was a geologist who had a major impact on Darwin. Lyell's work on the effect of water, waves, and wind on the landscape led him to oppose the notion of catastrophism and embrace the notion of a long geological time period. Moreover, he applied the law of uniformitarianism to support his stand. His major work was *The Principles of Geology or the Modern Changes of the Earth and Its Inhabitants* (1831–1833), which overturned the previous accepted wisdom and provided the foundation for Darwinian evolution through establishing the millions of years needed for the slow process of organic change.

Edward Lartet (1901–1871), a French lawyer, disputed the notion that humans and apes developed in the present epoch. The discovery of mastodon teeth in his village led to an interest in fossils. Soon he became a collector of fossils. In 1837, he discovered a fossil ape from the tertiary period resembling a modern gibbon. He named it *Pliopithecus*. Later, in 1856, he found another fossil ape, which he named *Dryopithecus*. These discoveries were but a few of the challenges to the theory of catastrophism, and they paved the way to modern evolutionary theory.

In the same year that Darwin published *On the Origin of Species* (1859), Paul Broca founded the Anthropological Society of Paris, the first anthropological society in the world. Broca was quite interested in physical anthropology, attempting to make it a scientific discipline. Toward that end, he set up an anthropological laboratory in 1858. This became a training center for anthropologists. Broca was a pioneer in craniology, using the measurement of heads for the purpose of racial classification. The use of anthropometry, the measurement of human physical characteristics, spread rapidly and added to the debate between those who felt there were many origins for human races (polygenists) and those who saw a single origin (monogenists).

The connection between primates and humans became a matter for serious concern. Ernst Haeckel (1834–1919), for example, wrote an encyclopedia of primate anatomy. He drew for it the first scientific tree demonstrating the connection between primates and humans. The continuing

debate over the origin of races and their connection pervaded the late-19th- and early-20th-century development of physical anthropology. Not surprisingly, the debate traveled to America, where Frank Russell (1868–1903) became the first American to receive a PhD in physical anthropology. He was honored with the degree in 1898 from Harvard. His dissertation was predictably on a measurement of Eskimo crania.

A Bohemian medical student, Ales Hrdlicka (1860–1943), became a major American physical anthropologist. New York State hired him to work in anthropology and pathology. In 1903, the U.S. National Museum hired him, and he remained there. In 1918 he founded the *American Journal of Physical Anthropology*. Hrdlicka was a key figure in establishing that American Indians had migrated across the Bering Strait. He was also a major opponent of the idea of racial superiority. In 1930, he founded the American Association of Physical Anthropology.

In addition to his work on primates, Ernst Haeckel (1834–1919) contributed a number of other essential ideas to physical anthropology. He coined the phrase “ontogeny recapitulates phylogeny.” Moreover, he popularized Darwin in Germany and drew a genealogical chart connecting all known life forms. Haeckel was a noted artist who produced many illustrations of animals for his *Artforms of Nature*. His *Freedom in Science and Teaching* was written to defend the teaching of evolution.

Thus, by the end of the 19th century, physical anthropology was established as a discipline. It was mainly concerned with anthropometric measurements, the issue of race, and the relationship of human to nonhuman primates. There were many arguments over racial superiority of the “white race” over other races, but there were many who opposed that view and argued for the unity of humankind.

Early Writings in Archaeology and Linguistics

It is probably true that all people have some interest in the past. Archaeology grew out of such an interest, an interest that has roots in both the sacred and secular. Both religion and looting have contributed to what has become known as archaeology. Egypt, for example, looked for roots of its religion in the past, and the government of ancient Egypt may have sponsored the first excavations of the past. Search for biblical roots and areas mentioned in the Bible still inspire archaeological digs today. The hunt for treasure needs little comment, since popular culture is filled with such tales.

Most archaeologists agree that the beginnings of scientific archaeology are found in the 18th century with the second excavations at Herculaneum. These digs went beyond previous treasure hunts. Unlike the first hunts, which destroyed intact remains, these excavations were rigorously conducted. However, things changed when Charles of Bourbon, King of the Two Sicilies, decided to hire Marcello

Venuti to supervise the process. Venuti reopened the former shafts and was able to translate the inscriptions, certifying the authenticity of the site. With this careful process, archaeology became a science.

Or it was at least on its way toward becoming a science. Although the 18th century was termed *the Enlightenment*, the next truly archaeological excavation was not until 1784, when Thomas Jefferson made excavations in Virginia. However, the interest in abstract theory in the period did provide interest in cultural evolution, the progress from one stage of development to another. Some scholars and amateurs became interested in finding proof for this idea.

The idea of cultural evolution, unfortunately, quickly moved away from the notion of equality toward one of European triumphalism. Moreover it provided a rationale for imperialism and colonialism in which the “civilized” Europeans had an obligation to bring their superior culture to undeveloped “primitives.” Scientists developed various systems ranking societies on their development and progress toward the level of civilized European society. These systems not only aided the production of a great deal of information on individual societies but also were used to shore up the notion of the natural superiority of European civilization.

Some gifted amateurs have aided the progress of archaeology. Jacques Boucher de Perthes, for example, was a French customs officer. De Perthes had an interest in artifacts. Over a period of time, from the 1830s to the 1850s, he discovered a good deal of fossil material along with hand axes and other artifacts at Abbeville. In 1847, de Perthes argued that this Ice Age site proved that humans had been on earth for more than the 6,000 years many religious scholars stated. However, it was not until 1859, when two British archaeologists examined the site and supported de Perthes, that other archaeologists took notice.

The romance of archaeology, reflected in recent times in the “Indiana Jones” saga in cinema, was carried on at the end of the 19th century in the work of Heinrich Schliemann, Paul Emile Botta, and Austen Henry Layard, among others. Schliemann went looking for ancient Troy and found it but did not know he had found it. Botta thought he had found Nineveh of Biblical fame, but he had not. Layard, however, did find the site of the biblical Nineveh. These expeditions kept up popular interest in archaeology and were the inspiration for many popular works of fiction.

More scientifically, Christian J. Thomsen and Jens Jacob Asmussen Worsaae, both of whom were curators at the National Museum of Denmark, found evidence for the three-age system of tools—Stone Age, Bronze Age, and Iron Age. They discarded the mistaken notion that the poor used iron and the wealthy used bronze in prehistoric times.

This early period in archaeology left a number of issues with which archaeologists must still deal. The question of the equality of humans was one that the Enlightenment embraced and many early archaeologists abandoned in their search for stages of human social and cultural development.

The idea that European culture was the crown of cultural evolution may appear ludicrous today, but there are still people who believe this to be true. Moreover, archaeology still has to cope with religious and nationalistic leaders who hold fast to their beliefs and fight any evidence that puts these beliefs into question. There is also the issue of the return of all those artifacts taken from ancient sites to the countries from which they were so blithely taken.

Linguistics underwent similar developments in its history. It, too, had deep roots in ancient civilizations but did not become a science until the 19th century. There have been many in the field who believe that the best hope for linguistic advance lies in attention to the evidence, and therefore leads, that archaeology offers. There have been many examples demonstrating this proposal. The advance of linguistics in delineating American Indian languages has been aided through the evidence provided by both archaeology and physical anthropology on the northeastern origins of Native Americans. The search for the “origins” of the Bantu language family, now seen to be part of the Niger-Congo family, profited from the work of archaeologists as did earlier work on the Indo-European language group.

There were 18th-century developments in linguistic studies that aided its movement toward becoming a scientific field, for example, the work of James Burnett and Lord Momboddo in discerning logical elements in the evolution of human language. Sir William Jones’s *The Sanscrit Language* (1786) argues that there is a connection between Sanskrit, Persian, Greek, Latin, Gothic, and Celtic languages, taking a step toward developing the notion of the Indo-European language family and the fields of comparative and historical linguistics.

There is such a natural connection between language and culture that a deep relationship between archaeology, physical anthropology, and linguistics appears integral. Indeed, both Franz Boas and Bronislaw Malinowski deemed it a natural one. Both men were committed to fieldwork, and the learning of the language of the people among whom one works is important to successful fieldwork. Moreover, the language a person speaks offers significant clues about the culture of that person.

By the end of the 19th century, anthropological linguistics had developed into a modern science and, in the eyes of Boas, an equal part of the overall anthropological picture. It had developed its basic scientific concepts, demonstrated the rule-bound nature of language, made significant advances in comparative and historical linguistics, and was moving toward other major areas of the field, such as structural and descriptive linguistics.

One of Boas’s students, Edward Sapir (1884–1939), advanced the field of linguistic anthropology greatly, mapping out many areas later developed in its history. In addition to his work in linguistics, Sapir also worked in other areas of anthropology. His work included studies of personality and cultural behavioralism. Sapir held that

language shapes the way in which we perceive the world. Different languages condition people to see the world differently. Sapir viewed language as a symbol system and a royal road to understanding culture and personality. Sapir was a brilliant theorist and looked for the connections among language, culture, and personality. In fact, a number of his students compiled a book of his writings in his honor; it was titled *Language, Culture, and Personality* (Sapir, 1949).

Sapir anticipated many of the later developments in the field. His concept of language drift focused on the changing nature of language, but Sapir also emphasized the fact that important elements of language are slow to change. Moreover, he noted the role of body language in communication as well as its unconscious nature.

Certainly, the most famous aspect of his work was the Sapir-Whorf hypothesis. Benjamin Lee Whorf (1897–1941) was a successful businessman working as an inspector for the Hartford Fire Insurance Company. He pursued studies in linguistics and ethnology as a hobby. His work as an inspector brought many instances to his attention of the manner in which language influenced behavior. He noticed that people were careless around containers and trucks labeled “flammable,” believing that such containers were not able to break into flames. People would throw lighted cigarette butts into empty containers of fuel, not realizing that empty containers are the most dangerous because of residual fumes. Whorf contributed a number of ideas to linguistic anthropology. He developed the concept of linguistic relativity, helped further the area of sociolinguistics, and made substantial contributions to the study of American Indian languages.

Early-20th-Century Anthropology, 1900–1930

By the end of the 19th century, anthropology had become a professional field. Not only were there professional associations, but the discipline began to be offered in universities. By the beginning and early years of the 20th century, anthropology had become more of a professional or academic discipline, and power moved from the federal government (the Bureau of Ethnology and the National Museum) to major centers of learning—universities such as Columbia, Harvard, and the University of California at Berkeley. Franz Boas was a major force in this shift of power.

Boas and his students struggled against those who offered eugenic explanations of cultural differences. American anthropology became strongly empirically and culturally oriented, moving away from those racist stands that supported discrimination and colonialism. Many anthropologists were members of one minority group or another—Jews, women, American Indians, or others. They were hardly liable to support the dominance of a White Anglo-Saxon male establishment. That does not mean that

Boas and his students were able to eliminate bias in the profession or won easy victories. Many of these battles are still being waged today. Nevertheless, the influence of the antiracist, antibiological determinism position has remained strong in the profession.

Adding to the drive for cultural understanding was the move to ethnography. The detailed study of a given society or group requires a long period, ideally a year or two, of living with the group and intensive study of the group. This participant-observation provides more than an intellectual understanding of the group. It is sometimes referred to as learning through the skin. Most anthropologists view this fieldwork experience as a necessary rite of passage, and anyone who has undergone it finds it difficult to forget. It provides a means for deeper understanding of the meaning of otherwise “foreign” behavior and thinking.

Malinowski is generally given credit for developing the method in his Trobriand Island fieldwork, and he passed the method on to his students in England. Boas endorsed the technique as well and passed it to his students, along with his idea of culture and cultural relativism—understanding a culture on its own terms and in its own setting. Boas focused on symbols and values in his work on culture rather than on institutions and groups, which were the emphasis of British social anthropology. Fieldwork helped clarify many problems that had been inherited from 19th-century arguments in anthropology.

Ethnographers, for example, reached a general agreement that both *diffusion*, the spread of cultural traits from one group to another, and *independent invention*, the development of an idea or tool without outside influence, occur in cultures at the same time. However, they also emphasized the fact the even borrowed traits may have vastly different meanings in different cultural situations. The focus was on understanding each culture on its own terms, rather than comparing them cross-culturally in whole or in part. This view, termed *cultural relativism*, was a strong factor in American anthropology. This emphasis on meaning led to a great deal of interest in expressive forms—art and myth, for example. There was a great concern with meaning and self-definition as well.

The presence of so many American Indian nations in the United States aided the practice of ethnographic fieldwork. Although a number of Boas’s students conducted fieldwork outside the United States, as did Margaret Mead and Melville Herskovits, for example, most did at least some work among American Indians. The ready availability of American Indians encouraged repeated trips and long-term fieldwork over time. It also enabled American anthropologists to build on a body of earlier work, dating to the 19th century.

Boas was involved in political issues and skeptical of government-sponsored research, as well as that supported financially by the wealthy. Moreover, Boas demanded rigorous empirical work from himself and his students. He shied away from putting forth universal laws and over-

generalizations. He emphasized nature over nurture and directed research demonstrating that fact with immigrant children. In addition, Boas took a strong stand in favor of equality and against all types of discrimination, leading the FBI to keep a file, mainly inaccurate, of his activities. Boas stressed that the uniqueness of cultures did not evolve. Each culture had to be studied in itself.

Boas also underscored the need for the four-field approach in anthropology: physical (biological) anthropology, cultural anthropology, linguistic anthropology, and archaeology. Boas noted that these interrelated areas aided one in understanding culture. Boas emphasized his approach through his work at Columbia University and the American Museum of Natural History. Boas’s students included Alfred Kroeber, Robert Lowie, Ruth Benedict, and Edward Sapir, as well as Margaret Mead. Their work attacked the idea of a general line of cultural evolutionary development and emphasized what came to be termed a *cultural history* method.

Although they were opposed to overgeneralization, anthropologists who followed Boas did feel that there was some sort of need to go beyond mere statements of specifics. Kroeber wrote a textbook, *Anthropology*, outlining the general ideas of the field. “Culture and personality” studies were in conformity with many of Boas’s ideas. Mead’s *Coming of Age in Samoa* (1928) and Benedict’s *The Chrysanthemum and the Sword* (1946) highlighted this trend. Mead chose to stay away from a permanent anthropological appointment, noting the bias, despite Boas’s efforts, against women in the profession. Boas wanted Benedict to succeed him as chair of the anthropology department at Columbia, but Ralph Linton worked against her appointment, proving the wisdom of the always astute Mead’s stand on the issue.

Ruth Benedict (1887–1948) studied with Boas at Columbia and received her PhD in 1923. She joined the faculty in the same year. Two of her outstanding students were Marvin Opler and Margaret Mead. Benedict held that each culture chooses from the vast possibilities but a small number of traits. These traits form a gestalt that shapes personalities within the culture. Her *Patterns of Culture* (1934) remains influential, though criticized as too general, and it is still remarkably readable and interesting. Benedict was among the few who applied anthropology to complex cultures in its early days. Like Boas, she was strongly drawn to social causes, and she opposed racism and the bigotry of some so-called religious people, using anthropological data to combat these biases.

Following in the footsteps of Benedict and Boas, Mead became a major public figure who combated bias and ignorance in her work. More than either, however, she became the voice of anthropology to the public. From the publication of *Coming of Age in Samoa* to her death, she represented anthropology in the public forum. Her books sold well, and her column in *Redbook* had numerous readers. Mead wrote about situations in the United States and was

among the first, with her third husband, Gregory Bateson, to use photography and filming in fieldwork. She was as much at home in New York as in Bali. *Time* magazine named her Mother of the World in the mid-1960s.

The Turn to Modern Anthropology

One of the all-around anthropologists, a master of the four fields, was Ashley Montagu, whose birth name was Israel Ehrenberg (1905–1999). Montagu changed his name in an attempt to avoid the vicious anti-Semitism of his day. Although he was born in England, he migrated to the United States as a young man and became an American citizen. He was a brilliant anatomist, and this skill aided in his attacks on race and gender bias and discrimination. Montagu studied with a number of distinguished scholars in England, none more important than Malinowski at the London School of Economics. Shortly after, he attended Columbia University and studied with both Boas and Benedict, writing his dissertation under their direction; it was titled *Coming Into Being Among the Australian Aborigines: A Study of the Procreative Beliefs of the Native Tribes of Australia* (1938). Before becoming a professor of anthropology at Rutgers, he taught anatomy in a number of universities. After leaving Rutgers, Montagu became an independent scholar and a great popularizer of anthropology, explaining its importance to the general public on many television programs.

Although always opposed to racism, he became a great proponent in the 1950s for eliminating the concept of race from biology. He wrote a number of works; the most famous of his writings on race are the UNESCO *Statement on Race* and *Man's Most Dangerous Myth: The Fallacy of Race* (1942). Montagu was deeply opposed to the work of the anthropologist Carleton S. Coon.

Coon was interested in the manner in which infants bonded to their mothers. He was among the first scholars to emphasize the significance of touch and the effects of a lack of affection for infants on later adult criminal behavior. His work influenced a number of experiments with monkeys in isolation. It was but a small step to opposing genital mutilation of children.

Montagu's attacks on the concept of race, dating at least from the 1930s, challenged the beliefs of most anthropologists. We would say that Montagu argued that race was but a social construct with no foundation in biological reality. Instead, he looked to gene-frequency analysis to unravel the mysteries of human evolution. Montagu put his ideas in an article coauthored with Theodosius Dobzhansky (1947). They argued that early humans everywhere were hunters and gatherers, facing similar problems. These early humans adapted in similar ways to similar changes. The conclusion, going back to the law of uniformitarianism, is that there are no mental differences between populations. The overwhelming majority of anthropologists accept this fact.

It was about this time that modern primatology (ethology) began to develop. The study of animals in their natural settings, like so much else in anthropology, has a long history. However, modern scientific observation dates from the early 1950s and the publication of Niko Tinbergen's *The Study of Instinct* (1951) and Konrad Lorenz's *King Solomon's Ring* (1952) and *On Aggression* (1966). Many primatologists began extensive studies in the wild, the most famous being Dian Fossey and Jane Goodall.

These studies led to the gathering of significant data leading to better understanding of human evolution. In addition to fruitful models of possible human evolution, there was the inevitable sensational popularizing of this work in volumes such as Robert Ardrey's *The Territorial Imperative* (1966) and *The Hunting Hypothesis* (1970) as well as Desmond Morris's *The Naked Ape* (1967). Interestingly, most of the material to disprove and discredit these works came from further field studies in primatology. Among the leaders in this area was Jane Goodall, a protégée of Louis S. B. Leakey, a famous paleoanthropologist. He encouraged Goodall to study chimpanzees, hypothesizing that these studies held hope of offering material enabling us to understand better our ideas of human nature.

These studies did add to our understanding of evolution and human nature. When Goodall, for example, found that chimps at the Gombe Reserve made tools as well as used them (Goodall, 1983), many preconceived notions of Man the Toolmaker were discredited. Since the 1960s and 1970s, further work has shown more similarities between the great apes and humans. There has been work on human sexuality, aggression, politics, and almost any other topic one can imagine, including language acquisition, stemming from ethological studies.

The discovery of DNA (deoxyribonucleic acid) has also led to amazing strides in many areas, including anthropology. DNA contains basic genetic instruction for the development of living organisms; it is the code of life. It stores information in coded form. In 1951, James Watson, Francis Crick, and Rosalind Franklin were working on the problem of the structure of DNA. Linus Pauling was also involved in the search for the structure of DNA. Others were also involved in the search. The full story is murky at best and a mystery in itself. However, there is no mystery about the significance of the discovery of the structure of the DNA molecule and its coding.

The discovery of the DNA molecule and its structure fed into the growing importance of genetics in understanding human evolution. Just as Gregor Mendel (1822–1884) provided support for the process of evolution with his discovery and experiments on genetic processes, so, too, did an understanding of DNA provide a better understanding of genes. Mendel provided a statistical overview of genetics. He noted the stability of his genetic ratios; thus, the results were not chance ones. He then distinguished between genetic factors (genotype) and appearance (phenotype).

What you see is not always what you get. This factor led Mendel to conclude that there were two genes (alleles) for each characteristic, leading to an understanding of the existence of dominant and recessive traits. DNA allows us to understand how genes work and how mutations occur; they are best understood as changes in the code or message of the DNA.

Other developments aiding the study of evolution came in absolute dating. The Carbon-14 method was among the first. It permits the direct dating of any material containing organic material. There is a known rate at which Carbon-14 disintegrates. Larger samples are better than small ones. Obviously, great care must be taken to avoid contamination of the sample. Moreover, recent samples are difficult to date, as are those over 50,000 years old. Finally, the ratio of ^{14}C to ^{12}C is not constant in time or place for various reasons. It is best to obtain more than one sample for dating and to cross-check samples using other dating techniques.

Finally, these various advances have strengthened the movement, supported by anthropology, known as antiracism. Anthropologists such as Boas, Benedict, Mead, and Montagu argued for worldwide equality and attacked the so-called scientific basis for inequality. Anthropology provided theoretical and empirical support for the antiracist movement. The U.S. Supreme Court decision in *Brown v. Board of Education, Topeka, Kansas* (1954) drew heavily on the works of anthropologists in its decision. Robert Redfield, a lawyer as well as an anthropologist, filed an amicus curiae brief opposed to segregation. Modern anthropology, by and large, has attacked the alleged biological foundations for the concept of race itself.

The Emergence of Applied Anthropology

Some anthropologists add applied anthropology—the application of anthropological theories, concepts, or approaches to the solution of practical problems—as a fifth field of anthropology. Any of the other four areas or a combination of them may be termed “applied anthropology.” The first use of the term was in 1906 at Oxford University for a diploma program. An even earlier term for essentially the same ideas was used in the 1860s, when James Hunt used it. Hunt was the founder of the Anthropological Society of London.

The British early considered anthropology useful for their colonial administration. E. B. Tylor called anthropology a “policy science,” and he urged its use to solve problems of human life. Northcote Thomas used anthropology in 1908 to implement indirect rule in Nigeria, the policy of Frederick Lord Lugard. It took some time for the U.S. government to begin to use anthropology in its administrative services. In 1934, the Bureau of Indian Affairs used anthropologists to implement the Indian Reorganization Act. John Collier, head of the Bureau of Indian Affairs, used anthropologists in a number of capacities. They were able to “translate” between the American Indian

groups and the bureau, study the culture and society of tribal groups, aid in writing charters and constitutions for tribes, and in many other ways aid the implementation of programs of benefit to Native Americans. Archaeology also proved its usefulness to public policy during the 1920s, when archaeologists aided the establishment and execution of public works programs.

The U.S. government found many uses for anthropologists during World War II. Anthropologists worked for the War Relocation Authority, for example, working with resettled Japanese Americans. There were also other government projects, such as the Study of Culture at a Distance program that was used to help the United States understand its enemies. In 1941, a number of anthropologists founded the Society for Applied Anthropology (SfAA).

Applied anthropology continued to grow in the post-war world to help international aid and foreign policy programs. Archaeologists continued to work in cultural resource management programs after the passage of the 1969 National Environmental Policy Act. This came at a time when many cultural anthropologists refused government employment because of the Vietnam War. As a result of that war, students demanded more involvement of anthropologists to aid in meeting human needs. As academic jobs decreased, private and government sectors recruited more anthropologists.

There have been a number of famous examples of applied anthropology projects over the years. Some were successful, other not. Some had mixed results. A case often cited as a successful example of intervention is a project among the Fox Indians in Iowa, headed by Sol Tax and conducted by his students. Students initially went to the Meskwaki (Fox) settlement for a summer of fieldwork in 1948, and 35 students went to the area over the decade of summers that followed. Over that period, students wanted to do more than simply collect traditional anthropological data. They wanted to help the Meskwaki solve their problems. They desired to provide an answer to a frequently heard question: What did the Meskwaki get out of the project?

With Tax's blessing, the students attempted to help the Meskwaki. Tax was the students' director. Tax held that an anthropologist had an obligation to the people themselves, not to governments. This “action anthropology” challenged some basic ideas of anthropology as a pure science, suggesting that research is only justifiable if it aids the people being studied.

Eventually, students went from basic help, such as driving people to appointments, to more profound intervention. Fred Gearing, author of *The Face of the Fox* (1970), aided in the establishment of cooperative farming. Others worked for different improvements. Some of the projects were more successful than others. Gearing's book provides more detailed discussion of the project and an evaluation of its overall impact.

Another long-term project was the Cornell University Vicos project. Vicos was part of the Cornell-Peru project.

The project discovered that the 2,250 Vicosinos were starving and were afflicted with gastrointestinal problems. Moreover, they were obligated to work for the patrons of a hacienda; these patrons controlled the best land. Cornell had a lease on the hacienda that expired in 1957. The project made a recommendation to the Peruvian government, which the government followed. Basically, it called for control of the land to be taken from the elite patrons and given to the Vicosinos. A long struggle ensued contesting that decision. Cornell eventually became the new patron. Evaluation of its role has provoked much controversy in anthropology.

The infamous Project Camelot, a 1964 U.S. Army project, is often cited as a model of what anthropologists should avoid. The basic goal was to find ways to help established governments fight insurgents. Chile was the primary test case. Social scientists, whom Norwegian Johann Galtung alerted, forced the cancellation of the project. This position was a step away from the position of anthropologists during World War II. However, many have pointed out that World War II presented a very different situation from meddling in local governments or in Vietnam.

At Michigan State University (MSU), an advisory group existed from 1955 to 1962 that was a front for the CIA to promote covert action in Vietnam. MSU faculty and staff aided the Ngo Dinh Diem regime in South Vietnam. The advisory group helped write the constitution of South Vietnam and entered into training programs for Vietnamese personnel. The United States ended the program as CIA involvement became better known. This and other actions of the FBI and CIA led many, if not most, anthropologists to be wary of government programs, aside from programs like the Peace Corps.

The recent Human Terrain project in Afghanistan echoes the program in Vietnam and has stirred up controversy once again. The deaths of at least three of the anthropologists employed in advising the American military on the customs and traditions of Afghans have added greater heat to the controversy. The poor employment opportunities for anthropologists may have added to the temptation to engage in the controversial activities. However, the range of opportunities for working in applied anthropology is great, including medical anthropology, public anthropology, salvage archaeology, employment by indigenous peoples, and a whole range of programs, including studying and documenting endangered cultures.

Forensic and Medical Anthropology

Forensic anthropology is an applied area of anthropology in which physical anthropology is used in a legal endeavor. Frequently, osteology is combined with physical anthropology when criminal cases involve skeletons that have become difficult to identify. Forensic anthropologists use their skills to help solve criminal cases, judging age, sex,

size, background, and cause of death. As with so many other areas of physical anthropology, forensic anthropologists are often part of a team working toward a goal, in this case solving a crime. In addition, forensic anthropologists may be found using archaeological tools, identifying footprints, reproducing faces of victims, and using a whole host of other skills. A forensic anthropologist also works on identifying the “race” and gender of a crime victim, the manner of death, the weapon that may have been used, and other facts of the crime.

In common with forensic anthropology, medical anthropology spans a number of other areas of the field, including social, cultural, biological, and linguistic anthropology. It employs a holistic approach to examine all possible influences on health and disease in a human population. The factors include, but are not limited to, environment, beliefs about illness stemming from culture and social class, political systems, and other biological, cultural, and social factors. It seeks to understand how people experience illness, its epidemiological distribution, how disease may be prevented, social and cultural factors of the health system, and the existence of folk practices and practitioners in the health system.

Medical anthropologists are acutely aware of popular beliefs and practices related to medicine and of broader social and cultural factors of the health system. They seek to account for human and nonhuman interrelationships in the environment and their influence on health issues. The impact of globalization on local health systems is of increasing importance to an understanding of health. A complete list of globalization’s ramifications would include a range of factors such as those on the list below, found on the official Web site of the Society for Medical Anthropology (2009):

- Health ramifications of ecological “adaptation and maladaptation”
- Popular health culture and domestic health care practices
- Local interpretations of bodily processes
- Changing body projects and valued bodily attributes
- Perceptions of risk, vulnerability and responsibility for illness and health care
- Risk and protective dimensions of human behavior, cultural norms and social institutions
- Preventative health and harm reduction practices
- The experience of illness and the social relations of sickness
- The range of factors driving health, nutrition and health care transitions
- Ethnomedicine, pluralistic healing modalities, and healing processes
- The social organization of clinical interactions
- The cultural and historical conditions shaping medical practices and policies
- Medical practices in the context of modernity, colonial, and postcolonial social formations

- The use and interpretation of pharmaceuticals and forms of biotechnology
- The commercialization and commodification of health and medicine
- Disease distribution and health disparity
- Differential use and availability of government and private health care resources
- The political economy of health care provision
- The political ecology of infectious and vector borne diseases, chronic diseases and states of malnutrition, and violence
- The possibilities for a critically engaged yet clinically relevant application of anthropology

This list provides an excellent overview of the field while demonstrating its need for a number of anthropological specialties.

Present Developments

There are a number of developments under the heading of current anthropology, depending on where one draws the line. The major areas have been in symbolic anthropology, all the “post-” movements (poststructuralism, postmodernism, etc.), humanistic anthropology, and various areas of biological determinism, such as sociobiology. Each of these areas is far from monolithic, and there are internal arguments within them at times more bitter than between the various schools of thought.

Symbolic anthropology is interested in examining and understanding how people in a given sociocultural system make sense of their surroundings and the speech and behavior of other people. More simply put, symbolic anthropology interprets symbols and the way in which people assign meaning to these symbols. Because people share in a common cultural system of meaning, symbolic anthropologists, like Clifford Geertz (1963), believe these symbols address basic issues of human sociocultural life. These symbols, according to Victor Turner (1967, 1980), can initiate social action.

Symbolic anthropologists see culture, then, as a system of meaning. The interpretation of its symbols and rituals provides a key to the meaning and purpose of that system. In its attempts to make sense of sometimes unintelligible beliefs and practices, symbolic anthropologists have turned to interpretive devices to examine ideal as well as material cultural dimensions. In a sense, symbolic anthropology is part of the “post” world. It is a reaction to rigid structuralism, such as that Lévi-Strauss (1955/1973) promoted. Geertz’s *The Cerebral Savage: On the Work of Claude Lévi-Strauss* (1973) is an example of this position. On the other hand, symbolic anthropology is anti-Marxist and against materialism of all types. It refuses to reduce culture to simply visible behavioral patterns with culture as an epiphenomenon.

Postmodernism and its related fields are opposed to positivism, the reduction of science to that which is known

by the senses. On a more affirmative note, it is in favor of using personal experience as a guide. There is great skepticism about knowing anything for certain. A method that postmodernists employ is deconstruction, in which the text—and almost anything can be a text—is broken down to find what it hides and assumes so that inconsistencies can be revealed.

The postmodernists are also committed to interpretation. However, it is a type of intuitive interpretation based on an individual’s own understating. It results in a narrative rather than an observation. Indeed, Michel Foucault (1972) holds that there is never a final meaning for any symbol or anything else. All is interpretation.

The postmodernists have inspired a turn to reflexivity and an investigation of and sensitivity toward ethnography. This investigation has led anthropologists to examine hidden premises in their own and past work, examining power relationships and deeper meanings. The process is termed *demystification*. However, a number of anthropologists have argued that postmodernism results in purely subjective criteria, or standards. Roy D’Andrade’s *Moral Models in Anthropology* (1995), for example, argued that these purely subjective models defeat any attempt to discover how the world works.

Humanistic anthropology is concerned with what it means to be human. During the first half of the 20th century, most anthropologists were humanists and unselfconsciously so. However, with the growth of other areas of anthropology, it became necessary to stress a humanistic approach to the study of being human, taking a holistic approach that looks at the entire human experience. Humanistic anthropology in common with symbolic anthropology focuses on the importance of symbols and interpretive approaches. In common with postmodernism, it rejects positivism.

There is a strong emphasis on viewing the self as something that changes and that the individual negotiates and reinvents. There remains a belief that knowledge is the goal of anthropology. Thus, truth can be discovered. Moreover, there is a belief in the importance of writing well and clearly. In addition, storytelling, including fiction, is promoted in relating ethnographies and field experiences. The importance of symbolic anthropologists such as Geertz and Turner are clearly evidenced here. A fine summary of the position is found in *Writing Culture* (1986), edited by George Marcus and James Clifford and including chapters by Renato Rosaldo, Stephen A. Tyler, and Vincent Crapanzano. There are many other influences on humanistic anthropology. Pierre Bourdieu, for example is certainly a major influence

In contrast with these approaches is the field of sociobiology. E. O. Wilson introduced the term in *Sociobiology: The New Synthesis* (1975). He viewed it as a Darwinian or evolutionary approach to society. A good deal of effort was expended by sociobiologists to explain human altruistic behavior in which people put the needs, even the lives and survival of others, before their own. Their explanation was

that such behavior aided in evolution through ensuring the survival of one's genes into the next generation. Similarly, they looked for genes promoting survival in warfare through ferocity. Much of the dispute over Napoleon Chagnon's study of the Yanomamo was a result of his use of sociobiology to study these "fierce" people. Many anthropologists resist sociobiology as a means for bringing biological determinism back into anthropology.

Future Directions

It is difficult to predict the future direction of anthropology, and any predictions will prove wrong to some extent. However, at this moment there are some areas that have come to the fore. There is what can be termed neoclassical anthropology for want of a better term. It is a return to some previous areas of the field and to the history of anthropology. Thus, there is a return to the roots of the field. There is an interest, for example, in the meaning of cultural relativity, of the origins of anthropology, its influence, and its and overall history. There is not so much iconoclasm in the field as in the past; now there is a search for continuity between more recent and earlier trends.

There is also a greater attention to the problems and conditions of globalization. Tied in with this trend is the importance of power and human agency. There is general agreement that the only constant is change. Anthropologists from the beginning have studied cultures in change and societies affected by world events. This fact must be recognized and addressed in one's research. Eric Wolf (1982), for example, led the way in calling for explicit concern with how current societies, which anthropologists study, got to be the way they are. Historical factors, in other words, need to be taken into account.

Wolf took an explicitly Marxist stance in his work. He called for an investigation of economic, political, and social power relationships. These included multinational corporations, labor policies, and information control. He called for attention to the position of people in society and their perspectives on events.

Michel Foucault and Antonio Gramsci (1971) added a local perspective to the picture. They looked more closely at symbols in interpreting meaning for individuals. In sum, they wished to discern the relationship between power and ideas. They noted that there is no single truth. There is a truth for capitalists, for instance, and a truth for laboring people. There are peasant truths and the truths of landlords.

Bourdieu (1977) carried the argument even further. Bourdieu speaks of different types of *habitus*, a concept roughly equivalent to the collective conscience of Émile Durkheim (1933). Others have adapted it to speak of various scapes or scenes, positions in society that have unconscious shared perspectives with others who also occupy them. In addition to economic capital, Bourdieu speaks of cultural, political, social, and other forms of capital,

including symbolic capital. People strive to make the most of their lives through manipulating this capital through various scapes or positions.

Globalization theory, like so much emerging in anthropology, is a synthesis of a number of approaches. It is a merger of neo-Marxism, neofunctionalism, symbolic anthropology, and humanism. It is an attempt to put a number of approaches, including postmodernism, together to address the problems of the 21st century.

The Anthropologist in Popular Culture

Anthropologists pop up in popular culture from time to time. Indeed, there are some anthropologists who write about anthropologists, such as Stanley Elkins (2000) and Kathy Reichs (2009). The movie *Krippendorf's Tribe* resonates with a number of anthropologists in its depiction of fieldwork and its problems. One could write a long paper on the topics.

Perhaps most people get their views of forensic anthropologists through television and the movies. *CSI* and similar programs often bring in forensic anthropologists, usually women, to help the forensic team. *Bones*, featuring an earlier incarnation of Reichs's heroine, Temperance Brennan, a thinly disguised Smithsonian Institution anthropologist, focuses on the female forensic anthropologist and places her in improbable but exciting situations with her FBI colleague. Indeed, the anthropologist as hero had a life before Susan Sontag's (1966/2001) famous essay on Claude Lévi-Strauss. Mr. Spock of *Star Trek* was an anthropologist, and some of Jules Verne's characters were anthropologists as well.

There is a long tradition of anthropologists writing fiction about their fieldwork. Laura Bohannon's *Return to Laughter* is the most famous, but there have been others. Issues of *Humanistic Anthropology* offer poetry and fiction celebrating the fieldwork experience. Of course, Indiana Jones in his four movies and TV program is the embodiment of the anthropologist as hero. Indy not only teaches at what appears to be Columbia University but also is a man of action into his 70s. Archaeology can be fun as well as enlightening.

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WOMEN AND ANTHROPOLOGY

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Many a retrospective take on the history of anthropology has characterized the discipline's formative decades as deeply rooted in the narrative of male quest. That is not to say, however, that women were never an object of study or that there were not important and influential women anthropologists helping to shape the discipline in its early decades. For the most part, however, women in anthropology (whether observed or observer) through the first half of the 20th century were relegated to a supporting role in the family of man. Theory often reified this notion as did anthropological practice.

One such example is illustrated by the public-private analytical approach to circum-Mediterranean societies that was influential for several decades in the mid-20th century. This approach applied a theory of social structure across a broad region believed to share key cultural traits. Representative of this approach is an influential volume published in 1965, *Honour and Shame: The Values of Mediterranean Society*, edited by John George Peristiany, which was cited for decades in the anthropology of southern Europe and the Middle East. This volume's attempt to move beyond ethnographic particularism to vigorous theory making was dominated by a perspective positing that politics and power were located in men's public worlds, while domesticity, reproduction, and child rearing (and the then-implied corollary, powerlessness) were consigned to the private world of women and the household.

The public sphere was considered more consequential and more prestigious—socially, politically, and culturally—than the private sphere and, as such, occupied a more central place in anthropological research generally. A critical follow-up to this volume was published in 1992, *Honor and Grace in Anthropology*, coedited by J. G. Peristiany and Julian Pitt-Rivers, in which detractors and apologists collided in a universalism-particularism debate but came to agreement that the honor-shame concept, associated as it was with the public-private dichotomy, was too weak analytically to be a powerful theoretical tool. Although a circum-Mediterranean anthropology is now out of fashion, favoring as it did a de facto anthropology of men, honor, and an exclusionary public sphere, it generated vigorous discussion for several decades on many topics.

Another example of the treatment of women in early anthropology is offered by some incidental research conducted by Alfred Louis Kroeber on women's fashion. Kroeber had been Franz Boas's first doctoral student; in 1901 he both received his PhD from Columbia and became the first professor in anthropology at the University of California, Berkeley. In this example, he studied three centuries' worth of women's fashion in an effort to offer a case that supported his "superorganic" conception of culture. He found interesting patterns in the variations of styles that, in his view, supported the notion that fashion is purely cultural and beyond the influence of individual choice. Although this is an example of an influential anthropologist's focus

on women's worlds, it is not necessarily a significant contribution to understanding women's lives.

In general, the treatment of women in anthropology, before the sea change that came about after the 1960s, was peripheral and in the service of theory building. Drawing from the earlier example of circum-Mediterranean societies, although there are many forms of sex segregation related to public and private space and tied up with notions of honor in these societies, to rely on a starkly dichotomous explanatory framework is to lose sight of much deeper complexities and ambiguities. Or, similarly, Kroeber's study of women's fashion was productive in terms of theory building but says nothing about women's experience, for example, with pressures to conform to changing standards of beauty, or with any number of possible topics that were taken up in earnest after the 1960s, after women as a more central focus of analysis and theory building seeped into the discipline.

Iconic Women in Early Anthropology

The German-born "father of American anthropology," Franz Boas, established the first doctoral degree-granting anthropology program in the United States at Columbia University and, among other achievements, mentored many prominent female anthropologists. This list includes Ruth Fulton Benedict (1887–1948), Ruth Leah Bunzel (1898–1990), Frederica de Laguna (1906–2004), Ella Cara Deloria (1888–1971), Viola Edmundson Garfield (1899–1983), Erna Gunther (1896–1982), Zora Neale Hurston (1891–1960), Margaret Mead (1901–1978), Elsie Clews Parsons (1875–1941), and Gladys Amanda Reichard (1893–1955). All of these women made significant contributions to the discipline. Four among them were eventually elected presidents of the American Anthropological Association (AAA), starting with Elsie Clews Parsons in 1941. Parsons came to anthropology from sociology and is noted, among other things, for her feminism and textual innovations. Ruth Benedict, who along with Boas mentored a generation of students at Columbia, was the next woman elected AAA president, in 1948. Margaret Mead, who enjoyed widespread popularity among the general public, became AAA president in 1960. Frederica de Laguna, who founded the anthropology department at Bryn Mawr College and conducted research among the Pima, Salish, Makah, and Tlingit, was elected president in 1967.

Mead and Benedict achieved particularly wide renown among the general public with their best-selling books: Mead's *Coming of Age in Samoa: A Psychological Study of Primitive Youth for Western Civilization* (1928) and Benedict's *Patterns of Culture* (1934), both of which have gone through numerous editions, translations, and reprints. These two books were immensely successful in popularizing cultural anthropology and making the case for cultural

relativism, a hallmark of American anthropology as established by Boas. Mead's audience was voyeuristically fascinated by her depiction of a worry-free, sexually uninhibited Samoan adolescence and by extension the notion that adolescence is not a universally fraught experience as Americans might have assumed. Benedict's cross-cultural comparison of Dobu (New Guinea), Kwakiutl, and Zuni societies in *Patterns of Culture* was an argument against judging negatively the values and practices of peoples from different cultures. "Good," Benedict persuaded, is not absolute and universal but relative to a particular culture. Both of these best-selling books reached a public that was receptive to Benedict's and Mead's often idealizing and didactic lessons.

Although both of these women had high-profile careers and made important theoretical contributions, they both faced forms of gender discrimination in their professional lives. As progressive and encouraging as Boas was with his female students and colleagues, he also was ineluctably of his time in hiring practices in assuming that married women did not need employment. Mead, for example, never held a full-time academic appointment. For most of her career, starting in 1926 and during her first marriage, she held a curatorial position at the American Museum of Natural History in New York. Mead defended her position at the museum proudly, saying that it was far more advantageous for her than a professorship would have been. Her museum job gave her ample time to focus on writing, traveling, and research, enabling her to be the most productive scholar possible. Benedict, meanwhile, was considered ineligible for a salaried academic position while she was married. Boas essentially gave his position at Barnard to the unmarried Gladys Reichard in 1923, the year that Benedict received her PhD. It was not until after her divorce in 1931 that Benedict was able to secure a full-time academic position. When she did so, she was not only the first woman to receive a full-time academic appointment at Columbia University (in 1931), but also the only other full-time anthropology professor at Columbia besides Franz Boas for several years.

"Papa Franz," as many of his Columbia students referred to him, served as patriarch-mentor and father figure at Columbia's anthropology department. He firmly guided the trajectories of most of his female students' careers, deciding where most of them were to conduct research and on what topic. For example, he directed many of his female students to conduct fieldwork at Zuni Pueblo in the American Southwest, because it was considered safer than other more far-flung and less well-known field sites. As a result, most of his female students and colleagues developed active research programs focused on Native American groups among whom Boas had already established ties in the course of his career, including the Inuit, Kwakiutl, Tlingit, Tsimshian, and Zuni. Some of his female students focused on other locales, typically with his approval and support. Boas encouraged Zora Neale Hurston to collect folklore in contexts familiar to her, the

African American South and Caribbean, just as he encouraged Ella Deloria to focus within her own context on the language and oral traditions of the Sioux. Mead, however, defied Boas in choosing to conduct her dissertation fieldwork in American Samoa rather than at Zuni Pueblo, although she did adhere to Papa Franz's insistence that she focus on adolescence and the nature-nurture debate, when she would have preferred to investigate culture change. Mead's assent to Boas on her Samoan research topic greatly influenced the trajectory of the rest of her career.

Among these women anthropologists trained by Boas, and after 1931 by Benedict, Mead was the one who focused most specifically and extensively on women and their lives. After the success of her first book, *Coming of Age in Samoa* (1928), she went on to conduct field research among Native Americans (Omaha), and different groups in Papua New Guinea (Arapesh, Biwar, and Chambri) that resulted in pioneering works on gender consciousness, *Sex and Temperament in Primitive Societies* (1935) and *Male and Female* (1949). In these books, she was groundbreaking in separating biologically based sex from socially constructed gender as she continued her inquiry into nature-nurture questions by asking whether temperamental differences between the sexes were culturally determined or innate. Her popular audience continued to be fascinated with the many cross-cultural examples she described that contrasted so sharply with gender role expectations in the United States at the time. Mead's popular voice was enhanced through her frequent lecturing and the regular column she contributed to *Redbook*, a popular magazine oriented toward married women, in which she responded to questions from readers.

Kinship Studies and the Sexual Division of Labor

Kinship Studies

Since kinship is one of the primary ways that humans determine relatedness to one another and from there extrapolate patterns of obligation, reciprocity, and status, it has been a staple in both American and European anthropology since the inception of the discipline. Studying kinship bespeaks an interest in the family, marriage, and the management of female reproduction. But mere presence in an anthropological discussion does not itself generate a nuanced understanding or representation of women's lives. Moreover, and as some of the previous examples show, there was a tendency in earlier anthropology to view women as objects of interest only insofar as they helped illustrate a particular theory or dutifully played a part in the larger social structure.

In anthropology, most pre-1970s scholarship on both kinship theory and the sexual division of labor ignored or naturalized sexual difference and assumed universal

“natural” male dominance. The earlier treatments of kinship took a rather fixed view of kinship structure, which extended as well to discussions of “preferred” marriage patterns. By contrast, post-1970s revisions of kinship tend to stress the inherent flexibility of kinship designations and categories. More recent understandings of kin-based relatedness and preferred marriages stress that they are not necessarily the product of fixed rules. One classic example comes from the Middle East, where it has long been assumed and commented upon that paternal first cousin marriage was a preferred marriage pattern. Although not untrue, there is nonetheless considerable flexibility regarding, for example, who exactly is considered a *bint 'amm* (paternal uncle's daughter) or *ibn 'amm* (paternal uncle's son). The designation “paternal first cousin” seems specific, but its application can in fact be quite fluid, just as marriage matches that are considered preferable can be so for many contextually specific reasons besides the location of potential spouses in a kinship diagram. Revised approaches to kinship studies emphasize that classificatory kinship terminologies, kinship categories, and preferred marriage patterns can all look quite different on the ground than the normative view might claim and thus need to be understood on a case-by-case basis. What is valued, desired, or considered normative shifts from generation to generation with changing social, political, and economic constraints and, even more immediately, can change from interview to interview in a single context depending upon who is interviewing whom, who else might be present at the time, and so on.

Sexual Division of Labor

Along with kinship studies, the sexual division of labor has long been a bedrock concept in anthropology's cultural inventory. The classic and long-held understanding of the sexual division of labor model maintained that men and women had universally distinctive work routines and differential access to labor resources. This stance thus posits stark dichotomies among men and women and, further, implies universal inequality and male dominance. In the mid-1990s, M. Priscilla Stone, Glenn Davis Stone, and Robert M. Netting effectively countered the major assumptions underlying the conventional anthropological understandings of the sexual division of labor in an agricultural context with their year-long labor analysis of Nigerian Kofyar intensive agriculture. They took issue with the consensus that “there is a nearly universal difference in the agricultural work routines of men and women [and that] women have more limited means than men for mobilizing labor” (Stone, Stone, & Netting, 1995, p. 166). Instead, they found that “in contrast to others who emphasize processes that cut across and through households . . . we stress the degree of cooperation and overlapping interests that characterizes the Kofyar household” (Stone et al., 1995, p. 166).

Their contribution was one important example of the broad and sweeping revision of received wisdom that took place in the last quarter of the 20th century in anthropology. What had heretofore been the proverbial nuts and bolts of anthropology's analytical toolkit, from kinship to the sexual division of labor and beyond, was re-tooled—reassessed, revised, and reframed. This new perspective on an old topic was in no small part the result of anthropologists looking more closely and critically at what actually was going on in women's worlds. Stone et al. argued against universalizing about the sexual division of labor in agriculture, and they made the case for looking closely at context; in this case, they looked at both women's and men's contributions to the household in painstaking detail. This meant accounting for every hour spent laboring by both men and women over one year, including differentiating by crop and by task such as field clearing, beer brewing, harvesting, planting, ridging, weeding, and so on.

The sexual division of labor has also been important in archaeological reconstructions of the past and in anthropological studies conducted among living hunter-gatherers/foragers. A "man the hunter" model dominated Richard B. Lee and Irven DeVore's edited volume of the same name, (1968) tellingly subtitled *The First Intensive Survey of a Single Crucial Stage of Human Development—Man's Once Universal Hunting Way of Life*. This collection brought together papers from a 1966 symposium on small-scale, nonagricultural, "living fossil" hunter-gatherer societies and included case studies from Africa, Australia, India, and South America. DeVore and Lee had, in 1963, helped establish the Harvard Kalahari Project in Botswana, a long-term research program that, to date, has produced over 20 books and over 200 articles, as well as a veritable industry of controversy on many topics. In the 1970s, Lee would change the terminology he used to refer to the !Kung San from *hunter-gatherers* to *foragers* based upon evidence that the greater proportion of the !Kung San diet came from collected food, not hunted meat. A "man the hunter" model had asserted that men procured most of the food—and most of the prestige in the process—and that women were categorically not involved in hunting, neither of which is necessarily the case, at least not universally. Lee and DeVore's *Man the Hunter* is a good example of what has subsequently been criticized as an exclusionary, proscriptive take on the sexual division of labor, whereby women's roles were understood more by what they were not doing or not permitted to do rather than what they were doing.

Late-20th-Century Trends and Future Directions

Many upheavals—both external and internal, as well as practical and theoretical—have marked anthropology and social science as a whole in the last third of the 20th century. Nothing remained quite the same after the major shifts in

social consciousness that took place in the 1960s. The civil rights, Native American, antiwar, and women's movements all effected sweeping changes in American society and in the ways that social scientists conceived of their research. Within this ferment, the anthropological treatment of women was at first very specifically focused on the question of women's status relative to men's status from prehistory to the present.

Michelle Zimbalist Rosaldo and Louise Lamphere's coedited volume *Women, Culture, and Society* (1974) reflects this moment well. This collection, firmly anchored in a feminist anthropology sensibility, brought a programmatic new set of questions to anthropology, proposed new theoretical directions, and did so with a sense of urgency and purpose. Contributors to Rosaldo and Lamphere's volume mostly agreed that universal asymmetry defined sex roles in most societies, but they took an entirely different view of the nature of that asymmetry than had been dominant in previous generations: "The secondary status of woman in society is one of the true universals, a pan-cultural fact. Yet within that universal fact, the specific cultural conceptions and symbolizations of woman are extraordinarily diverse and even mutually contradictory" (Ortner in Rosaldo & Lamphere, 1974, p. 67). For her part, Rosaldo focused on the structural opposition between the public and domestic orientations of men and women in society, while firmly rejecting conventional understandings associated with that split, especially regarding power relations:

In those societies where domestic and public spheres are firmly differentiated, women may win power and value by stressing their differences from men. . . . The very symbolic and social conceptions that appear to set women apart and to circumscribe their activities may be used by women as a basis for female solidarity and worth. . . . Extra-domestic ties with other women are, then, an important source of power and value for women in societies that create a firm division between public and domestic, or male and female roles. (Rosaldo & Lamphere, 1974, pp. 37–39)

By the 1980s, however, before her untimely death, Rosaldo had shifted away from a dichotomizing public-domestic analysis to an approach that emphasized gender and the interdependence between women and men. This shift is reflected across the discipline generally and in feminist anthropologically specifically.

The contributors to *Women, Culture, and Society* were hoping to effect change beyond revised analyses and theory making in anthropology:

My interest in the problem is of course more than academic: I wish to see genuine change come about, the emergence of a social and cultural order in which as much of the range of human potential is open to women as is open to men. (Ortner in Rosaldo & Lamphere, 1974, p. 67)

Indeed, many of the volume's contributors went on not only to have productive and influential careers in anthropology

but to remain active advocates for gender equity. Louise Lamphere, for example, who became AAA president (1999–2001), received the Squeaky Wheel Award in 1998 from the Committee on the Status of Women in Anthropology “for her lifelong work for the equality of women in anthropology.” In her 2001 presidential address at the 100th annual meeting of the AAA, Lamphere referred to Rosaldo as “one of the pioneering young feminist anthropologists who helped revive the discipline’s interest in women,” adding that Rosaldo’s contribution to their coedited book “developed out of her participation in the early 1970s women’s movement” and was motivated by the notion that “theory had a critical role to play in political change” (Lamphere, 2004, p. 135).

Rosaldo and Lamphere’s volume helped establish a framework for a veritable explosion of anthropological research on women and gender. What started out as an investigation focused somewhat narrowly on “where women are and how we got here” has expanded dramatically in subsequent decades. Anthropological treatments of women have come to pay close attention to the myriad ways that women negotiate, resist, and/or accommodate power and moreover how they do so within overlapping contexts of class, race, ethnicity, gender, and so on. A number of subspecialties developed over the late 20th and early 21st centuries continue to produce fascinating and trenchant analyses of women and, for example, their experiences with and roles in colonial and postcolonial history, labor markets, and increasingly intrusive medical technologies. An interest in the dynamics of gender and identity itself has proliferated as well and considers everything from early child socialization (for which linguistic anthropology makes important contributions) to hybrid sexualities.

Ann Laura Stoler and Partha Chatterjee are just two of many noteworthy anthropologists whose theoretically rigorous research examines, among other things, the roles women have played within larger imperial and governmental contexts, such as colonialism, postcolonialism, nation building, and state formation. Their analyses typically give a nuanced accounting of class, gender, power, and race extant in these relationships. For example, one important, often-cited article of Stoler’s makes the argument that in the later colonial period, European wives of colonial administrators were encouraged to set up house in the colonies in an effort to maintain sex segregation between European men and local women. To do so was to preserve an all-important sense of racial superiority that was undermined, or at least severely challenged, by the existence of mixed race offspring (Stoler, 1989). These European women were strictly trained in how to establish a happy home in order to keep their husbands focused on family. These women, she concludes, were both oppressed and oppressors. The onus put on them to maintain racial and class superiority created an oppressive situation for them, and they, in turn, oppressed indigenous women and men whom they employed or otherwise dealt with in

country. A complementary example is offered by Indian scholar Chatterjee (1989), who discusses the effects of Britain’s “civilizing mission” on India. One Indian response was to promote an image of a new Indian woman, an exemplar and embodiment of a distinctively modern Indian national culture. This new female icon was considered superior to both Western women and “traditional” or lower-class Indian women. Better than the West also meant better than the rest of Indian women from lower status groups.

Labor studies offer another rich line of inquiry into women’s lives in recent anthropology. Anthropologists have always been interested in what people do to make a living, as the long life of the sexual division of labor model attests. The difference in post-1960s anthropology is reflected in the proliferation of ethnographies that look in depth at women’s economic lives, accounting for everything else related to that from intimate kin relations to global markets. One notable example, keeping in mind that there are many noteworthy examples from which to choose, is Gracia Clark’s *Onions Are My Husband* (1994), an expansive, detailed ethnography of Western Ghana’s Kumasi central market, where the “market queens” shrewdly negotiate with other queens, customers, vendors, police, market associations, and so forth as they make their livings. This ethnography, exhaustive in its detail, accounts not only for the dynamics of the local markets but also for how they are affected by regional, national, and global markets. In the Middle East context, Jenny White has made important contributions to the understanding of women’s labor in an urban Turkish context (2004). She focuses on rural immigrants to Istanbul and how their outside wage work, which is culturally valued but poorly compensated, affects kinship relations and social identity. White locates women’s paid work in larger contexts of global capitalism, Islam, gender, and Turkish family life.

In addition to labor studies, another important area of inquiry in recent decades of anthropology concerns “the body,” embodiment, and reproduction (both theoretical and literal reproduction). One important example is Emily Martin’s highly influential *The Woman in the Body*, which appeared in 1989 and is currently in its third edition. In it, she compares the way women speak about their own reproductive processes with the mechanistic model that informs the way their bodies are viewed and treated in medical settings. For example, Martin claims that medical science views menstruation as an instance of failed reproduction. Some women accept this model, but some do not. Among Martin’s informants, middle-class women tended to accept the failed reproduction model and were described as “mystified” by the physical process, whereas working-class women, both black and white, resist that conception and speak about menstruation in more explicit, immediate, and straightforward ways than middle-class women.

The next generation of “woman and the body” research reflects a biomedical landscape that is increasingly complex and ethically fraught. Amniocentesis, in vitro

fertilization, DNA testing, and surrogacy are but a few of the (often painful and invasive) treatments that raise complex personal and societal questions about reproduction—such as how reproduction can be manipulated, why, and with what results. This type of anthropological inquiry takes on the nexus between women's bodies and biomedical technology and considers the often confusing morass of ethically ambiguous options and technologies that are available to individuals, both women and men, dealing with infertility all over the world. For example, Rayna Rapp (2000) examined the social and personal challenges that fetal testing and prenatal diagnosis bring to women across a spectrum of racial, cultural, religious, educational, and financial backgrounds. In a more cross-cultural vein, Marcia Inhorn has done a great deal of important work, across the Middle East, on fertility and infertility issues that affect both women and men (Inhorn, 2006). Also from the anthropology of the Middle East, there are two ethnographies (Kahn, 2000; Kanaaneh, 2000) that lend themselves well to comparison in that they focus on two different groups of women in the State of Israel—Palestinian Arabs in the Galilee region and Israeli Jews—and their experiences related to reproduction, including fertility issues and reproductive technologies, sexuality, beauty, and political demography. These ethnographies describe the reproducing female body as a site of complex meddling and identity formation at the individual, communal, and national level.

These trends and ethnographic cases exemplify several exciting and productive directions that the anthropological treatment of women has taken in recent decades.

Women and Linguistic Anthropology

Linguistic anthropology formally emerged in the late 19th and early 20th centuries as part of the holistic, four-field approach championed by Boas. He insisted, for both practical and theoretical purposes, that language was a necessary lens through which to gain insight into culture. But he left it to his students to develop the language and culture connection further. Edward Sapir and Benjamin Lee Whorf's so-called Sapir-Whorf hypothesis fueled decades of productive, yet ultimately unresolved, debate across disciplines regarding the "linguistic relativity principle" and the degree to which language influences or even determines a worldview. This principle holds that language is more than just a means of communication; it actually shapes perception and exemplifies each society's unique model of the world. Gender and language studies would later invoke this principle across a range of language and culture issues. In the 1970s and 1980s, for example, an extended argument raged regarding the common use of gender-neutral "he," which feminist detractors insisted projects a diminishment of the female across language and penetrates into individual and social consciousness, influencing the worldview as per the Sapir-Whorf hypothesis. Calls for gender-based

language reform of sexist language came from many quarters, including linguistic anthropology. Gender-based language reform has been remarkably successful over the past 40-year period. Popular use of terminology that feminists had labeled sexist has in many cases shifted to significantly more neutral options that are widely used, including the use of a singular "they" for "he" and "she" (or an alternation among "he," "she," and "they"), "Ms." (as an alternative for "Miss" or "Mrs.," both of which identify a female based upon her marital status, contrary to the nonparallel example of "Mr."), and gender-neutral vocabulary related to work, such as "flight attendant" and "salesperson."

From "Women's Language" to "Gender and Language"

For linguistic anthropologists, a sustained focus on women's language is typically traced back to Robin Tolmach Lakoff's *Language and Woman's Place* (1975). Lakoff, a linguist and not an anthropologist, was not the first to write about women's speech, gender differences in language, sexist language, or gender-linked variation. But her book is widely regarded as having inaugurated gender and language studies. Lakoff proposed that a female speech style exists; it is characterized by the use of hesitations, qualifiers, "tag questions," excessive politeness, and "empty" adjectives that together work to weaken or mitigate the force of an utterance. She claimed, for example, that women ask tag questions more often than men, because women feel compelled to soften what they say, rather than be forceful and direct. She believed that the uncertainty expressed by tag questions reflected women's relative weakness in society. The actual findings on tag questions reveals significantly more complexity while at the same time supporting the notion that power is delicately negotiated in speech events that include tag questions. In claiming that women's language was a powerless language and further that it contributed to perpetuating male dominance and inequality between the sexes, Lakoff also emphasized women's own complicity in perpetuating inequality, by both using women's language and socializing their children into its use as well.

Over a quarter century later, some of Lakoff's insights may sound dated, and some of her claims have been disproven, or at least more succinctly problematized (especially regarding tag questions), but the overall impact of her book remains significant for having started the conversation on gender and language in a productive way. Lakoff argued for a notion of women's language as a social act, an act with real consequences, that is, the reproduction of power inequities. This aspect of her approach resonated deeply with linguistic anthropologists, for whom "language as a social act" is a central tenet.

Overall, linguistic anthropology came to reject the essentializing aspects of Lakoff's approach, such as the

notion implied in her analysis that women's language was part of a separate women's culture, when in practice there is much more cross-referencing, ambiguity, and shifting of contexts taking place:

If we understand women's everyday talk and linguistic genres as forms of resistance, we hear, in any culture, not so much a clear and heretofore neglected "woman's voice," or separate culture, but rather linguistic practices that are more ambiguous, often contradictory, differing among women of different classes and ethnic groups. (Gal, 1989, p. 178)

In critiquing Lakoff and other feminists writing on "women's language," Susan Gal emphasized the necessity of attending not only to words, but also to ethnographic context—the interactions in which these words are found and the larger political and economic contexts of communication. A research program that focuses on gender, speech, and power, as Gal described her own "theme," must determine what power and powerful language look like cross-culturally, something of which Lakoff and many other feminist commentators on language were woefully neglectful. In direct contrast to the type of argument explicated by Lakoff—grounded as it was in the white, middle-class experience—Gal describes an example from Madagascar in which Malagasy men's speech is characteristically indirect and deferential, avoiding confrontation, while women's speech is more direct, prone to angry outburst, and seen as conflictual. Among the Malagasy, it is universally agreed that men's speech is considered superior to women's speech.

The Malagasy example notwithstanding, it is interesting to note that the ethnographic literature shows that many of the features that Lakoff identified as characteristic of women's language—silence, indirectness, politeness—are in fact often associated cross-culturally with women's ways of communicating. Still that fact in isolation does not reveal much about the rest of the picture, such as how power is defined and differentiated in a particular culture or society or what other dynamics, such as class, race, gender, and ethnicity, are affecting social relations in general or in a particular speech event. Silence, to take one important example, is an inherently ambiguous communicative resource that does not always indicate the deference and passivity that Lakoff claimed it did. Sometimes, Gal emphasizes, silence is an effective way to enact opposition or resistance.

Language Socialization, Variationist Studies, and the Japanese Case

Language socialization studies is an important subfield of linguistic anthropology that sheds light on how girls and boys learn the gender norms of their society. Since the late 1970s, a great deal of research has been conducted on how

children and other novice language learners become both communicatively and culturally competent across the various speech communities they inhabit throughout their lives. To learn language is to learn culture, echoing the important link that Boas insisted upon in the early 20th century. Ideologies, identities, stances, values, practices—including those associated with gender norms and identities—are all learned in the process of language socialization.

In addition, language variationist studies have a great deal to offer in analyses of language, culture, and gender. Language variationist studies look at the different ways that members of the same "communities of practice" speak. Everything from phonological variation (pronunciation differences) through grammar to vocabulary is important in "self-constitution," that is, in showing who you are and what your affiliations are. Penelope Eckert spent three years conducting participant-observations at "Belten High" (Eckert, 2000). She found that over the course of their high school years, girls' speech tends to become increasingly standard, while boys' speech becomes increasingly non-standard. She claims that this reflects several things, including different senses of maturity, that nonstandard grammar is associated with autonomy (versus girls' conformity), and that boys are expected to curse more (reflecting gender norms that hold girls should be more conformist than boys, and boys have license to curse and speak more sloppily than girls). She also found telling symbolic significance associated with phonological variation that showed an interesting cross-cutting of gender and class categories. Different styles of pronunciation were shown to be inextricably linked with the construction of identity. Moreover, she emphasized how gender is not only a matter of male and female but also is embedded in other parts of our social lives, along with other socially significant categories, such as class, race, and ethnicity.

It is relevant to note here that language variationist studies typically come out of a sociolinguistics tradition (linguistics). There is, however, extensive overlapping and cross-referencing among sociolinguistics, anthropological linguistics, and linguistic anthropology in the area of gender and language studies. There is also some active disagreement regarding these subdisciplines' genealogies and disciplinary homes. For the purposes of this chapter, however, these disciplinary arguments are omitted in favor of maintaining the extended general focus on the anthropological treatment of women's arguments. Scores of syllabi across many universities attest to the fact that Eckert's "Belten High" case study is used extensively in linguistic anthropology classes across the country.

Finally, a productive case study that has been revisited often by linguistic anthropologists interested in women's language is that of Japan. In Japan, there are not only distinct female and male speech registers, but also other distinctive *isoo* ("sections"), styles of speech that reflect age, generation, social background, class, gender, regional background, and profession. Language is thus very tied up

with Japanese self-presentation and identity construction. Japanese women's language itself is characterized by the use of certain sentence-final particles (-*wa*), superpolite forms of speech (including honorifics), slow tempo, high pitch, and other features. It is seen as a highly valued cultural ideal—beautiful, elegant, and sophisticated—and important as a symbol of Japan itself. In the popular media, anxiety is expressed by some over the belief that women's language is disappearing—that the speech styles of *all* Japanese women are changing from less feminine to more masculine, and that young girls' speech in particular is becoming rough. At the same time, the use of honorifics is weakening in general in Japan, across all of society. Comparatively speaking, however, there is considerably less anxiety associated with declining use of honorifics than with changes related to women's language.

The Kogal phenomenon, a predominantly teenage girls' subculture, has provided one interesting site through which to examine ideologies related to women's language. Being Kogal is enacted through language and behavior. The language used when girls perform as Kogals includes non-standard forms, novel coinages, and explicit references to sexual or taboo topics. They use terms considered to be demeaning ("bitch" or "girl") "owning" the terms as endearing and playful forms of address. The dominant ideology holds that teenage girls' demeanor and speech should reflect qualities of innocence, modesty, docility, and deference. Japanese media have accused them of destroying their language.

Women in the Middle East

As with the rest of anthropology, the treatment of women in the anthropology of the Middle East was, until the 1970s, largely unidimensional and focused on formal roles. To complicate matters, however, there is a long history of mutual antagonism, suspicion, and misrepresentation between the Middle East and the West that goes back even further than the medieval Crusades and is alive and well in the early 21st century. It is certainly something that has thrived in both scholarship and the arts, as has been so famously documented by Edward Said (1978, 1993). Central to the perpetuation of this long-standing unease has been the "Middle Eastern woman," repeatedly stereotyped as passive, oppressed, and veiled. In addition, this stereotypically oppressed woman has sometimes played an inadvertent role in justifying outside intervention—to "save" her—from the colonial period to the 2001 invasion of Afghanistan. Lila Abu-Lughod, a major figure in Middle East anthropology, addresses the latter example in a trenchant piece presented shortly after 9/11 (Abu-Lughod, 2002).

An important exception to the prevailing pre-1970s unidimensionality with respect to women was Elizabeth Warnock Fernea's *Guests of the Sheik: An Ethnography of*

an Iraqi Village (1965), written while accompanying her husband, Robert Fernea, during his dissertation fieldwork on changing relations of political authority in a rural, southern village. *Guests of the Sheik* was the first in a very long line of contributions that Fernea made over her lifetime to an anthropology of Middle Eastern women (and their families and lives), both in print and in a number of documentaries. *Guests of the Sheik* is still in print and continues to be used frequently in university courses on the peoples of the Middle East. It offers a view "behind the veil" into women's lives and is effective in helping dismantle the stereotypes that students typically bring with them to the topic of women in the Middle East.

A relative absence of women in the scholarship of the Middle East, especially through the first two-thirds of the 20th century, perpetuated various assumptions: Women play little or no significant role in society, the world of men is much more interesting and significant than that of women, gender relations are not an issue, and there is little if any crossing of the boundaries between men's and women's worlds. Certainly this parallels what went on in other corners of anthropology at the same time, as discussed earlier. This kind of message reifies certain notions of power and associated notions of a public-private split in which the world is divided into neat binaries. It also has contributed to an implicit devaluing of theory in anthropology that comes out of women's experience, which is explicitly referred to in Abu-Lughod's 1989 *Annual Review of Anthropology* article on "zones of theory" in the Arab world. In this piece, Abu-Lughod identifies three gate-keeping concepts in the anthropology of the Middle East: segmentary lineage, the harem, and Islam. Segmentary lineage, she points out, has contributed the most in terms of theory, and thus prestige, to anthropology. The other two gate-keeping concepts she identifies as those of Islam and the harem (or, women). In referring to the harem, Abu-Lughod is clearly hearkening to the legacy that sensationalized focus on out-of-context phenomena, such as veiling and female circumcision, has created in both popular and academic views of the region. Veiling itself is a nonspecific gloss for any number of practices that are informed by often-competing ideologies. Also, veiling itself is not a frozen practice; it changes over time and means different things to different people at different times in their lives. An anthropology of Middle Eastern women in the past four decades has made this dynamism increasingly apparent.

It should go without saying that ideological conventions concerning women and gender vary considerably across the Middle East. There is not only no single Islamic view on women, but also, of course, no single Arab, Jewish, Christian, or Turkish view. The anthropology of Middle Eastern women has become increasingly effective at making this variety and contestation clear.

A generation of solid ethnographic work on women appeared in the 1970s and 1980s that focused on women in their familial, domestic, and village contexts. This work

was very successful in presenting humanized portraits of very unfamiliar (to Western readers) and mystifying lives long considered exotic. These valuable contributions gave detailed accounts of women's lives in very dense local contexts, accounting for processes of change in family patterns, livelihoods, household production patterns, and so on. A short list of contributions to this output includes Lila Abu-Lughod (1986) on Egyptian Bedouin women's lives, Christine Eickelman (1984) on women and community in Oman, Suad Joseph (1977, 1978, 1983, 1988) on women and the family in Lebanon, Andrea Rugh (1984, 1997) on family in Egypt and Syria, and Nancy Tapper on marriage, kinship, and politics in Afghan society (1978, 1991). They tended to present more "traditional" anthropological settings, that is, villages and tribal peoples. A more recent trend in anthropology has been to account for urban lives, such as Farha Ghannam's (2002) work in Cairo on the topic of "modernizing" entire neighborhoods by relocation and Christa Salamandra's Damascus ethnography (2004), which is also a departure not only for its focus on an urban context but also for its focus on the elite classes, which anthropology in general has by and large avoided.

Future Directions (Middle East)

As the late 1980s and 1990s progressed, ethnographic treatments of women's lives began to reflect a more fragmented, globalized, and disruptive world. Smadar Lavie's work on the Mzeina Bedouin of the Sinai Peninsula (1990) discussed the effects of Egyptian occupation, Israeli occupation, drug smuggling, and prison stays, as well as shifting gender norms in villages that are tourist sites and where men are away most of the year earning money.

One of the richest lines of inquiry in Middle East ethnography currently involves those works that consider the links between modernity, Islam, and women. The issue of how to balance modernity and tradition has long been a difficult one in Middle Eastern society. A neologism, *gharbzadegi*, or "Westoxication," was coined in the mid-20th century that describes being addicted to and intoxicated by the West, which also is believed to reflect Iranian self-hatred and self-doubt about themselves. On the one hand, there have been robust "modernization" movements—in Atatürk's Turkey, Nasser's Egypt, and the shah's Iran—that brought many irrevocable social changes, many of which have been viewed as betrayals of indigenous principles and local heritage. This complicated dynamic, tied up with notions of modernity, is part of an ongoing tug-of-war in a Middle East that is now very "wired" and very young. Future directions in the anthropology of Middle East women will necessarily deal with this dynamic as well as with the corresponding "mediatization" of women's (and others') lives.

Lara Deeb's ethnography of Shi'ite women in southern Beirut, for example, focuses on how a modern "authenticated" Islam is created through women's activism,

especially volunteering at local community centers, and women's active engagement with religious discourse. The Shi'ite women in this ethnography, for example, acknowledge that theirs is a patriarchal society, but they stress that an authenticated Islam, one based on engagement with the Koran, offers gender parity. Women can interpret religious texts *and* debate them with men, which they do with great frequency. The theme of men's misinterpretation of texts is a common one in everyday conversation. These women not only embrace models of strong women in Islamic history, especially Zaynab, but also Aisha and Khadija (all were wives of Muhammed). In short, this is one of several recent ethnographies problematizing the link between women's roles in defining both modernity and tradition, religious or otherwise. Deeb's work is nicely paralleled by both Saba Mahmood's important work on the women's mosque movement in Egypt (2005) and Azam Torab's research in south Tehran among Shi'ite women (2007), with its focus on women's increasing influence and participation in mosques.

There has also been a great deal of productive anthropological work done on issues related to women's health, public health, and demographic issues in the Middle East. A recent summarizing article by Marcia Inhorn is especially valuable in laying out what this body of anthropological literature, over 150 volumes, has brought over the past 25 years to the study of women's health, public health, reproductive politics, and gender roles in the Middle East, including, importantly, changing notions of masculinity and partnership in marriage (Inhorn, 2006). One important point concerns how a

specifically ethnographic approach [offering up deeply qualitative, women's voices] to women's health leads to a particular set of insights that are important, timely, and quite different from the women's health research agenda currently being promoted within biomedical and public health circles. (p. 346)

Anthropology's tendency to focus in these ethnographies on women's and men's voices, Inhorn claims, could be a valuable source of information for public health officials in understanding many of the health-demoting aspects of biomedicine that exist.

In short, the future trend of the anthropology of Middle Eastern women will continue to humanize and demystify their lives. Major topics will include reproductive politics and practices, changing notions of family, accommodating modernity on their own terms, effects of large-scale rural-to-urban movement, and mediatization.

Conclusion

The state of the art in the anthropological treatment of women is impressive in both its depth and breadth. Anthropology has gone from studying women in a largely essentialized and somewhat marginalizing fashion in its

earlier decades to a more contemporary concern, not only with women per se, but also with gender relations as they interact and are mutually informed by a number of interpenetrating axes of power, class, technology, ethnicity, and so forth. To have gotten from one end of this arc to the other has taken a little over a century.

Lamphere, in her 2001 presidential address at the 100th annual American Anthropological Association meeting, emphasized the structural marginality of some of the iconic women anthropologists of Boas's era. The most influential female anthropologists were of their time, in that their access to professional academic and research opportunities was mediated through the support of their benevolent patriarch, Boas, who was admittedly very ahead of his time in actively encouraging these opportunities for his female students. All of the early women anthropologists, however, laid a fundamental groundwork that enabled later generations to take off running when the opportunity arose. Lamphere, for example, claimed that Elsie Clews Parsons was structurally marginal in the discipline until elected AAA president in 1941, despite having joined Boas and Benedict on the Columbia faculty—exerting her own influence as an advisor, mentor, and patron.

Future directions in anthropology that concern women's lives will continue to reflect the challenging ambiguities people face navigating the many technologically mediated aspects of our lives, as well as the challenges and opportunities of living in a globalized, transnational, and information-saturated world. For anthropological treatments of women specifically, this will include continued research on issues related to reproductive technologies. There are some interesting parallels between future directions and old concerns to the degree that kinship and labor studies are still prominent concerns, but with the important caveat that these bedrock topics are now looked at in radically different ways than they were 100 years ago. This reflects a number of dynamics at work over the past century.

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VISUAL ANTHROPOLOGY

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Visual anthropology is typically considered a sub-field of cultural anthropology that developed out of the study and production of ethnographic photography and film. However, there are some anthropologists who disagree and instead place it “squarely within the discipline of anthropology” (El Guindi, 2004, p. 19). Visual anthropology is useful for ethnographic research, media analysis, and studies of material culture. Visual anthropology also encompasses the anthropological study of representation, including areas such as performance, museums, art, and the production and reception of mass media. However, to date, photography and film have been the primary concerns of visual anthropologists and will be the main focus of this chapter.

Visual anthropology emphasizes the cultural meanings of visual expressions and visually recording cultural practices within an ethnographic context. This encompasses the idea that “culture is manifested through visible symbols embedded in gestures, ceremonies, rituals and artifacts situated in constructed and natural environments” (Ruby, 1996, p. 1345). Visual anthropology utilizes visual media to practice anthropology and to investigate the social realm. The discipline of visual anthropology has unclear boundaries ranging from the narrow to the broad and complex. It has been defined in a variety of ways: as audiovisual aids to supplement the teaching of cultural anthropology; as another descriptor for ethnographic films; as the anthropological study and production of media (Ginsberg, 1994); as

pictorial and visual communication, which consists of anything “made to be seen” (Ruby, 1996); and as “anthropology of visual systems or, more broadly, visible cultural forms” (Morphy & Banks, 1997, p. 5).

History of Visual Anthropology

Before visual anthropology was considered an academic discipline, early ethnologists were using photography as a research tool (Ruby, 1996). Many of these photographs, like those of Native Americans made by Edward S. Curtis, were made in an effort to preserve societies and their way of life (Prins, 2004). Historically, anthropological filmmaking was associated with documentary filmmaking; Barnouw suggests that a person who made such a film was a “documentarist as travel lecturer” (1993, p. 29), for instance, some of the first ethnographic films (e.g., *Promenades des Éléphants à Phnom Penh* [Elephant Processions at Phnom Penh], 1901) with the intent of exposing “pristine” cultures. This same pattern persisted in later ethnographic films, such as Robert Flaherty’s *Nanook of the North*, in 1922, about the lives of Arctic peoples and Robert Gardner’s *Dead Birds*, in 1965, about the Dani people of New Guinea (Barnouw, 1993).

In the history of visual anthropology within the scientific realm, early pioneers and their accomplishments included the following:

- Félix-Louis Regnault, chronophotographic film of a Wolof woman making pots and later a study of body movement and behavior, 1888–1896
- Alfred Haddon, photography of Torres Strait, 1898
- Baldwin Spencer, photographs, films, and recordings of aboriginal society in central Australia, 1899
- Franz Boas, 16-mm films of the Kwakiutl, 1930
- Marcel Griaule, 35-mm films *Au Pays des Dogon* and *Sous les Masques Noirs*, 1935–1938

Some credit Regnault, a physician interested in anthropology, as the first ethnographic filmmaker (El Guindi, 2004). All of these early research projects were marked by difficulty in transporting heavy, rudimentary equipment to the field (El Guindi, 2004). In the ethnographic arena, the work of John Marshall (Bushmen series), Tim Asch (Yanomamo series), Ian Dunlop (Yirkala project), David MacDougall (Wedding Camels), and John Bishop (Himalayan Herders) served as a bridge between anthropology and indigenous practice (El Guindi, 2004; Morphy & Banks, 1997). By the 1940s, anthropologists such as Hortense Powdermaker, Gregory Bateson, and Margaret Mead were incorporating anthropological perspectives into mass media and visual representation. Powdermaker is best remembered for her anthropological studies of an African American community in Mississippi (Powdermaker, 1939/1993) and one of the few substantial examinations of the American film industry (Powdermaker, 1950). Mead, a student of Boas, worked with Bateson to use visuals and film throughout their collaborative work in Bali and beyond (see, e.g., Bateson & Mead, 1942). Much has been written about Mead and Bateson's approaches to using the visual within the anthropological scope, especially their breakthroughs in incorporating film and photography. In the history of American visual anthropology, Mead and Bateson's work is unparalleled with respect to the sheer volume of footage they produced.

Karl G. Heider noted in his revised edition of *Ethnographic Film* (2006) that after Bateson and Mead, the history of visual anthropology is defined by

the seminal works of four men who were active for most of the second half of the twentieth century: Jean Rouch, John Marshall, Robert Gardner, and Tim Asch. By focusing on these four we can see the shape of American ethnographic film. (p. 15)

In addition, the depth of the work of leading ethnographic filmmakers David and Judith MacDougall, in both their observational approach to filmmaking and the extensive writing by David MacDougall over the past 20 years, has shaped ethnographic film outside the United States. Collaboratively, the MacDougalls have documented groups of people in Uganda, Kenya, Sardinia, Italy, Australia, and more recently, India, where David filmed a series of films about the prestigious all-boys boarding school called The Doon School (*Doon School Chronicles*, 2000).

The term *visual anthropology* was coined after World War II and slowly grew to include visual records about culture and the study of social systems ethnographically using description and comparison (El Guindi, 2004). Mainstreaming of visual tools in anthropology began in the 1980s. In 1984, the Society for Visual Anthropology (SVA) was formed as a section of the American Anthropological Association. The SVA publishes a regular newsletter now known as the *Visual Anthropology Review*. The SVA described itself as promoting

the use of images for the description, analysis, communication and interpretation of human (and sometimes nonhuman) behavior. Members have interests in all visual aspects of culture, including art, architecture and material artifacts, as well as kinesics, proxemics and related forms of body motion communication (e.g. gesture, emotion, dance, sign language). The Society encourages the use of media, including still photography, film, video and non-camera generated images, in the recording of ethnographic, archaeological and other anthropological genres. Members examine how aspects of culture can be pictorially/visually interpreted and expressed, and how images can be understood as artifacts of culture. Historical photographs, in particular, are seen as a source of ethnographic data, expanding our horizons beyond the reach of memory culture. The society also supports the study of indigenous media and their grounding in personal, social, cultural and ideological contexts, and how anthropological productions can be exhibited and used more effectively in classrooms, museums and television. (SVA, n.d.)

Several things are important about the SVA's statement: It includes diverse forms of media, including public media; it includes different domains of culture (including material manifestations of a culture), and it covers multiple approaches to the study of visual anthropology.

The first attempt at an academic home for visual anthropology was made in 1958 with the creation of the Film Study Center at Harvard's Peabody Museum of Archaeology and Ethnology. In 1994, the review section in the journal *American Anthropologist* formerly called "Ethnographic Film" was renamed "Visual Anthropology." At present, the SVA represents the subfield in the United States as a section of the American Anthropological Association. Ethnographic films are shown each year at the Margaret Mead Film Festival, and the yearly American Anthropological Association conference features a coinciding visual anthropology conference at which many emerging ethnographic films are viewed and screened. Films are also shown at other international annual festivals and conferences.

Early Ethnographic Photography

Much of early ethnographic photography cannot be separated from the popular scientific paradigms and cultural biases of the time. For instance, anthropometrics and race were central to early ethnographic photography, with the assumption that

visual depictions provided insight into the intellectual and moral characteristics of their subjects (i.e., indicating a hierarchy, with the more “civilized” at the top and the more barbaric further down). The next theme in early ethnographic photography challenged evolutionary origins of polygenesis (multiple races with differing origins) versus monogenesis (single origins, same evolutionary path). Next was a demonstration of cultural tools, dress, traits, and practices. Finally, early ethnographic photography was characterized by salvage ethnography with the goal of preserving cultures thought to be dying out (Morphy & Banks, 1997; Ruby, 1996). Overall, early ethnographic photography can be characterized by one of two themes: (1) romantic primitivism—a cultivated, artistic approach such as that seen in the photographs of Edward S. Curtis, who made images of American Indians and their cultural practices, rituals, and customs; or (2) salvage ethnography, best exemplified in the fieldwork of Franz Boas, a cultural relativist who intended to preserve aspects of American Indian life before they disappeared.

Taking photographs in anthropology was not new. Even as early as 1912, in *Notes and Queries on Anthropology*, there was a discussion of how to take photographs in the field. One of the first to use photography and film for research was French ethnographer Marcel Griaule. During the Mission Dakar-Djibouti, an expedition in Africa from 1931 to 1933, Griaule used aerial photography not only to analyze the spatial organization of societies but also as a stimulus to evoke responses in interviewing individuals to acquire knowledge about their religion (what is now typically referred to as *photo elicitation*).

Visual Media as a Research Tool

Margaret Mead and others in the field advocated the use of visual tools in research for the purpose of recording and discovering knowledge. In a classic article, Mead (1975/2003) criticized other anthropologists for being overly reliant on words in anthropology when they should be using visual media. Photography can be used in qualitative and ethnographic research for investigative purposes. In ethnographic research, photographs offer striking, rich data that can transcend the photograph’s visual content (Collier & Collier, 1986). With photos, researchers can examine aspects of people and life not easily studied with other methodologies. Because visual images can often reveal more than words, researchers may gain a deeper understanding beyond the objective content of data (Asch & Asch, 2003). Photographs can also help researchers to “push their analysis” when the data do not fit previously conceptualized theories and ideas.

Researchers use photos in interviews with participants to understand how participants define their world and to reveal what they take for granted or what they assume is unquestionable. Visual data can strengthen research through the use of multiple data sources (this is also known as *triangulation*) and can offer a deep authenticity to an otherwise singular dimension of data. Adding a visual

means of data collection like photography can enhance fieldwork, since no one method of data collection can adequately record and explain all aspects of a phenomenon (Asch & Asch, 2003). In addition, photographs provide an opportunity for researchers to take the photos back to the participants and review them to get feedback, explanation, and interpretation. This strengthens the study and gives voice to the participants in the research process and results (Collier, 2003). Photographs can prompt participants’ memories and help researchers discover information that may not be as easily exposed with traditional interview methods (Beloff, 1984).

There are several notable examples of this kind of work. In a study of the immigration experiences of Latino adolescents living in rural North Carolina, photographs were utilized as a basis for interview discussions (Streng et al., 2004). Kruse (2004) asked elderly women to take photographs about their perceptions of a recently deceased loved one. Gaskins and Forte (1995) combined photos and interviews in order to enhance the richness of their data. Four participants in their study were provided with single-use, automatic cameras and asked to take images they felt were suggestive of hope. The researchers used the resulting photographs to guide in-depth interviews with the participants in order to further explore the meaning and experience of hope.

In another research study using photos, Radley, Hodgetts, and Cullen (2005) interviewed homeless people about their experience with homelessness. After taking photos of a typical day, the homeless participants were asked to describe the story and focus of each of their photos and their response to the person, place, or object in the photographs. All photographs were then spread out, and each participant was asked to identify the ones that best captured their experience of homelessness. Participants were also asked about their experience of taking the photographs and the feelings that accompanied the pictures they had taken. Interviews were audio-recorded and later transcribed for analysis.

In addition to photos taken as part of studies, there is an enormous amount of extant photographic material available to researchers, such as yearbooks, family photo albums, historical images of indigenous people, and historical society collections. The historical activities associated with people or places in these photos supply nonverbal, historical data and offer perspectives on the changes between the past and present. Researchers can gain a considerable amount of data from a photograph alone, but the combination of archival photos with interviews allows for identification of the individuals and events in the photos (Collier & Collier, 1986). Another benefit of using archival photos alongside interviews is that researchers can access feelings that are connected with the moment depicted in the photograph. Photos viewed during an interview that occurs at some point after the photos were taken can invoke the same feelings and emotions as those of the moment the photos were taken (Akeret, 2000). This is of great value to the researcher, because the information from the interviews is enhanced, and the data

associated with the photos come alive (Collier & Collier, 1986). The use of visual images “inject(s) the emotional context that is such a crucial component of all social problems” (Huff, 1998, p. 577).

Photo elicitation is a research methodology used primarily in anthropology and sociology as a way to explore social class, community history, individual and community identity, and cultural studies (Harper, 2002). Through symbolic meanings assigned to photographs, the social world of individuals, families, and communities can be revealed and connected to the larger society, culture, and history (Harper, 2002). Photographs may also elicit visions of what is possible for the future.

Ethnographic Film

Visual anthropology is probably best known for producing ethnographic films. With the invention of photography in 1839, early pictures of the “other” accompanied the written word, when anthropology was still an armchair science. In 1895, the silent movie was invented, and sound was first added in 1930. With the establishment of sync sound in 1960, doors opened to produce films that allowed the moving image and sound to work together simultaneously. In 1990, digital technology opened up even more opportunities, and with the rise in technology, the viewing and seeing experience has changed significantly over the past 20 years.

Currently, the ethnographic filmmaker often films in situations that allow for an in-depth understanding; this requires long-term participant observation with the camera, whether it occurs in another culture or in the visual anthropologist’s own backyard. Filmmakers are concerned with making a contribution to anthropological knowledge and are always critical of the films they produce. Filmmakers such as Robert Flaherty, Robert Gardner, John Marshall, and Dennis O’Rourke have contributed greatly to the emerging field of visual anthropology. These filmmakers, often educated in cinema or documentary filmmaking, typically have worked collaboratively with anthropologists or have had backgrounds in anthropology themselves. They helped set what today is considered the standard in ethnographic filmmaking in that they spent long periods of time with the people they filmed.

Modes of Documentary Film

In the 1960s, observational and interactive styles of filmmaking blossomed, with sync-sound making it easier to record the words of the individuals in the film. These methods imitated television and radio journalism styles, which included heavy interviewing techniques. Bill Nichols, professor of cinema and director of the Graduate Program in Cinema Studies at San Francisco State University, has written extensively on documentary and ethnographic film. By looking at key features within documentary film, Nichols

(1991) developed four modes of representation, comparable to those used to classify written texts, which allow for a system of classification for the ethnographic film: expository, observational, interactive, and reflexive. Each mode addresses the issue of how people and issues can be represented appropriately. Further, each of the four modes has been emphasized in a particular time period or in certain regions or countries (Nichols, 1991). It is important to note that most films will have elements of various modes with one dominant form of content.

Expository

The expository mode in ethnographic film might be considered “classic documentary.” This mode contains much description, as it usually sets up an argument, often from the anthropologist’s point of view. It then provides visuals and film footage as evidence to support the argument. Voice-over dominates throughout the expository film and controls and leads the argument. The expository film can be viewed as the visual equivalent to a written essay, and as Nichols (1991) suggested, the visuals in the film illustrate and support for the viewer what is being commented on throughout the film. The editing is subordinated to the “voice of god,” with the use of words providing the logic. In the absence of sync-sound, subtitles may act as voice over, as evidenced in the 1922 film, *Nanook of the North*, by Robert Flaherty.

The editing process in the expository mode is usually not done in a chronological way where events unfold; rather, it is organized so that the visuals support the underlining argument, which is articulated through the spoken word or subtitles. Other classic visual anthropological examples of the expository mode include Basil Wright’s *Songs of Ceylon* (1934), John Grierson’s *Coalface* (1935), Jean Rouch’s *Les Maitres Fous* (1955), and Melissa Llwelyn-Davies *Maasai Women* (1974). In Grierson’s *Coalface*, heavy voice-over tells viewers what they should know about the coal industry, making this a film about the process of the coal industry. In *Maasai Women*, the voice-over, that of the anthropologist herself, powers and controls the argument set out within the film. Here, viewers listen as the anthropologist tells them what to think and what is happening while the film footage shows what is being described, all of which support the anthropologist’s words.

For this last example, it is noteworthy that the target audience was a television audience. This may have affected the type of mode used, thus illustrating further the importance of keeping the audience in mind when choosing whose story is being told and what type of film an anthropologist or filmmaker will set out to produce. Within the expository mode generally, there may be elements of interviews, but they are used to support the main argument of the film or provide evidence (Nichols, 1991). The viewer finds these films to be logical, with cause and effect—similar to the evening news. The viewer expects a problem to be solved in the film, making it solution-oriented.

Observational

The observational mode is also known as *direct cinema* according to Erik Barnouw (1993), or *cinema vérité* according to Stephen Mamber (see Barnouw, 1993, for more information on direct cinema and cinema vérité). This mode of ethnographic film is usually a favorite among ethnographer filmmakers who utilize long periods of time in participant observation. Here, the focus of the film is usually on the details of everyday life, often in intimate settings. It can be thought of as the “fly on the wall” type of approach. The final version of the film is not dominated by voice-over, and the point of view is that of the characters in the film; there is no script. The viewer is looking in on and overhearing the people’s lived experiences. Sync-sound, long takes, and everyday life activities and events are what make the content in the observational film. As Nichols (1991) suggested, the observational mode is missing commentary and generalized images, which encourages filmmakers to focus on specific social formations of the family, the local community, or an institution.

Classis ethnographic films that use the observational approach include David and Judith MacDougall’s films, most notably *To Live With Herds* (1974), John Marshall’s *Bitter Melons* (1971), and Gary Kildea’s *Celso and Cora* (1983). Another example of an observational film that also has expository elements is anthropologist Jerry Leach and Australian filmmaker Gary Kildea’s *Trobriand Cricket* (1976). Here, although the anthropologist’s voice dominates that of the Papua New Guinean’s chief throughout the film, the visuals illustrate a game of cricket played the Trobriand Islander way. This film is from the native point of view, and while it does have expository attributes, it is one of the most recognized ethnographic observational films. It is expected that the viewer of an observational film will have to do some work to understand it, and it is the skill of the filmmaker to capture viewer interest. There is typically some type of tension or movement that is created throughout an observational film. (See Kildea’s *Celso and Cora*, for example.)

Interactive

Interactive films are often based on interviews within the film. The filmmaker here is trying to get many points of view across, and typically the film becomes a film with words as the central subject. According to Nichols (1991), interactive documentary often includes testimony, verbal exchanges, and demonstration. One of the most famous examples of the interactive mode is Jean Rouch and Edgar Morin’s *Chronicle of a Summer* (1960), even though it does have elements of an observational film as well.

The interactive form raises ethical questions of its own, in that interviews are a form of hierarchical discourse deriving from the unequal distribution of power, as in the confessional and the interrogation (Nichols, 1991). A comparison of the interview technique used in the expository mode versus that used in the interactive mode reveals that

interviews in the former are used as evidence to promote the anthropologist’s or filmmaker’s argument, whereas in the latter, the interaction itself between filmmaker and subject is part of the evidence to support the film’s argument. The viewer of the interactive mode expects to be informed, to come to an understanding of something through listening to the words and viewing the interactions of the individuals in the film (Nichols, 1991).

Reflexive

The reflexive mode is based on the filmmaker’s reflections on the content and form of the film itself as well as on the filmmaking process. The reflexive ethnographic film is about the actual encounter between the filmmaker and the people being filmed, and it “addresses the question of *how we talk about the historical world*” (Nichols, 1991, p. 57). Examples include *Man With the Movie Camera* (Vertov), *Lorang’s Way* (MacDougall), and Tim Asch’s *Ax Fight* (1975). In Asch’s *Ax Fight*, the viewer’s assumptions about reality are challenged, not only by the content of the film itself, but also by how the film was made, including the chronology depicted in the film.

Asch, who was never educated in filmmaking, viewed film as a method for teaching anthropology (Ruby, 1995). He began working with Napoleon Chagnon in 1968, and over the course of 10 years made 39 films among the Yanomami of Venezuela. According to Ruby (1995), along with the !Kung Bushmen in Africa, the Yanomami have become one of the most filmed non-Western groups of people. Two of Asch’s best-known films, *The Feast* and *Ax Fight*, came from this time period. In *Ax Fight*, Asch produced four versions of the same footage, resulting in a four-part film. Unedited raw footage is shown first. Next, a voice-over narration is added (using the voice of Napoleon Chagnon, the anthropologist Asch was working with), along with slow freeze frames, including on-screen arrows that point out the particulars that are being discussed. Next come kinship diagrams describing the people being filmed and who is related to whom. Finally, there is an edited version of the film without voice-over that almost appears to be a somewhat observational finished product.

One of the main differences between this type of film and observational films, like MacDougall’s, is the filmmaker’s approach and reason for making films in the first place. Asch has always been concerned with making films for teaching anthropology, while MacDougall was more concerned with using film as a way of producing knowledge.

Challenges Within Visual Anthropology

One major critique of visual anthropology is the degree of “ethnographicness” of the visual medium. To address this concern, several anthropologists have defined what makes a film truly ethnographic. For instance, Ruby (1975) proposed that ethnographic films should focus on

entire cultures or specific portions of cultures, be informed by theories of culture, include an explanation of the research and film methodologies, and use an anthropological lexicon. Others believe that ethnographic film is suitable for use in undergraduate teaching, archiving of cultural material, design and presentation of research studies, fieldwork, and publicizing anthropology.

Many anthropologists are uncertain about the parameters of visual anthropology. They might have little to no background in critiquing the photographs or films as opposed to the written word most often used in anthropological research. Visual media do not have the same attributes, methodologies, and theories as the written word. While most ethnographic films are made today by anthropologists trained in the academy, many films in the past were made by professional filmmakers working collaboratively with anthropologists (Ruby, 2000). These filmmakers often did not have a strong anthropological understanding and, according to Ruby, depicted their subjects as exotic “others” and were “actively hostile to anthropology and [knew] next to nothing about issues of reflexivity, giving the subjects a voice or any other post-modern issues that have dominated anthropology for decades” (2008, p. 3). Deficient in theory and analysis, ethnographic film still lacks clear and rigorous principles to make a significant contribution to cultural anthropology (Ruby, 2008).

Other questions that concern visual anthropologists about ethnographic film include (Ruby, 1996): (1) Who is doing the filming? (2) Is he or she an anthropologist or a filmmaker? and (3) If the film is made by a nonethnographer, then was an anthropologist involved in the project and in what capacity? Ruby is clear that if the film is to be considered “ethnographic,” then the filmmaker must have the intention of doing ethnography, must use ethnographic field methods, and must seek validation among those competent to judge the work as ethnography using the standards of evaluation from anthropology (2000).

Another issue with ethnographic films is their degree of reflexivity. Filmmakers have addressed reflexivity in three main ways: (1) including comments about the filming process by the subjects, (2) identifying themselves as filmmakers (normally in a visual way) early in the film, and (3) leaving traces of material that demonstrate the workings of filming (Morphy & Banks, 1997). Without the conscious effort of reflexivity, visual anthropology runs the risk of objectifying and exoticizing others, which may connect the discipline with colonialism and the ethnocentric view of indigenous peoples (Smith, 2003).

A major issue for ethnographic filmmakers is deciding whose story is to be told—the filmmakers’ story or that of the subjects in the film. “Filming selves” connotes visual anthropology projects in which members of a population under study participate in the filming of themselves or actually film themselves directly (El Guindi, 2004). The indigenous population can serve as “local assistants, culture bearers, collaborators, native ethnographers, filmmakers or filmed” and can offer views of culture to

anthropologists (p. 121). Within the “filming selves” genre, films can be (1) procedural, to demonstrate the traditional culture; (2) investigational, to analyze assertions in anthropological theories; and (3) made for the purpose of self-empowerment, advocacy, and self-representation of marginalized populations (El Guindi, 2004).

Harald Prins (1997) described himself as an action anthropologist who uses video technology to give indigenous people a way to oppose political oppression and resist cultural assimilation. Through his work, Prins offers an alternative to the typical discrimination, incarceration, exile, abuse, torture, and even murder that indigenous people have experienced. He provides a way for these populations to highlight their homelands, distinctive sociocultural practices, language, and spiritual belief systems.

Future Directions

While historically ethnographic filmmaking might have been the predominant method used within visual anthropology, there is much room within the field for other techniques covering the visual sphere of analysis. The future of visual anthropology is concerned, according to Pink (2006), with thinking about and exploring visual research methods across disciplines, anthropology of the senses, and media anthropology, including digital and hypermedia technology. She believes that developing innovative visual technologies and new ways to work within the field will result in creative and novel research projects within visual anthropology. In the future of visual anthropology, Pink foresees more applied projects, greater recognition in the public sphere, and more theoretically and methodologically informed research projects (2006).

Multimedia Forms

Today, images are ubiquitous and ever present on cell phones, the Internet, family photos, and billboards. These images highlight the importance of understanding the sociocultural significance of images. Although the importance of societal images has long been acknowledged by anthropologists, the burgeoning of the visual media has resulted in a visual emphasis in the analysis of people and culture. The consequence of this change has been a transition from the very limited use of imagery by anthropologists to its use as mainstream technique that continues to increase with advances in new visual technologies. Contemporary traditions of visual anthropology include self-representation, culture reconstruction, research film/photography/video, digital/multimedia presentations, and visual ethnography (El Guindi, 2004).

Jay Ruby’s innovative work short films, various photographs, and stories on a Web site is one direction in which the field of visual anthropology seems to be headed in the United States. This new approach to conducting visual ethnographic fieldwork follows from Biella (1993),

who proposed that interactive multimedia blending text, photographs, and film offered a viable alternative to traditional methods. Ruby's *Some Oak Park Stories* project includes four interactive digital CD-ROMs containing ethnographic portraits of three diverse families and one portrait of The Oak Park Regional Housing Center (Ruby, n.d.). This innovative project includes text, photographs, video clips, and other media showing Oak Park, Illinois, a middle-class suburb outside of Chicago that consciously constructed itself to be ethnically diverse.

Ruby was interested in the suburb's idealism and the everyday impact of this idealism on the residents. In addition, Ruby was interested in notions of reflexivity, since the suburb was his hometown. In addition to CD-ROM portraits, Ruby utilizes the Internet, the Web, and other digital technologies as fieldwork devices and for output. His Web site includes his academic biography, a preliminary description of the project, copies of funding proposals, his professional lecture material from American Anthropology Association meetings, newspaper interviews, and quarterly progress reports. He created a listserv with 100 subscribers, mostly Oak Park residents, and obtained regular feedback through this outlet. An interesting aspect to this project is that viewers and readers of the Web site can start anywhere, since it is nonlinear—each portrait section includes a slide show with family snapshots and their corresponding comments. Video clips are less than 10 minutes in length and serve as a way of producing life histories on each of the adults involved.

Pink (2004) discussed the use of hypermedia as a mechanism to share research and as a vehicle for teaching and learning. Her Web project, *Visualising Ethnography* (Pink, 2002), exemplifies this modality and is both a resource in and of itself and an access point to other resources in visual anthropology. *Visualising Ethnography* offers instruction on using the visual during the ethnographic process. Pink's Web project includes interviews with and written works by visual researchers, exhibitions, introductions to different media, and useful Web links.

Participatory Forms of Photography

Photovoice is a participatory form of research where participants take photographs to document their lives, concerns, and communities. Participants then share and discuss the photos in order to identify personal and community/group issues. Photovoice has been used with numerous diverse populations, including rural Chinese women; neighborhood groups; people with mental illness in New Haven, Connecticut; homeless men and women in Michigan; youth peer educators in South Africa; American Latina girls; and many more (e.g., Vaughn, Rojas-Guyler, & Howell, 2008; Wang, Yi, Tao, & Carovano, 1999). Worth and Adair (1997) initiated *autophotography*, a method similar to photovoice. Worth and Adair gave movie cameras to Navajo Indians so they could describe themselves from their own perspective. Ziller and colleagues extended this approach to instamatic

cameras and asked various groups to take pictures within their environment. They believed that taking photos allowed one's true self to be expressed (Ziller & Lewis, 1981).

Community photography is a photographic methodology in which participants take photos of their daily lives in order to increase knowledge about issues in a community. It gives community members a way to inform policymakers and other people who control resources about community issues that are both strengths and challenges. Photography has been implemented as a methodology for studying social issues and for understanding people's lives in various communities. For example, participatory forms of photography have been instrumental in work with homeless children, children living in the Guatemala City garbage dump, children of Appalachia and India, children of poverty and affluence in Mexico, women in rural China, and the Kayapo in Brazil. Community members are given permission to tell their own story from their own perspective simply because they have cameras in their own hands. Thus, understanding of these communities is enriched because the data are being produced directly by the community participants. It is important that the photos and the corresponding stories offer a focal point for discussions of change and involve directly the people who will be affected by the changes.

Participant forms of photography permit people to explore and articulate their lived experience. Participatory photography gives participants freedom to depict their actual surroundings, to choose the people and places that are important, to reflect on priorities and belief systems, and to decide what issues are most salient in their lives.

Interdisciplinary Projects

Another way in which new approaches may be applied to visual anthropology is by looking to disciplines outside the field of anthropology. Other disciplines incorporating visual analysis include cultural studies, psychology, semiotics, media studies, sociology, and cultural geography. Incorporating visual research methods and visual applications used in cultural studies, cultural geography, and sociology as well as other social sciences allows room for innovative research and new knowledge within visual anthropology. According to Pink (2006), the following criteria should be considered in visual research regardless of discipline: "the context in which the image is produced; the content of the image; the contexts in and subjectivities through which images are viewed; and the materiality and agency of images" (p. 31). Pink (2006) proposed three sets of questions to ask while conducting social research on images: (1) What is the image of, what is its content? (2) Who took it or made it, when, and why? (3) How do other people come to have it, how do they read it, what do they do with it?

Quantitative Research in Visual Anthropology

Anthropological visual analysis is emerging in a cross-disciplinary way. Katie E. Englert's anthropology master's

thesis, *Pictures Worth Thousands of Words: Youth, Ethnicity and Photography* (2005), used content analysis following Philip Bell's (2001) methodology. Here, as a methodology for quantitative analysis, Englert devised a visual content analysis while researching the visual representation of Lebanese-Australian Muslim youth in two Sydney newspapers during a series of rape trials in 2001–2002. Initially, Englert utilized the four steps of content analysis, which, according to Bell (2001), include image selection, coding, analysis, and results. While such quantitative analysis may have ignored issues surrounding reflexivity and the audience view, she turned to a semiotic approach method after the visual content analysis in an attempt to investigate possible meanings produced once the images in question were viewed and consumed.

During the fourth step in visual content analysis (analyzing the quantitative results), Englert chose images and newspaper editions for the semiotic analysis. While Rose (2001) suggested developing graphs and tables with numbers of results from the coding process, Englert produced a finer semiotic analysis of the visuals she analyzed, which provided a deeper analytical view of how images were used within a wider set of components. These components included the images, captions, and headlines as well as the structure of the whole newspaper page in question and the entire newspaper edition, all of which allowed for broader interpretations from the large quantitative visual content analysis.

By looking at semiotic concepts of denotative and connotative meanings developed by Roland Barthes (1975) and his notion of mythologies, while also keeping the viewer in mind, Englert developed several attributes residing in the visuals analyzed that denoted wider anthropological themes. Salient themes included generational differences between Muslim immigrant parents and their children and issues surrounding multiculturalism and tolerance of the “ethnic other” in a Christian dominated society. The widespread Anglo-Australian idea of “mateship,” media use of language, and notions of honor and gender were also investigated. Finally, the nature of the Muslim immigrant friendship group, as opposed to that of organized ethnic gangs, was considered, as were issues around sexual assault (Englert, 2005). Englert was able to carry out original anthropological visual analysis while reaching across disciplines, incorporating both visual content analysis (often found in other social science fields like cultural studies, sociology, and psychology) and semiotics.

Visual Anthropology in Academia

Most universities with anthropology departments offer a range of courses in anthropology, but few offer courses in visual anthropology specifically. Many undergraduate courses, especially introductory cultural anthropology courses, utilize visual anthropology only in the viewing some of the well-known classic anthropology films. Even within this sphere, the films viewed are often more than 20 years

old. For example, most professors show films known to be classics within anthropology, like *Dead Birds*, John Marshall and Adrienne Miesmer's *N!ai* (1980), the various films made for television such as Granada Television's *Disappearing World* series (Leslie Woodhead & David Turton, 1974–2001), *Maasai Women*, and other films relating to language, rituals, religion, gender and so on. Few universities offer in-depth courses on visual anthropology, and even fewer offer master's or doctoral programs. Universities that offer more extensive courses or training in visual anthropology in the United States include San Francisco State University, Temple University, New York University, and University of Southern California. Outside the United States, visual anthropology is offered at the Australian National University, the University of British Columbia, the University of Kent, the University of London (Goldsmith's College), the University of Manchester, and the University of Troms.

Conclusion

While historically the field of anthropology has been dominated by the use of words, the visual world has always played an important role within ethnography and the representation of people and culture. In the early years, anthropologists brought exotic “others” to museums, world fairs, and colonial expositions, putting them on show “as curiosities at circuses and other entertainments” (MacDougall, 1997, p. 276). Anthropologists then realized that this approach was problematic, because unless the indigenous people were filmed or photographed in their home environments, they were stripped from their cultural context, and the people themselves couldn't be incorporated into the written word. Enter the role of visual anthropology as a mechanism to bring the real people front and center. Visual anthropology has a robust history using photography and ethnographic film in the production of knowledge about various people throughout the world, particularly in a cross-cultural context. Visual anthropology continues to be an emerging subfield of anthropology, constantly finding new ways to produce meaningful visual accounts, films, and research.

While visual anthropology has often been equated to the production and use of ethnographic films, the scope is much broader and includes photography, art and material culture, research on the body and movement, and more. Throughout history, many anthropologists have probably been doing a version of visual anthropology without knowing it (Jacknis, 1988). New avenues, such as interdisciplinary approaches of visual research, participatory photography projects, and interactive multimedia Web projects are adding to the complexity and richness of visual anthropology as it continues to grow and define itself as a subfield of anthropology. Advances in technology, globalization, and a greater emphasis on collaborative approaches to research not only within academia but also in partnership with community members and indigenous populations offer many exciting possibilities for the future of visual anthropology.

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COMPUTERS AND ANTHROPOLOGY

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Human beings are toolmakers. The history of their civilization is strongly influenced by technological innovations that, to an ever-greater extent, make the use of matter and energy for human purposes possible. From the building of huts and the making of a fire to the construction of skyscrapers and the fusion of nuclei, all cultures have been transforming the resources of nature to reproduce and improve the basis of their own survival. Besides matter and energy, there exists another source of supply that has been exploited technologically since time immemorial—information. Whoever used, for the first time, a sharp edge to leave a durable mark that could express excitement, appeal to demons, or represent a bagged animal, stood at the beginning of a process that led to our modern technologies for storing, transmitting, and processing information. Writing, printing, telegraphy, telephony, radio, and television opened new ways of storing and transmitting information; digital computers also revolutionized the processing of information. Although other innovations of the 20th century, such as the industrial production of artificial fertilizers, might have a greater impact on the biological survival of the human species, the computer is the key technology of today when it comes to the emergence of a globalized information society.

The computer is an artifact that has manifold and far-reaching repercussions on current anthropological research. Apart from being a very useful tool for scientific data management and analysis, the computer serves as a model

of the human mind and shapes the understanding of information society. The individual and culture are interwoven when the future of humankind is discussed in terms of the relation between human beings and the technologies they invent: Does cultural evolution lead to super-intelligent artifacts, or to yet unknown kinds of hybrid systems that will take the place of *Homo sapiens*?

It is necessary for an anthropologist to have at least a basic understanding of the technological history and the conceptual foundations of the computer. In the following, historical landmarks, which are representative of the cultural role of digital calculating technology, are described, and future trends, which are already discernible today, are presented. Then, the fundamental concept of computation is introduced, together with the simplest form of an abstract computing machine. The science called artificial intelligence finally occupies the focus of attention; it builds a bridge between computer science and anthropology so that the field of computational anthropology can be established.

From Abacuses to PCs and Beyond: A Very Short History of Digital Calculating Technology

The desire to create artifacts that have all the abilities human beings possess is documented by testimonials handed down to us from antiquity. The legendary king

Pygmalion of Cyprus, whose story Ovid tells, carved a statue of his ideal woman, because true women did not live up to his expectations. After he had fallen in love with his work of art, Aphrodite breathed life into the statue so that Pygmalion could marry her. Real technologies, however, were largely bound to mimic and enhance the physical capacity of human beings and other organisms. None of the Greek gods gave assistance in creating objects with cognitive skills. The long history of digital devices for calculating with numbers, which led eventually to the development of computers, clearly shows the difficulties human inventors had in order to overcome constructing intelligent artifacts. Digital, from the Latin *digitus*, meaning “finger” (the principal corporeal counting aid), means that these devices are based on counting discrete units as representations of numbers, in contrast to analog instruments based on measuring continuous physical quantities.

Digital Calculators

The Abacus

Although the development of intelligent machines is still a matter of front-line research, digital instruments that help human beings with routine mental activities, such as doing arithmetic, were already used in early but advanced cultures. Most widespread was the *abacus* (the Latin loan word of a Greek expression meaning “slab”), which has been used in various forms, for example, in Mesopotamia, Persia, Greece, Rome, India, China, and Central America. Typically, it consists of a stable structure, such as a tablet inscribed with geometrical markings or a frame holding parallel rods, in which small objects (*calculi*, Latin for “pebbles”), such as stones or beads, are moved as counters.

Strictly speaking, an abacus does not calculate. It is a number-representing mnemonic tool, the functioning of which is completely dependent on manual activity. An abacus assists in a calculation; its stable structure makes its user follow the internal order of a particular numerical system, and the actual positions of its counters store the partial results of an ongoing calculation.

Mechanical Calculators

The next decisive step, beyond number-recording aids, was the invention of mechanical calculators in early modern times, when thinking in terms of mechanisms flourished. These calculators could perform more and more complex arithmetical tasks with less and less human intervention. In 1623, the first one was built for astronomical tasks by the German theologian and scientist, Wilhelm Schickard (1592–1635). It was called a “calculating clock,” could add as well as subtract, and—what is most important—had a decimal carryover mechanism: If the sum of two digits

exceeded nine, a one was carried over to the next column of numbers to the left.

Two famous philosophers, both of whom were also pioneers in mathematics, pushed the development of calculators forward. In the early 1640s, for his father, a tax collector, the young Blaise Pascal (1623–1662) invented a machine that could add and subtract with automatic carryover. Thirty years later, Gottfried Wilhelm Leibniz (1646–1716) formulated, within the context of his Enlightenment project to free mankind from the tiring burden of tedious mental activity, the design principles of calculators that implement all the first rules of arithmetic. Leibniz’s so-called “stepped reckoner mechanism” was used until the 20th century. Great technological progress happened, of course, in respect to the complexity, accuracy, speed, user-friendliness, and durability of such calculators.

What the calculators mentioned so far have in common is that the level of difficulty of the tasks they can perform is quite strictly limited by their mechanical structure. Ideas to overcome those limits evolved during the 19th century. A legendary calculator of that time, the analytical engine, was planned from 1834 onward by the British mathematician Charles Babbage (1791–1871). Although he would never realize it, not least because of the inadequate mechanical engineering of those days, the analytical engine made a great advance by introducing the idea of programming. Babbage wanted to use perforated cards, which had been employed for the control of mechanical looms since the 18th century, in order to instruct the analytical engine to work through a sequence of simple calculations that, altogether, perform a complex mathematical task. In this system, each simple calculation depended on the result of the previous calculation in the sequence. Had Babbage succeeded, a great step toward full mechanization of arithmetic would have been taken. With his failed project, mechanical calculators entered, at least conceptually, the age of automatization.

The First Digital Computers

The rapid development of science and technology, with which the industrial revolution went hand in hand, led to a strong demand for calculating machines and people who could operate them fast and reliably, in order to solve mathematical equations. These people were called computers—a word derived from the Latin *computare*, “to calculate” (originally, to cut numerals into a piece of wood). However, machines were not called “computers” before the end of World War II. General technological prerequisites for their development included the use of electricity (not only as a power source but also as a carrier of information, e.g., in Morse code telegraphy), the development of relays as electromagnetic switches that can control the flow of electricity, and the refinement of punched card and paper tape technology, for example, in tabulating systems that were used for the storage and statistical analysis of huge volumes of data.

The first who began to project digital computers in the 1930s, and build them in the 1940s, were physicists and engineers in Germany, the United States, and Great Britain. Their developments were carried out in parallel and, for the most part, independently from each other. Whereas the literature on the history of early computers is sometimes biased by national and institutional interests, the following selection of four machines shall just show the variety of technology and purpose that characterizes the first generation of computers.

Pioneering Machines: Z3, ASSC, ENIAC, and Colossus

The first functioning general-purpose digital computer, the Z3, was built by the German civil engineer, Konrad Zuse (1910–1995), in 1941. Following an idea of Leibniz, Zuse based his machine on the binary system—in hindsight, this was a natural consequence of using relays (the Z3 contained about 2600). These electromechanical switches can be in two different states, which represent zero and one, respectively. Zuse implemented logical operations (the junctors AND and OR as well as the negation NOT) in electrical circuits and used them to calculate with binary numbers.

Zuse was not encouraged much by the official institutions of Nazi Germany; after the war, he set up the leading computer company of West Germany. In Great Britain and the United States, the situation was completely different. The development of computers, at first particularly for military purposes, had a lot of support from companies, scientific institutions, and governments. Thus, it cannot come as a surprise that the first large-scale computer was built in the United States. In 1937, a Harvard engineer, Howard H. Aiken (1900–1973), proposed to construct an electromechanical computer on the bases of the available technology of decimal-system calculating machines. With the support of IBM, this machine became the automatic sequence controlled calculator (ASSC), or Harvard Mark I, and it was put into operation in 1944. Aiken's calculator—a large-scale machine, indeed: 50 feet long and nearly 10 feet high, made of 750,000 parts and 500 miles of wire—realized Babbage's dream: a special-purpose programmable machine for number crunching in order to numerically solve differential equations. A giant of the preelectronic epoch, the ASSC was in use until 1959.

Only 2 years after Aiken's machine, America's first large-scale electronic computer was completed. The ENIAC, the acronym of electronic numerical integrator and computer, was built by J. Presper Eckert (1919–1995), an electrical engineer, and John W. Mauchly (1907–1980), a physicist, at the University of Pennsylvania between 1943 and 1945. Whereas the ASSC had been the result of an ingenious combination of traditional technology, the ENIAC was based on state-of-the-art electronics: high-speed vacuum tubes that were not as reliable as relays but could switch

1,000 times faster. Its 18,000 tubes made it the incomparably fastest machine built so far, yet to program it took quite a long time; rewiring was necessary for each new problem. The ENIAC was used, like the ASSC, mainly to calculate (in the decimal system) solutions of differential equations for military and civic purposes until 1955.

Only 30 years after the end of World War II, it became known that the ENIAC was not the world's first large-scale electronic computer. Since the 1970s, declassified information of the British intelligence service unveiled step by step the existence and specifications of the Colossus machines, a series of computers the first of which had been completed in 1943. They were special-purpose machines used to discover the settings of the code wheels of German cipher machines, so intercepted encrypted messages could be decrypted. Encoding and decoding is a form of the manipulation of symbols—and even a more general one than calculating; it is not restricted to numerals. Since cryptanalysis must happen as fast as possible, particularly in times of war, the electrical engineer Thomas H. Flowers (1905–1998), who worked at the now-famous Government Communications Headquarters Bletchley Park during World War II, decided to automate it by using computers that were based on vacuum tubes (about 1,500 in the first Colossus, about 2,500 in the later machines) and operated in binary logic.

Triumph of the Computer

After World War II, the computer started its triumphal march and became the key technology of modern developed societies. This success story has been made possible by an impressive series of technological breakthroughs, some of which will be highlighted below.

Technological Progress on the Basis of the von Neumann Architecture

None of the four pioneer machines introduced above had an internal memory that could store programs. The first more-than-experimental computers that incorporated such storage were the electronic discrete variable computer (EDVAC) built by Mauchly and Eckert between 1945 and 1951, a smaller and faster successor to their ENIAC, and the IAS computer, named after the Institute for Advanced Study in Princeton, New Jersey, where its construction was started in 1946 and finished in 1952. What seemed to be just a rather innocuous technological improvement was, in fact, a great conceptual step toward the realization of a truly all-purpose computer. Storing, in an internal memory, the program (or software) that controls the working of the computer made it easier to change instructions—not only for the human programmer, but also for the computer itself—even during its operation. From that time on, programs were considered symbol structures that were data for other programs.

The general design principles of the IAS computer were developed by the Hungarian-born mathematician John von Neumann (1903–1957), one of the greatest scientists of the 20th century. He not only knew the need for fast, reliable, and simply programmable computers very well from his wartime work, for example, on the atomic bomb, but he also had the ability to recognize the formal structures underlying a tremendous variety of scientific and engineering problems very quickly and to find ingenious solutions for them. After Mauchly and Eckert had told von Neumann about their ideas for the EDVAC, he began to tackle the formal problem of conceiving a general architecture for the all-purpose computer. The solution he found—in honor of him, it is now called the von Neumann architecture—is the abstract organization according to which ordinary computers are designed to this day. It distinguishes the five essential material (hardware) components of a computer:

- A memory unit, whose locations store data and programs so that they can be read and rewritten arbitrarily
- A central arithmetic unit, which implements the fundamental rules of arithmetic
- An input unit, which allows the user to feed the computer new data and programs
- An output unit, which transmits the results of computations and other information about the computer to the user
- A central control unit, which manages the sequential execution of programs by coordinating the information flow in the computer

The IAS machine served as the paradigm for a number of influential noncommercial and commercial computers, both inside and outside the United States. The implementation of von Neumann's general architecture has, of course, been benefiting from incredible technological progress, which concerns all components of the computer. The most evident trend is miniaturization. Since the mid-1950s, after the pioneer machines of the 1940s and early 1950s used electromechanical relays and vacuum tubes as switches, the second generation of computers experimented with transistors, a solid-state technology invented in 1947. A few years later, the third generation used integrated circuits, or chips (invented 1957–1958), which combine transistors and other semiconductors in prewired configurations and are fabricated from a single piece of silicon. This process led, in the early 1970s, to implementing the arithmetic and the control unit (plus working memory) on one chip, the microprocessor. According to the so-called Moore's Law, which was postulated by the engineer Gordon E. Moore (b. 1929) in 1965 and has been validated to this day, the number of transistor functions on a chip is doubling every 18 months.

The progress of switching technology led to a spectrum of machines that implemented the von Neumann architecture on different scales. In the 1960s, mainframe computers, such as the IBM System/360, continued the tradition of the

pioneer machines. These room-filling and expensive systems were built for the high-speed processing of very large data sets and were operated by specialists. Minicomputers, such as the DEC PDP-8, appeared in the second half of the 1960s. They were smaller and less expensive machines made possible by transistors. Not only did these machines allow their users to interact directly with them, but also their standard design required them to be individually adapted to particular applications. In the second half of the 1970s, microprocessor-based personal computers, such as the Apple II, began to fascinate hobbyists, and these computers have been welcomed by small businesses and common consumers since the 1980s. These innovations made the use of the computer easier and easier in the office and at home; for example, by implementing graphical user interfaces, the personal computer and its mobile siblings became an integral part of everyday life.

Besides miniaturization and increasing user-friendliness, the spread of computer networks is another very important trend of the last 25 years. Starting in the mid-1980s, personal workstations, as parts of local networks that connect computers of any size, made the idea of distributed systems familiar in many professional contexts. The 1990s and the beginning of the third millennium saw the rise of global networking, via the Internet, and especially the World Wide Web, in all areas of society; the transmission and processing of information, communication, and computation began to fuse together in such a way that a truly global information society is technologically possible now.

SAGE: The System Dynamics of Information Society in a Nutshell

From the perspective of cultural anthropology, the most significant tendency in the history of digital computing, since World War II, is the development of an ever-stronger integration of computers into all fields of human activity. They are used in offices (e.g., for accounting), in factories (e.g., for control of manufacturing machines), in laboratories (e.g., for data analysis), in the armed forces (e.g., for early warning), in the infrastructure (e.g., for traffic-flow control), and at home (e.g., for playing).

What is quite remarkable for computers, compared to other artifacts, is their astonishing capacity to induce, due to their information processing abilities, the emergence of new sociotechnological systems in all contexts of use. Such systems are purposefully ordered sets of equipment and processes on the one hand and ordered sets of institutions and persons who conceive, realize, and use technologies on the other. The task to create and develop those complex organizations, by controlling them through networked computers, forced engineers and scientists to think generally about systems as functional units of the information society.

To show the impact of that thought on modern culture, it is advisable to have a closer look at the prototype of a

computerized sociotechnological system, the Semi-Automatic Ground Environment (SAGE). It served, from the 1950s to the 1980s, as a command, control, and communications system for the continental air defense of the United States. SAGE automated the early warning about, and interception of, attacking aircraft as a complex process that involves radar detection, the computer processing of incoming data, the countrywide communication of analyzed data, and the direction of intercepting aircraft. Ground-based and airborne radar systems, planes, ships, missile sites, command stations, and a hierarchy of military decision makers were to be so connected that a fast flow of reliable information was guaranteed.

A necessary condition for gaining an information advantage in air defense was the availability of computers that could process information in real time, that is, so fast that the results could lead to successful action in the situation that had been depicted by the initial data. The Whirlwind machines, built at the Massachusetts Institute of Technology between 1945 and 1953 under the direction of Jay W. Forrester (b. 1918), were the progenitor of the SAGE computers. They constituted the knots not only of a nationwide network of telephone-line information transmission channels but also of local clusters of cathode-ray terminals that had access to a central computer in time-sharing mode. They outputted radar information graphically and were interactively operated by a light pen. Those innovations implied that programs of a length and complexity unknown so far had to be developed and the definition of new high-level programming languages included. Since human beings were needed to accomplish these feats, scientists, engineers, and operating crews had to be trained. Psychological barriers among academia, the military, and civil companies needed to be overcome. To solve these problems, technological progress required institutional innovation; the nonprofit MITRE Corporation was founded. It was a group of research, development, and implementation organizations that worked only for governmental clients, both military and civil.

SAGE required interacting in real time with a complex technological system that contributed to the stability of deterrence during the cold war. People who were responsible for its development, use, and maintenance had to learn the management of complex systems. Thus, it cannot come as a surprise that many SAGE professionals set up, or became managers in, companies that were pioneers of the computer industry. The best example of how the SAGE experience influenced the emerging information society is Forrester himself, who, as an engineer, invented a new type of storage device—the magnetic core memory, which was faster and more reliable than the vacuum tubes used before. Forrester became a professor of management at MIT, started research on the computer-based modeling of complex social systems, and provided the scientific basis of the famous Club of Rome reports in the 1970s.

SAGE already represented, a few decades ago, those important aspects of the interaction between technology

and culture that characterize the internal dynamics of organizations in today's information society. It could adopt this symbolic quality because it contributed to a most important public good, national security, during an era in which the latter was highly threatened, so technological as well as institutional innovation in this field was strongly supported. Thus, the development of SAGE is a main event in the origin of the information society, and it needs to be intensely contemplated by cultural anthropologists.

Today's Information Society

The social life of organisms is based on communication, the exchange of information by means of the transport of matter and energy. In this sense, any society in the history of life is an "information society." What cultural anthropologists mean when they use this term, which was invented by Japanese journalists in the mid-1960s (*joho shakai*), is essentially two things: First, the velocity and direction of societal change in today's developed countries is to a large degree explainable only by taking into account the central role they allow the development of information technologies to play as sources of material and intellectual wealth; second, the great importance of information technologies is a key element when members of developed countries describe the society they live in, and acknowledge that those technologies are a powerful motor of their productivity. From both points of view, it follows that scientific, economic, political, and juridical decisions about information technology are not only a most important factor in the transformation of all areas of society, but also these decisions are recognized as such. The computer becomes the preferred medium of influencing social and cultural change.

Some Trends Toward Human-Computer Symbiosis

It is difficult to give a fairly sensible forecast of the volume and direction of growth of information technology for even the near future. Twenty years ago, the impact of the Internet on everyday life would generally not have been considered as being as tremendous as it has become. Extrapolating progress from the status quo too conservatively is just one widespread error in prediction, while underestimating the difficulties of technological innovation is another one. However, promising candidates for trends in computing that are likely to become very important in the near future are as follows:

Pervasive and ubiquitous computing: The difference between computers and other artifacts of everyday life, such as kitchen utensils and clothes, will vanish almost completely. What is more, those computer-equipped objects

can be connected with each other so that a continuous flow of information between them will be possible.

Unconventional computers: Beyond the von Neumann architecture, many other design principles of computers are being developed. This involves, for example, the construction of a quantum computer whose processor could, according to the strange laws of quantum physics, work through a program starting simultaneously with a very great number of different input data. Another important research direction experiments on organic matter (e.g., DNA), sometimes even whole organisms (e.g., slime molds), as computational media.

Agent software: Programs are beginning to be conceived as agents that their principals allow to perform simple or complex tasks independently in respect to certain types of behavior. A mobile agent, for example, is sent out to search information in a computer network that might be helpful in solving a problem, and its way through the network is not determined by its user.

Autonomous robots: Computer-controlled automata that process sensory input from their environments, move in real space-time, and autonomously carry out specific functions in complex situations will be mass-produced. Future children will grow up with such robots, and when the behavioral complexity of the latter becomes high enough, intelligence and an ethical status will be ascribed to them.

Altogether, these technological developments will converge on a new quality of technological existence, which might be called “human-computer symbiosis.” This concept was introduced by the American psychologist Joseph C. R. Licklider (1915–1990) as early as 1960. In biology, the Greek *symbiosis* (literally, “living together”) basically means that at least two organisms of different species continuously cooperate in a way that benefits all involved. As regards the interaction of human beings and computers, a symbiosis that enriches the physical and intellectual life of humans, as well as fosters autonomy in computers, is accompanied by astounding phenomena at the intersection of biology, sociology, and engineering, for example, virtualization and hybridization. (Network-based communities of software agents will strongly influence how human individuals form their identities by communicating through their agents, and ontologically new types of entities, hybrid systems that synthesize evolved and engineered components, will emerge). Anthropology has to become anthropotechnology.

Turing’s Universal Machine and the Concept of Computation

The impact of computers on modern society since World War II is obvious, and their future significance can hardly be overestimated. To grasp the influence of the computer on an anthropological understanding of the

human being, a look at the conceptual basis of the von Neumann architecture, the abstract technological scheme according to which nearly all of today’s computers are built, is a prerequisite.

Most generally, computers are machines; thus, it must be asked what is meant by “machine.” Computers constitute a special class of machines, so the difference between them and other such classes has to be described. This involves stating the meaning of “calculation” more precisely, which can be done very elegantly by introducing an abstract automaton, the *Turing machine*, which in turn helps define the concept of a computer as it is understood conventionally. An analysis of this machine shows the fundamental limits of mechanical computations.

Machines: Particular and Universal

A physical object is considered a machine if the explanation of its behavior supposes that a mechanism is working in its inside in order to generate the behavior. Moreover, the mechanism is thought to perform its task neither by chance nor by some mysterious power. Instead, how the internal mechanism generates the system’s external behavior is assumed to be explainable by a process that runs, in time and space, according to laws of nature, which have effects under boundary conditions set by the organization of the system.

More generally, a machine implements, through its mechanism, a rule leading to a certain result (behavior) when given a certain input. A machine not only fulfils a concrete function (a task that it shall perform) but also realizes an abstract function (a formal rule that maps input on output). The behavior of a car, for example, can be explained as a movement in a coordinate system, with time and space axes, that results according to natural law from the interaction of many independent variables: the design of the car, the actions of its driver, and environmental conditions.

Most machines, such as planes, television sets, and refrigerators, perform just one or very few specific tasks; they are particular machines. If machines for many functions are constructed, then the guiding principle is to let the machine utilize a part of its input as a specification of the behavior it shall show next. By extending the set of alternatively possible behaviors more and more, the universal machine results. It can perform an infinite number of formally describable different tasks, given arbitrary input, if the correct mechanism is chosen for processing the input. From the abstract point of view introduced above, the universal machine can realize an infinite class of rules that map input on output. That should sound familiar; it is a reformulation of the idea of the all-purpose calculator, the computer. Thus, it must be possible to give a precise meaning to the idea of calculation by describing the basic architecture of the universal machine, and to define, in terms of

this abstract automaton, what any particular computer does: to calculate an output given an input and a program.

The Turing Machine

John von Neumann has described the basic architecture according to which ordinary computers are designed to this day. Yet, more than 10 years before von Neumann wrote down his ideas, a British mathematical genius, Alan M. Turing (1912–1954), had already invented a most simple abstract automaton that was able to do anything that an all-purpose digital information processor can do. In retrospect, his 1936 paper “On Computable Numbers, With an Application to the Entscheidungsproblem,” which introduced the machine that is named for Turing nowadays, is the birth certificate of theoretical computer science. During World War II, Turing acted as chief scientist for the Bletchley Park cryptanalysts and designed electromechanical devices, which were predecessors of the Colossi machines, for decrypting intercepted German messages. After the war, he was the guiding spirit of the development of the first British all-purpose electronic computer, the automatic computing engine (ACE), whose design was far ahead of that of contemporary machines and shifted priority from complex hardware to complex software.

The Turing machine integrates all components of the von Neumann architecture in an astonishingly simple way:

- The memory unit is an infinitely long tape that consists of linearly ordered discrete squares, each containing a zero or a one.
- The combined input and output unit is a head that can read and overwrite the content of one square of the tape at a time.
- The combined central control and arithmetic unit is a look-up table that contains information on what the read/write head should do next according to the internal state (represented by a row of the look-up table) the machine is in. It reads the symbol in the square on which the head is positioned at any given time, overwrites it with a symbol, and moves one square to the left or the right. The look-up table says what the new state of the machine will be after the head’s action is executed.

The Turing machine works as follows: The machine starts out in its initial state. The input, to be processed by the automaton, is written out in a sequence of binary digits on the tape. The head reads the symbol in the square on which it is positioned. The look-up table says what the head should do, given the initial state of the machine and the symbol read. This is done (e.g., the head writes a zero and moves to the left), and the internal state of the machine is updated according to what, given the read symbol, the look-up table says. Then the operational cycle starts again: The machine reads the symbol in the square on which the head is now positioned, the look-up table says what the head should do, and so on. The machine stops if, given its present

internal state and the symbol just read, the look-up table sends the machine into the halting state after the head has executed its operation. The machine will not do anything further. Then, the sequence of symbols on the tape is the result of the calculation the machine has done, given the initial contents of the tape and the particular look-up table.

The look-up table of Turing’s ingenious automaton is analogous to the program of a digital computer. The Turing machine can, thus, be programmed by an appropriately completed look-up table, in order to make a particular calculation using as input a series of symbols on the tape. What is more, the Turing machine can be programmed to interpret a part of its input as a description of another Turing machine whose program it shall execute. Such a programmable Turing machine is equivalent to a digital computer, even though it takes it comparatively many more steps to do even simple calculations; it is a universal Turing machine that can implement all possible programs any computer based on the von Neumann architecture is able to process. Thus, the universal Turing machine defines abstractly what a computer is.

Turing introduced his universal machine in order to prove that it defines the class of all processes that can be carried out by stepwise going through a sequence of well-defined rules, that is, by an algorithm (from the name of an Arabic mathematician of the 9th century, Al-Khwarizmi, who wrote the oldest known work on algebra). Anything that is calculable by such a process—a mathematician would speak of general recursive functions—is computable by a universal Turing machine. The vague concept of calculation can thus be substituted with Turing’s more precise concept of mechanical computation by means of his universal machine. This proposal is called the Church-Turing hypothesis—Alonzo Church (1903–1995) being an American logician who worked on a clarification of the concept of calculation at the same time as Turing. It is just a hypothesis, since it cannot be proven to be true; it is a well-founded proposal to state a vague concept more precisely. Unconventional computers of the future, for example, both quantum and organic computers, might make it necessary to revise the Church-Turing hypothesis.

Mechanically Undecidable Problems

Turing also showed mathematically that it is possible to confront his universal machine with problems it principally cannot solve in finite time. Such problems are called mechanically undecidable and represent the limits of what can be done by computers.

A famous problem, called the “halting problem,” that has been proven, by the American mathematician Martin Davis (b. 1928), to be unsolvable, is to program a Turing machine so that it decides, in a finite lapse of time, whether any given Turing machine will stop its processing of an arbitrary input. By using proof techniques known from metamathematics, Davis showed that there does not exist a

Turing machine that implements a general decision procedure for solving the halting problem. The simplest solution seems to be to let a tested machine run and see if it stops the processing of a given input. Yet, this would not help in the case of very long computations, since the testing Turing machine does not know whether it has waited long enough; the tested machine might stop just one second after the testing machine has stopped the test run. The general idea of how to prove the undecidability of the halting problem involves the construction of a self-contradictory Turing machine that tests itself as a testing machine and does not halt when it, as a tested machine, does so, and vice versa.

Turing's ideas on abstract universal machines seem far away from anthropological considerations on computers, yet the reverse is true. That there are principal and mathematically provable limits on what computers can do is of utmost importance when it comes to computational models of human thinking and behavior. This is most evident in the science of artificial intelligence, one of whose founding fathers was Turing.

Artificial Intelligence as Computational Anthropology

Anthropologists, like most other scientists, apply the computer as a tool for scientific data management and analysis or just for text processing. Already in the 1950s, the French ethnologist Claude Lévi-Strauss (b. 1908) insisted that, without the intensive use of computers for documentation and analysis, anthropologists could not handle their large volumes of collected data any more. Yet, the computer is also used as an explanatory model of human thinking and behavior, most explicitly in artificial intelligence (AI), a research program that emerged just a few years after the first digital computers had been constructed. Its name was invented by an American computer scientist, John McCarthy (b. 1927), to title a workshop at Dartmouth College in 1956; this event went down in the annals of AI as the foundation event of this discipline.

The research program of AI can be construed in both a narrow and a broad sense. Its aim may expressly be an anthropological one: to understand human intelligence, so that computer scientists are called upon to construct artifacts whose internal mechanisms and external behaviors get closer and closer to the cognitive and behavioral patterns of *Homo sapiens*. AI may, on the other hand, be indifferent to the resemblance of the artifacts computer scientists construct to resemble human beings. Then, AI is considered the general science of all possible intelligent systems that have, neither in their externally observable behavior nor in their internally detectable information processing, to measure up to humans. Yet, even if AI is regarded as an anthropological science, its constructions are possible intelligent systems in a particular sense: After they have been successfully designed and people have accustomed themselves to

interacting with them over a considerable lapse of time, AI artifacts might be accepted as possessing humanlike but, of course, not real human intelligence.

The Turing Test, or How to Make the Concept of Human Intelligence Operational

Whether AI is construed in the narrow or the broad sense, it needs a catalogue of criteria that a system must fulfill if it is to be recognized as being intelligent. In an experimental science, those criteria should take on the form of operationalizable sufficient conditions of ascribing intelligence. This was stated clearly by Turing in his 1950 paper "Computing Machinery and Intelligence," a historic document of AI's beginnings that still is hotly disputed.

Turing proposed a game in which a computer communicates to a human being in order to convince the latter that it is also human. This so-called imitation game can be transformed into a test that nowadays is named for Turing and basically requires the following components: two computer terminals, a connection between them, a human being who operates one of the terminals, a digital computer that operates the other, and a partition wall between the human and the computer so that the former cannot see the latter. The human starts the test by typing a question into the terminal. This question is sent to the other terminal, into which the computer then keys an answer. The human receives the answer, asks another question, and so on. After some time, the conversation is interrupted, and the human must address the question of whether he communicated with another human or with a computer. The computer passes the Turing test when it succeeds in deceiving the human, a feat that, as Turing hoped, will be performed by a digital computer in the near future.

The Turing test suggests that one may ascribe intelligence to a computer when its communicative behavior is not distinguishable from that of an intelligent human in the same situation. This reasoning is based on an analogy that invites one to infer an externally unobservable cognitive competence from an observable behavior known to be shown by humans who are considered intelligent.

The Need for a Full Structural Comparison of Humans With Computers

The criterion of intelligence provided by the Turing test, or similar experimental procedures, does not refer to the internal information processing of possible intelligent systems. This is an important shortcoming, if AI is to be construed as the science of human-like intelligent systems; the comparison of humans with artifacts in respect to their intelligence must then also refer to mechanisms of information processing that are working inside.

On the hardware level of, roughly speaking, the human brain and the microprocessor of the computer, differences prevail, as von Neumann showed in his lectures on

the computer and the brain: The brain is not a purely digital machine, and statistical methods of data analysis are hard-wired in neurophysiology that are not implemented in the integrated circuits of conventional computers. Yet, if human beings and computers are compared on the software level, similarities might be discernible. The conceptual basis of such a comparison is given by Turing's structural definition of computation: It does not need to specify whether a computing system has been evolved by natural selection, educated by cultural interaction, or engineered by scientific construction. Thus, the science of computing might apply to digital computers as well as to human beings, and it is an empirical question whether human cognition can be described by computational models as a form of programmable processing of digital information. If the answer is affirmative, then the concept of computing becomes a most important supportive part of a general framework for anthropology that also includes an engineering part: AI or, as this discipline might then be called more adequately, "computational anthropology."

The Physical Symbol System Hypothesis: A Paradigm of Computational Anthropology

The hypothesis that has been most influential in the history of AI was developed by two American computer scientists, Allen Newell (1927–1992) and Herbert A. Simon (1916–2001), who did research also in psychology, economics, political science, and philosophy. Simon is the only computer scientist so far to become a Nobel laureate; he was awarded the 1978 prize in economics.

The unifying idea of Newell and Simon's work is the physical symbol system hypothesis. It says that, for any system that shows general intelligent action, it is a necessary and sufficient condition to be a physical symbol system. By "general intelligence," Simon and Newell mean that such a system is comparable to a human being as regards the realization of its aims in complex situations and the adaptation of its aims to the environment. Against the backdrop of Turing's structural theory of computation, it is easy to explain what symbol systems are: They are identical to universal machines. Newell and Simon decided to introduce a new name for Turing's abstract automaton, since they realized that the mechanism by which a Turing machine interprets its input is necessarily based on symbol-based designation: A particular symbol on the tape stands, relative to a well-defined internal state of the machine, for a certain operation of its read/write head and a change of its internal state. The same is true for the interpretation of symbols on the tape as representations of other Turing machines—the essential feature of computational universality.

The reason Simon and Newell speak of physical symbol systems is that they are interested, as empirical scientists, in really existing symbol systems. Any symbol system in the physical world, such as a personal computer,

is not an unrestrictedly universal machine; in contrast to the abstract machine of Turing, it cannot possess, for example, an infinitely large memory. Differences between real symbol systems are, thus, due to their respective material constitution that appears as a limitation on information processing if compared to a universal Turing machine. Another way of expressing this idea is to say that the behavior of all physical symbol systems can exhibit general intelligence, because it is generated by a universal machine, but each system does so on a particular material basis that results in its specific form of bounded rationality (e.g., cells in the human brain and integrated circuits in digital computers).

These remarks show that the physical symbol system hypothesis is not to be interpreted as being incompatible with more biologically inspired approaches to intelligent behavior (such as neural net modeling, artificial life research, and evolutionary robotics), most of which have their intellectual origins in cybernetics (from the Greek *kybernetes*, "steersman"), the structural science of communication and control, which was founded by the American mathematician Norbert Wiener (1894–1964). The idea of a computational anthropology based on the physical symbol system hypothesis does not exclude those approaches; it integrates them. Any anthropological model of intelligent behavior and cognitive processes that can be expressed in the form of a program (which is the case in the approaches mentioned above) is principally executable by a symbol system (i.e., a universal Turing machine). Biological research is, in fact, of utmost importance for Newell and Simon's conception of AI; the difference in computational power between a program that simulates the cognitive mechanisms and generates the intelligent behavior of an average human being in everyday situations on the one hand, and the universal Turing machine on the other, is due to the physical constraints of the human body on its internal information processing.

An intensely debated question asks whether human beings have cognitive and behavioral abilities that are not algorithmically formalizable. If there do not exist such skills, then the principal limits of computability are also the anthropological limits of human thought and action. Otherwise, it might be good to advise anthropologists that they should expect the construction of new, unconventional types of computers beyond the von Neumann architecture; these automata might then help the anthropologist to understand what human beings are by analyzing what they can engineer and how they think about the limits of their artifacts.

Conclusion

The enormous impact of computers on modern society urges anthropologists, engineers, and philosophers to discuss today how traditional ideas of the human condition will fare in the technological world of tomorrow. Humanism has

been proposing, since the Renaissance, that the way toward a humane existence leads neither through religious belief nor through ideologies of collective welfare, but through the education of the individual. "Education" here means a process of developing oneself into a spiritually and corporeally refined, ethically autonomous, and socially agreeable being. Traditional humanism, which recommends the study of classical works of art as the best way toward independent individuality, usually spreads the fear of technology, the latter being considered the quintessence of standardization and heteronomy. However, anthropologists may help undermine this misleading confrontation: Humans are toolmakers from the beginnings of their history, and progress in science and engineering makes the individualization of artifacts possible. Information technology is not only a tool adaptable to individual needs and abilities but also a medium for developing them.

Particularly in respect to the computer, it is of great importance for anthropologists to listen to a warning of the Spanish philosopher José Ortega y Gasset (1883–1955): The real danger of our time is that human beings are becoming too lethargic and unimaginative to introduce unusual uses for their tools, machines, and automata or to invent new technologies. One reason for this threatening weakness might be the still widespread attitude of traditional humanism that an eternal essence of humankind must be defended against technology. Instead, anthropology should consider the computer to be not only an adaptable tool of and a developmental medium for humanity but also an existential challenge to humanity, in the sense of a venturesome call to discover the unexplored possibilities of human existence. Since technology has always been powerful in transcending given circumstances, an anthropologically enlightened humanistic perspective on today's information technology might properly be called "transhumanism."

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HEALTH AND ILLNESS

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Medical anthropologists disagree about definitions of the terms *health* and *illness*. A complicating factor is that health and illness are not—and never have been—opposites, since both health and illness can reside within the same individual at the same time. Clearly, health, illness, and disease are related concepts. But how does illness relate to disease? All definitions of health are imbued with moral, ethical, and political implications. Perhaps the broadest definition of health is that proposed by the World Health Organization (WHO), defining health with reference to an “overall sense of well-being.” By WHO’s criteria, only a relatively small percentage of the world’s population could be classified as healthy.

Medical anthropologists find it necessary to distinguish disease from illness (Beyerstein, 1997; Eisenberg, 1977; Helman, 2001). Beyerstein argues that the term *disease* applies mainly to organic, physical conditions that can be traced to viruses and bacterial infections, tissue damage, cancerous growths, and so on, while *illness* refers to how patients perceive the physiological experience of “things not being quite right.” He narrows this distinction even further by contending that disease is primarily organic, while illness is primarily psychological. Not all medical anthropologists would accept his distinction. Beyerstein’s ideas need further refinement, because it is well established that psychological and cultural factors, such as expectations, folk explanatory models, subjective biases, and even self-delusion, may

greatly shape the experience of illness (Green, 2003; Kleinman, 1997). The placebo effect (*placebo* is Latin for “I will please”), for example, has been noted in all medical systems (Moerman, 2001), and 21st-century medical anthropologists have become increasingly concerned with the symbolism of healing and the impact of belief (the patient’s belief and that of the healer) on the healing process itself (Buckser & Glazier, 2003; Lévi-Strauss, 1967).

Anthropologists researching health and illness have focused mainly on the relationships that cultural systems have with organizations, institutional practices, and power structures, as well as the epistemological basis of medical knowledge. In addition, they have explored the cultural dimensions of health and illness from ethnographic, comparative, theoretical, and phenomenological perspectives.

Anthropological approaches to health care differ from those of other social scientists in a number of respects. Sociologists often focus their attention on single institutions, while medical anthropologists study multiple institutions and embrace medical pluralism (Baer, Singer, & Susser, 2003). Anthropologists recognize that all societies possess numerous and sometimes conflicting ideas about illness, curing, and health, ranging from predominantly local health systems (like core-shamanism) to scientific systems (like biomedicine). As anthropologist Murray Last (1996) pointed out, there is a wide range of subcultures represented within all medical systems.

Anthropologists assert that health care specialists can be found in all societies, because sickness, pain, suffering, morbidity, and mortality exist everywhere. The wide variety of beliefs and practices associated with death and diseases; ideas about what constitutes the “good life” and “well being”; connections between morality, illness, and ethics; and the use and abuse of power and social control as mechanisms for dealing with misfortune serve to highlight the universal interconnectedness of culture, health, and illness. Indigenous ideas concerning health differ markedly from biomedicine. The !Kung San of the Kalahari Desert, for example, interpret the ability to sweat as indicative of good health, since sweat is regarded as a “life-giving” substance (R. Katz, 1982). American biomedicine does not share this interpretation of sweat.

Anthropologists are equally concerned with the hows and whys of healing. As noted, all medical systems are grounded in human frailty; that is, all humans must deal with the realities of pain, suffering, and death. But cultures deal with pain in different ways (Morris, 1998). While some societies rely almost exclusively on traditional systems of knowledge (which may seem less effective from a strictly biological point of view), other societies advocate modern, scientific biomedicine. Both traditional and biomedical systems can make claims to efficacy; for example, an estimated 25% to 50% of substances used in traditional nonbiomedical botanicals have been shown to be effective by accepted scientific measures (Singer & Baer, 2007). All societies share common concerns about the quality of life, their valuations of human life, and the alleged adequacy and/or inadequacy of their own medical practices. As a consequence, medical anthropologists have expanded their field to encompass complex social, political, economic, philosophic, religious, and ethical issues like organ transplants (Lock, 2001).

The Scope of Medical Anthropology

As noted, anthropologists look at health and illness from a broad perspective; for example, Ember and Ember's (2004) *Encyclopedia of Medical Anthropology* contains 53 thematic and comparative essays as well as 52 “cultural portraits” of health and illness in specific cultures around the world. Thematic and comparative essays address topics as diverse as bioethics, medical pluralism, shamanism, homelessness, nutrition, social stratification, aging, breastfeeding, immunization, genital mutilation, alcohol use and abuse, cholera, culture-bound syndromes, stress, diabetes, diarrhea, HIV/AIDS research, malaria, mental retardation, sudden infant death syndrome (SIDS), tobacco use and abuse, and tuberculosis. The 52 cultural portraits include case studies from every continent and represent diverse cultural groups ranging from the Amish of Lancaster County, Pennsylvania, to the Hmong in Laos and the United States, to the Yoruba of Nigeria.

Another indication of the broadened scope of medical anthropology is the number of anthropologists contributing to the second edition of *The Gale Encyclopedia of Alternative Medicine* (2005).

Medical anthropologists examine health and illness from a human-centered perspective focusing on individuals and their well-being. Medical anthropologists are also activists. The field of medical anthropology is characterized by its applied focus and its extensive use of ethnography and participant-observation to better understand the complexities of health, illness, and health care. There is a sense of urgency in all medical anthropological research. Translation of anthropological findings is of vital concern—not only to transcend language barriers (translating research findings into local languages) but also to bringing research findings to the attention of those in a position to implement them.

From Periphery to Center

Historically, medical anthropologists have focused on marginalized groups and marginal individuals, but a number of recent studies have examined elites and elite health practices. For example, Rayna Rapp (1999) has shown how social class influences female experiences of the reproductive cycle (pregnancy, infertility, abortion, and child delivery), Myra Blueblood-Langer (1996) demonstrated how middle-class parents and siblings cope with cystic fibrosis and other chronic illnesses, and Pearl Katz (1981, 1998) has examined the interactions of senior surgeons at a Canadian hospital. Surgeons, as Katz pointed out, constitute an elite group among biomedical practitioners.

The field of medical anthropology has become highly nuanced. Few societies make either/or distinctions with respect to health. Anthropologists often focus on subjective ideas about health and illness as negotiated within the context of an increasingly sophisticated understanding of human physiology, as well as increasing disparities in global access to health care (Green, 2003). Paul Farmer (2000) has shown how social forces may alter the distribution of diseases and contribute to the advent of new microbial diseases, which often are confined to the poor. Farmer concludes by noting that in the 21st century, social forces often are—following French sociologist Pierre Bourdieu—“embodied,” or interpreted as biological events. In addition, Farmer emphasizes that many people do not have access to health care technology. A growing percentage of the world's population is becoming medically disenfranchised.

Medical anthropologists frequently cross disciplinary boundaries and draw from the research findings of other disciplines (e.g., epidemiology, demography, paleobiology, and forensics). While anthropologists document the tremendous variation in cultural perceptions of health and illness, demographers and epidemiologists categorize these changes in terms of a worldwide health transition

associated with increased life expectancy, a decline in mortality, and an overall decrease in infectious diseases due to the widespread availability of antibiotics. As noted, not all people have benefited equally from advances in biomedicine. There has been a dramatic increase in the number of chronic and degenerative diseases, as well as new epidemics like HIV/AIDS. Demographers point out that poorer nations struggle mightily with disruptions caused by rapid urbanization and—at the same time—are faced with a dramatic increase in infectious diseases like tuberculosis that have been eradicated elsewhere. As Nancy Scheper-Hughes (1992) contended, developing nations are forced to deal with all the medical problems of the developed world plus additional problems like higher rates of infant mortality, life-threatening dehydration, the lack of potable water, urban violence, and widespread hunger.

Medical anthropologists also examine ways people explain and treat diseases and ways people adapt to changing environments. McElroy and Townsend (2004) convincingly argued that environmental factors are becoming increasingly important in predicting the incidence and prevalence of diseases. Their approach—influenced greatly by the writings of Rene Dubos (1959) and Alexander Alland Jr. (1970)—looks at disease over time and space and posits that a community's health status closely reflects its adaptations to the environment.

Negotiating Disciplinary Boundaries

Over the past 30 years, American medical anthropology has become the largest subfield of anthropology and is now the second largest unit within the American Anthropological Association. Also over the past 30 years, medical anthropologists have expanded their field to encompass everyone, any time, everywhere. They see their field as unbounded.

Some have criticized medical anthropology for its lack of boundaries, but medical anthropologists themselves celebrate the many opportunities presented by loose boundaries (Ember & Ember, 2004; Singer & Baer, 2007). Like the discipline of anthropology itself, there is consensus that medical anthropologists should not be confined to researching strictly medical topics. Medical anthropology, according to its practitioners, is the sum total of “whatever medical anthropologists do.” We have adopted this broad perspective in writing this chapter.

Some have portrayed medical anthropology as yet another subfield within anthropology, while others perceive it as a separate discipline that draws on the findings of other subfields. Some say that medical anthropology constitutes a fifth subfield within anthropology, comparable to the four standard subfields: anthropological linguistics, biological anthropology, cultural anthropology, and archaeology.

Sometimes, medical anthropologists appear inconsistent when they resist delimiting the scope of their field, especially when they argue that biomedicine should be

limited in scope. Following Ember and Ember (2004), they seek to encompass topics like environmental pollution, pesticide use, alcohol and drug abuse, sexual practices, dangerous work environments, and so on within their purview (Singer & Baer, 2007) while at the same time arguing that all problems should not be seen as medical problems. Medical anthropologists frequently criticize what they see as the increasing “medicalization” of social problems like alcoholism, AIDS, and drug abuse and suggest that modern biomedicine may not provide adequate solutions to these far-ranging problems.

Toward an Anthropology of Health and Illness

Foundations of Medical Anthropology

Medical anthropology presents itself as a new discipline, although it is not all that new. It has its own intellectual traditions going back to the 19th century, and some medical anthropologists claim that their field has even earlier roots among the ancient Greeks and Romans; for example, the Roman physician Galen (Claudius Galenus) was among the first to explore comparative medical systems. Galen's most important contribution was establishing empirical observation and scrupulous record keeping as hallmarks of medicine practice. In many respects, the 16th-century Spanish priests charged with documenting Aztec cosmology and medical practices were also pioneers in medical anthropology (Ortiz de Montellano, 1989).

In the United States, medical anthropology emerged as a specialized field of research immediately following World War II, when a number of prominent American anthropologists were brought in as consultants on health care projects in Latin America, Asia, Africa, and the Caribbean. But its origins are clearly in the 19th century. Organizationally, American medical anthropology traces its roots to the formation of the Medical Anthropology Group in 1967 under the leadership of nurse-practitioner Hazel Weidman. In 1972, the Society for Medical Anthropology was formally accepted as a section of the American Anthropological Association.

The Torres Straits Expedition (1898–1899)

Alfred C. Haddon, along with British physicians W. H. R. Rivers and C. G. Seligman, initiated the Cambridge University Torres Straits Expedition of 1898–1899. Haddon, Rivers, and Seligman are considered to be among the first to conduct systematic research in medical anthropology. Rivers (1864–1922) anticipated many of the future directions of medical anthropology. He collected valuable data on traditional healing practices among Australian aborigines (Slobodin, 1997) and reported on these practices and beliefs in *Medicine, Magic, and Religion* (1924/2001).

As a physician, Rivers privileged biomedical models of illness and disease, and he concluded his study of Australian aborigines by noting that while preliterate societies may appear to possess systematic and coherent beliefs concerning the causes and effects of diseases, native beliefs and practices are not equivalent to those offered by Western biomedicine. For Rivers—and the other members of the Torres Straits team—ethnomedicine and biomedicine were seen as separate and unequal domains.

From Clinic to Field (and Back)

Other 19th-century founders of medical anthropology include Rudolf Virchow, who greatly influenced Franz Boas when both were colleagues at the Berlin Ethnological Museum between 1883 and 1886; Forrest E. Clements and Erwin Ackerknecht, who published a number of seminal articles in the 1930s dealing with native understandings of illness and disease; anthropologist Cora Du Bois, who was hired by WHO in the 1950s; Edwin Wellen, who worked for the Rockefeller Foundation; and—perhaps most significant—Benjamin Paul, who was the first anthropologist to have an appointment at the Harvard School of Public Health. Funded research projects included the Navajo-Cornell Field Health Project directed by psychiatrists-anthropologists Alexander and Dorothea Leighton and a number of projects administered by Yale physician William Caudill.

Early medical anthropologists—like many medical anthropologists today—focused on infectious diseases. In many poor nations, infectious diseases were the main cause of illness and death, and in many regions of the world, 50% or more of infants died before reaching 5 years of age. Between 1945 and 1965, antibiotics transformed the treatment of infectious diseases. The use of antibiotics, immunization of children, improved sanitation, and improved nutrition became major concerns of large-scale health programs.

Western-trained physicians who directed health care projects frequently encountered resistance from locals who underutilized their clinics, ignored instructions to boil water, and otherwise refused to comply with professional advice. Project workers suggested that local cultural traditions posed insurmountable barriers to adoption of modern health practices. Anthropologists were brought in who intervened and proposed ways of incorporating native ideas to supplement allopathic health practices. Benjamin D. Paul's *Health, Culture, and Community* (1955), consisting of case studies that were first presented at the Harvard School of Public Health, soon became a basic text for researchers who, encouraged by private foundations and increased availability of funding through the National Institute of Health and the National Institute of Mental Health, began new graduate programs to train medical anthropologists. Today, most anthropology departments and most medical schools

regularly offer classes in medical anthropology, and medical anthropology graduate programs now exist in 34 North American universities:

Brown University	University of Colorado Denver
Case Western Reserve University	University of Connecticut
City University of New York	University of Hawai'i
Emory University	University of Iowa
Harvard University	University of Kansas
McGill University	University of Kentucky
Michigan State University	University of Manitoba
Rensselaer Polytechnic University	University of Massachusetts
Southern Methodist University	University of Memphis
State University of New York at Binghamton	University of Michigan
University of Alabama	University of Missouri
University of Alberta	University of North Carolina at Chapel Hill
University of Arizona	University of South Florida
University of Buffalo	University of Toronto
University of California, San Diego	University of Washington
University of California, San Francisco	Wayne State University
	Yale University
	York University

Prior to the 1960s, training of medical anthropologists varied greatly. A number of prominent 20th-century medical anthropologists had their primary training in medicine, nursing, nutrition, psychology, or psychiatry. Most notable among these are Abram Kardiner, Robert I. Levy, Jean Benoist, Gonzalo Beltrán, Arthur Kleinman, Margaret Lock, Ronald M. Wintrob, George Devereaux, and Roland Littlewood. Conversely, a number of early contributors to medical anthropology were first trained in anthropology, sociology, social work, or psychology. Examples include George M. Foster, Veena Das, Byron J. Good, Tullio Seppilli, Gilles Bibeau, Luis Mallart, András Zemleni, Gilbert Lewis, Alexander Alland Jr., Ronald Frankenberg, Horacio Fabrega, Eduardo Menéndez, Gretel Pelto, Hans Baer, Ida Susser, and Merrill Singer.

In an essay published in the journal *Science*, physician William Caudill adumbrated what would become the main interests and concerns of 21st-century medical anthropology. Caudill reported as follows:

Social anthropologists and other social scientists have been doing unusual things of late: participating with physicians in conferences in social medicine, teaching in medical schools, working with public health services in Peru, studying the social structure of hospitals, interviewing patients about to undergo plastic surgery, and doing psychotherapy with Plains Indians. (1952, p. 3)

Caudill's vision placed medical anthropology squarely in clinical settings. American researchers worked within the culture of medical organizations. In Europe, cooperative relationships between practitioners of anthropology and medicine are long-standing and well documented, especially in Portugal and Spain (Martinez-Hernaez, 2008). In the Americas, cooperative programs between anthropology and medicine developed in the United States, Mexico, Brazil, and Canada (Saillant & Genest, 2007).

Anthropology once occupied a prominent place in the medical sciences corresponding to those subjects commonly referred to as "preclinical." But as medical education began to be confined to clinical settings, European medical practitioners abandoned ethnography. However, as Comelles (2000) noted, the divergence of anthropology and medicine was never complete.

Medical anthropology during the mid-1970s at the University of Connecticut Health Center in Farmington closely followed Caudill's 1952 model for the emerging field. Lectures were given by social scientists and physicians who had appointments at the medical school. They addressed many of the topics that had been outlined by Caudill in 1952. The main textbook was Alexander Alland's *Adaptation in Cultural Evolution: An Approach to Medical Anthropology* (1970). Today, medical anthropology classes at the University of Connecticut are very different. In the 21st century, UConn medical anthropology is informed by critical medical anthropology (CMA) and by the community-based perspectives of Pam Erickson, W. Penn Handwerker, Merrill Singer, Steve Schensul, and Jean Schensul.

Theoretical Approaches

Biomedical Approaches to Illness

As noted, medically trained researchers (Beyerstein, 1997; Eisenberg, 1977) demanded more precise definitions of *illness* and *disease*. For these researchers, the term *disease* is limited to organic, physical conditions, while *illness* refers to how patients perceive the physiological experience of "things not being quite right." But this distinction requires further refinement, because psychological and cultural factors, such as expectations, folk explanatory models, subjective biases, and even self-delusions greatly shape the experience of illness (Kleinman, 1997; Littlewood, 2005). The term *disease* refers to biological causes that can be treated physically, while *illness* refers to the experience of symptoms. Traditional medicine is holistic, while biomedicine is predicated on mind-body dualism with the body separated from mental and social functions (Rhodes, 1996). Paul Farmer (see Kidder, 2003) advocates both a biomedical and cultural approach to illness as he seeks to bring biomedical advances to poor nations of South America, Africa, and the Caribbean.

Ecological Approaches

Medical ecology looks at health implications of interactions between human groups and their physical and biological environments. It provides a useful corrective to the clinical preoccupation with disease and the anthropological focus on ethnomedicine. Following Rene Dubos (1959) and Alexander Alland Jr. (1970), medical ecology's unit of analysis is not the individual or the society, but the total ecosystem. From the perspective of ecological anthropologists (McElroy & Townsend, 2004), health is understood with respect to individual and group adaptations. Health behaviors are behaviors that foster survival within a given environment. Health is determined by the quality of relationships within a group, with neighboring groups, and with plants and animals within the environment. Ecological anthropologists focus on beliefs and behaviors that protect individuals from diseases or injury; for example, McElroy and Townsend (2004) pointed out that use of snow goggles among Arctic dwellers protects them from Arctic glare.

Sociological (Institutional) Approaches to Illness

Still others have examined medical beliefs and practices from institutional perspectives. Medical institutions can be portrayed as monolithic or pluralistic. As Cecil G. Helman (2001) astutely observed, it is difficult to separate a society's health care system from aspects of their religion, politics, or economics. The arbitrary division of health care sectors into popular, folk, and professional is impractical and unsatisfactory. Helman—like other social scientists—outlines a variety of help-seeking behaviors that, he suggests, will inevitably lead to what he terms healthcare pluralism. He correctly argues that while one form of health care may be elevated above all others within a given society (and that form may be upheld exclusively by the legal system), it cannot be divorced from alternative healing techniques or from other societal institutions.

Critical Medical Anthropology

Critical medical anthropology (CMA) emphasizes the structures of power and inequality in health care systems and broadens the scope of medical anthropology to include wider causes and determinants of human decision making and behaviors as they relate to health and illness (see Singer & Baer, 2007, pp. 33–34). A critical understanding of health and illness involves paying closer attention to the vertical links connecting individuals to regional, national, and global forces. The CMA perspective examines dominant cultural constructions of health and illness with respect to structures of power and inequality in health care systems and shows how these dominant systems serve to reinforce social inequalities, for example, how poverty, violence, and the fear of violence relate to disease. CMA

assumes a degree of autonomy, agency, and power in making health decisions, but it also recognizes that people make these decisions in a world that is not of their own making. They have little control over factors such as the lack of health care access, the influence of the media, the lack of productive resources (e.g., land and water), and social status. Advocates of CMA consider the daunting effects of pollution, pesticides, drug laws, and street violence in the making and breaking of health and illness cross-culturally. In addition, advocates of CMA explore the roles medical practitioners play in the creation and perpetuation of illnesses. Following Ivan Illich's *Medical Nemesis* (1975), CMA suggests that many illnesses are iatrogenic; that is, they are caused or exacerbated by biomedical treatment. Unlike Illich, most contemporary advocates of CMA do not blame biomedical practitioners but seek broader explanations for biomedical failures.

As noted, critical medical anthropologists seem inconsistent when defining the scope of their field. They argue that biomedicine should be limited in scope, but at the same time contend that the scope of their own discipline should not be limited. More than any other perspective, CMA emphasizes that the anthropological study of health and illness should be expanded to address global issues. But these anthropologists also protest the increasing medicalization of social problems in the United States and suggest that allopathic medicine cannot provide adequate solutions to many of these far-ranging problems.

Phenomenological Approaches to Illness

Advocates of phenomenological approaches attempt to come to terms with the subjectivity of human illness. They accomplish this by adopting traditional participant-observation methods of listening and discovering and try to provide an insider perspective; for example, Margaret Lock compared differences in women's experiences of menopausal symptoms in Japan and the United States. Patient and healer narratives provide useful insights into cultural ideas concerning illnesses and their respective treatments (Garro & Mattingly, 2000; Good & Delvecchio Good, 2000).

As noted, Myra Blueblood-Langer researched how other family members cope when a family member is diagnosed with cystic fibrosis (CF). Siblings, Blueblood-Langer discovered, are deeply affected by the disease as are their interactions in the larger community (school, church, etc.). Like all medical anthropology, phenomenological studies also have an applied focus. Blueblood-Langer, for example, suggests concrete applications of her findings. By understanding how other family members experience CF, she was able to propose guidelines for physicians and other health care professionals dealing with the families of CF patients.

One of the most revealing phenomenological studies was provided by Columbia University anthropologist Robert

Murphy, who—during the final years of his life—was afflicted with brain cancer and became paralyzed. Professor Murphy—while immobilized—described his struggle with the disease in an evocative book, *The Body Silent* (1987). Murphy's book is a poignant, personal testament of what it means to be treated as disabled. He noted that as he became more and more dependent, he also began to vanish socially. Disability, Murphy contends, is experienced not just in terms of bodily affliction but as a disease that alters one's sense of self and colors all social interactions.

Epistemological Concerns

A number of medical anthropologists have attempted to combine biological and symbolic or meaning-centered approaches to health and illness. Psychiatrists have been at the forefront of this movement because, as Tanya Luhrmann so astutely noted in *Of Two Minds* (2000), they have one foot in each camp.

Arthur Kleinman, an anthropologist and psychiatrist who has researched health and illness in Taiwan, China, and North America since 1968, is one of the most influential "bridge builders" in medical anthropology. He draws on his own multidisciplinary background to propose alternative strategies for thinking about interrelationships between medicine, society, and the modern world.

Kleinman's *Writing at the Margin* (1997) explores the permeable borders between medical and social problems and examines boundaries that separate health from social change. According to Kleinman, "health" is at once an end and a means. Following French sociologist Pierre Bourdieu's ideas about "embodiment," Kleinman conceptualizes the body as a mediator between individual and collective experiences. He suggests that many health problems—like the trauma associated with violence and depression stemming from chronic pain—are not just individual medical problems but interpersonal experiences of suffering as well. Like Margaret Lock (2001), he emphasizes that definitions of health and illness possess wide-scale moral implications and argues for an ethnographic approach to moral practice in medicine that incorporates sociopolitical contexts of illness, responses to illnesses, social institutions relating to illness, and documents how illness is configured within medical ethics.

In the 1970s, social scientists attributed multiple medical shortcomings to the malfesance of doctors. Medical anthropologists no longer subscribe to such negative assessments, but—like Kleinman—continue to explore tacitly held medical assumptions and epistemological concerns.

In *On Knowing and Not Knowing in the Anthropology of Medicine* (2005), Roland Littlewood—himself an MD and an anthropologist—argued that many medical studies have been based on the assumption that medical knowledge is uniform and consistent. Anthropologists reject the notion that cultures are discrete, bounded, rule-driven entities, but medical science has been slow to develop alternative

approaches to understanding diverse, unbounded cultures of “health.” Littlewood considers the theoretical, methodological, and ethnographic implications of the disconcerting fact that most medical knowledge is dynamic, incoherent, and contradictory and that all understandings of medicine are necessarily incomplete and partial. In settings ranging from the homes of indigenous individuals to Western hospitals, it is necessary to consider issues such as how to define the boundaries of “medical” knowledge as opposed to other types of knowledge; how to understand overlapping and shifting medical discourses; how to deal with the medical profession’s need for anthropologists to produce “explanatory models”; how to address the limits of the Western scientific method and its potential for methodological pluralism; and the constraints on fieldwork, including violence and structural factors limiting access, and the subjectivity of researchers.

Practical Applications

Religion, Magic, and Healing

Religion and healing are closely interrelated. When Forrest E. Clements (1932) first proposed a first cross-cultural classification of native causes (etiology) of disease (i.e., sorcery, breach of taboo, intrusion of a foreign object, spirit intrusion, and soul loss), four of five native explanations were essentially religious. Erwin Ackerknecht (1971) reinforced Clements’s understanding when he suggested that all tribal medicine should be viewed as “magic medicine.” Tribal healing, Ackerknecht asserted, lacks an empirical basis. It is grounded in witchcraft and superstition.

E. E. Evans-Pritchard’s classic study *Witchcraft, Oracles and Magic Among the Azande* (1937) concluded that the Azande interpret all illness and misfortune as a direct manifestation of witchcraft. According to Azande beliefs, there is no such thing as a natural sickness, a random accident, or a timely death. Even when a granary that is overfull and in ill repair collapses, or a 99-year-old with a history of heart trouble dies in his sleep, these events are nevertheless attributed to witchcraft.

Edward C. Green (1999) has argued that far from being the province of witchcraft, indigenous understandings of contagious diseases in Africa parallel Western concepts of diseases and are similar to “germ theory.” Green calls this indigenous contagion theory (ICT). Major components of ICT include (1) pollution and/or “mystical” contagion, (2) naturalistic infections, (3) environmental dangers, and (4) violations of taboos. Pollution beliefs, Green suggests, may be a common concern for both biomedicine and traditional healers.

There are, however, important distinctions between superstition and belief.

Traditional healers interpret and manipulate powerful cultural symbols. By introducing complex psychosocial

factors, dramatic symbolic imagery, metaphor, prayers, and enactments, healers activate beliefs and expectation in patients triggering psycho-neuro-immunological responses (Cannon, 1942; Winkelman, 2000). Using theatricality and symbolism, imagery, and metaphor, healers provide a way for patients to situate and comprehend their somatic sensations (Lévi-Strauss, 1967; Romberg, 2009). Daniel Moerman (2001) convincingly postulated substantial pathways linking physiological and cognitive states. These pathways, he suggested, are the stage on which metaphorical concepts of performance may effectively influence biological processes. Just as some native ethnobotanicals have been shown to have strong efficacy, some native healing practices have been shown to have efficacy as well (Turner, 1996). Sidney M. Greenfield’s *Spirits With Scalpels: The Cultural Biology of Religious Healing in Brazil* (2008) addresses the symbolic aspects of psychic surgery. Greenfield neither accepts nor dismisses the bizarre practices he personally has witnessed. Instead, he seeks to reconcile religious-based healing and recent findings from neurobiology. Like Moerman, Greenfield clearly recognizes the place of symbols within the healing process and advances a theoretical model that stresses altered states of consciousness and hypnotic states and moves beyond the limitations imposed by mind/body dualism.

Navajo Healing and Aesthetics

Healing, music, and art are also closely interrelated (see Csordas, 2000). Gary Witherspoon (1977) documented the healing power of Navajo chants, while Nancy J. Parezo (1983) charted a dramatic transformation of Navajo sand paintings from the sacred to the secular. Prior to the 1920s, Navajo sand paintings were used primarily as part of a healing ritual. Sand paintings were produced to “allow the patient to absorb the powers depicted, first by sitting on them, next by application of part of the deity to corresponding parts of the patient—foot to foot, knees to knees, hands to hands, head to head” (Parezo, 1983, p. 14). Today, Navajo sand paintings are commodities. They are bought and sold as tourist art.

Shamanism

Shamans are the prototypical healers in tribal societies. The term *shaman* is derived from the Mongol-Tungusic word *saman* (to know). As Michael J. Harner (1980) correctly asserted, shamanism is “the most widespread and ancient system of mind-body healing” (p. 175).

Shamanic techniques are surprising universal. Joan B. Townsend (1999) has outlined some of the basic components of what has become known as the shamanic complex. These include direct communication with the supernatural, an ability to control spirits, the ability to enter into and exit altered states of consciousness, a focus on problem solving, and soul flight. In practice, shamans

serve as mediums for spirits. At times, they are able to call on the spirits without entering into trance, and they sometimes remember parts of what occurs on their journeys to the spirit (supernatural) realm. (For differing interpretations see Kehoe, 2000, and Winkelmann, 2000.)

Shamanic beliefs and practices have been a major topic of anthropological study since the beginnings of the discipline, but the first systematic studies of the entire repertoire of illness concepts and therapeutic practices did not begin until the 20th century, when anthropologists began to question the efficacy of shamanism (Lévi-Strauss, 1967). As noted, earlier researchers like W. H. R. Rivers had been less ambivalent about traditional healing practices and suggested that traditional healers were frauds. This changed as critics of Western medicine began to challenge the value of Western medicine, faulting it for its positivist separation of mind from body; its dehumanizing focus on body parts, malfunctions, and lesions; and its treatment of pregnancy and birthing as pathological disorders rather than normal biological processes. Shamanic techniques, critics suggested, might be superior to those of allopathic medicine. This opened the way for collaboration between biomedical practitioners and traditional healers.

Collaboration

Collaboration is a key concern for 21st-century anthropologists. As defined by Mattessich, Murray-Close, and Monsey (2001), collaboration is “a mutually beneficial and well-defined relationship entered into by two or more organizations to achieve common goals” (p. 4). Collaboration entails shared decision making and mutual respect (Caluccio & Maguire, 1983, as cited in Henneman, Lee, & Cohen, 1995). In all cases, a major concern is the patient’s well-being. Within medical anthropology, collaborative efforts have been focused in two directions: participatory community research and collaborative projects among health care professionals.

The primary goal of collaboration research is to foster productive relationships (both formal and informal) among all parties concerned (El Ansari & Phillips, 2001). In participatory community research, community members take an active role in the research process itself (Taylor et al., 2004). For example, Noel Chrisman (2008)—an anthropologist who teaches in a school of nursing—conducted primary research with indigenous groups like the Yakima Indians of Washington State and has worked as an evaluator for numerous community-based participatory projects sponsored by the Centers for Disease Control.

Addressing a critical shortage of biomedical personnel in Africa, WHO adopted a number of resolutions to promote collaboration between traditional and biomedical practitioners. In 1978, WHO and UNICEF passed the Declaration of Alma-Ata recommending the use of traditional healers in government-sponsored health care

programs, and in 2007, the ministers of health for the WHO African Region reaffirmed their support for collaborative efforts by adopting the Declaration of Traditional Medicine.

There is considerable debate among public health professionals regarding collaboration between traditional and biomedical practitioners. Those favoring collaboration emphasize that 80% of the African population regularly use traditional medicine and point out that the ratio of traditional healers to biomedical doctors is 100:1 (Green, 2003; UNAIDS, 2000). Those against collaboration point to what they see as irreconcilable differences between the methods and goals of biomedical and traditional practitioners. Some notable examples of organizations conducting successful collaborative initiatives include Traditional and Modern Health Practitioners Together Against Aids (THETA) in Uganda, and Tanga AIDS Working Group (TAWG) in Tanzania. Much literature on collaboration has focused on ways to train, educate, and integrate traditional healers into existing biomedical systems rather than fostering collaborative relationships between them and biomedical practitioners. Initiating collaboration with traditional healers is a complicated process (Kayombo et al., 2007), and 21st-century medical anthropologists will need to examine factors that serve to promote and those that impede collaborative efforts.

Comparisons: Global and Topical

Global Comparisons: Clements, Murdock, and Fabrega

In a reassessment of Forrest E. Clements’s 1932 study, anthropologist George Peter Murdock (1980) compared medical beliefs and practices of 186 societies included in the Human Relations Area Files (Murdock, 2004). Murdock divided theories about the causation of illness into two broad categories: theories of natural causation and theories of supernatural causation. Later, Murdock attempted to correlate different types of beliefs about causality with different global regions and different levels of social organization (foragers, horticulturists, pastoralists, and citizens of early states). Regional differences were found to be the most significant. Africa, Murdock found, ranks high in theories stressing mystical retribution, while North America outranked all other regions in theories of sorcery. South America ranks highest in theories emphasizing spirit aggression. A major problem with Murdock’s approach—like that of Clements—is that most societies rely on multiple theories of causation. Few tribal societies (and even fewer modern societies) posit a single cause for any single illness.

Horacio Fabrega (1997) offered a more sophisticated comparison of medical systems that has greatly influenced 21st-century research. Fabrega examined behaviors that he

saw as biological adaptations related to sickness and healing (SH). Chimpanzees, he posited, enact behaviors like dressing wounds with leaves or wiping their feces. Neanderthals posed an even more elaborate SH repertoire. In foraging (hunting and gathering) societies, SH behavior was provided by insightful and socially attuned individuals who possessed a keen knowledge of the biological, cultural, and social environments in which they lived. A primary focus of tribal healers is ritual intended to restore social relationships. Village-level societies are characterized by more specialized healers, more elaborate ceremonies, and a better-defined “sick role,” whereby individuals perceived as “sick” were excused from normal social and economic obligations.

As societies became more complex—as in the development of chiefdoms and early states (e. g., the Greeks and the Aztecs), medical knowledge became systematized and institutionalized to include (1) a standardized, widely accepted corpus of medical knowledge; (2) incipient medical pluralism, and (3) the presence of a wide array of competing healers—herbalists, bonesetters, and midwives who would undergo systematic training and/or apprenticeships. These trends continue.

Medical Pluralism: Looking at Health and Illness in Haiti

The Caribbean nation of Haiti ranks as the poorest country in the Americas and is one of the poorest nations on earth. Health care options range from advanced biomedicine for elites in Port au Prince to floating hospitals like Project Hope to herbalists, religious healers (Pentecostals), and Voodoo practitioners. Access at every level is restricted to those who are able to obtain referrals, contribute bribes, and/or establish political connections.

The Haitian medical system is also among the most pluralistic and convoluted on earth. It consists of five unrelated sectors: (1) the public sector (The Ministry of Public Health and Population and The Ministry of Social Affairs); (2) the private, pay-as-you-go sector (a limited number of health care providers in private practice); (3) the mixed nonprofit sector (Ministry of Health personnel who actually work in private institutions such as nongovernmental organizations [NGOs] or faith-based organizations [FBOs]); (4) the private nonprofit sector (NGOs, foundations, and associations); and (5) traditional healers. A number of overlapping bureaus supervise health programs (except treatments for AIDS and tuberculosis, which are directly under the Office of the Director General). In principle, all health-related organizations are coordinated by the Ministry of Health. In practice, the Ministry of Health has been unable to assume leadership. Allopathic medicine is available to less than 60% of the population. In 1998, there were 2.4 physicians for every 10,000 people, and in 1996, there was 1 nurse per 10,000 people and 3.1 auxiliary professionals per 10,000 people. Haiti has both public and

private medical schools, but of four private Haitian medical schools, only one is accredited.

In the countryside, the most common sources of medical care are traditional healers, NGOs, FBOs (largely American-funded clinics), and aid from other Caribbean nations. In 1999, a bilateral cooperation agreement was signed with Cuba. Under the agreement, 500 Cuban health professionals began working in 62% of the municipalities for a period of five years (or until the return of 120 Haitians selected to study medicine in Cuba). This agreement has been extended.

In Haiti, as in other poor nations, religion, magic, and healing are very much interconnected. In 1987, when Brodwin (1996) began an extensive study of folk ideas concerning illness, healing, and mortality in a small (3,000+ residents) Haitian village he called “Jeanty” (a pseudonym), his primary interest was in health-related activities among villagers. Brodwin’s major concerns were as follows: (1) How does medical pluralism function in Haiti? (2) How do clients select which ethnomedical system to access from among many available options? (3) What factors influence their selections? and (4) What happens when patients and healers interact?

Brodwin observed over 50 consultations between patients and herbalists as well as consultations between patients and *houngouns* (Voodoo practitioners). He concluded that villagers readily consulted *houngouns* for pressing health problems, but—at the same time—they were ambivalent, because a *houngoun* has the ability to send illness as well as to cure it.

In 1987, physician and medical anthropologist Paul Farmer—along with Ophelia Dahl, Jim Young Kim, Thomas J. White, and Todd McCormack—founded the NGO Partners in Health (PIH). The first PIH clinic was established in the central plateau of Haiti. The PIH hospital in Haiti provides free treatment and dispenses drugs to treat tuberculosis and HIV/AIDS. In addition to the clinic in Haiti, PIH oversees medical clinics in Russia, Rwanda, Lesotho, Malawi, and Peru. By and large, Farmer’s clinics follow an allopathic model, with emphasis on ethnographic analysis and real-world practicality. In *Mountains Beyond Mountains: The Quest of Dr. Paul Farmer, a Man Who Would Cure the World* (2003), Tracy Kidder details Farmer’s work in Haiti, Peru, and Russia, as well as Farmer’s efforts to balance clinical, humanitarian, and academic responsibilities. Kidder’s book documents the myriad difficulties Farmer faces as he attempts to secure health care for the poor.

As noted, an estimated 25% to 50% of substances used in traditional nonbiomedical ethnobotany have been demonstrated to be effective by scientific measures (Singer & Baer, 2007). This is also true of Voodoo medicines. In *Passage of Darkness: The Ethnobiology of the Haitian Zombie* (1988), ethnobotanist Wade Davis provided great insight into the Haitian underworld and its relationship to healing through an examination of the secret Bizango society. Equally important, Davis provided incontrovertible evidence

for the existence of zombies (the living dead). Davis points out that hougouns possess extensive knowledge of plant irritants and animal poisons, such as tetrodotoxin, which is produced by puffer fish. Hougouns might administer tetrodotoxin to place their intended victims in a catatonic state (heart rate slows, breathing is imperceptible, and the victims appear dead). The victims are then buried while fully conscious. They are dug up later—often by the same hougoun who administered the tetrodotoxin, and moved to another island location where, under the influence of the botanical *Datura*, they become confused and disoriented. This process, according to Davis, is the process by which Haitian zombies are created.

New Directions

Since its inception, medical anthropology has undergone a number of dramatic transformations. Its applied focus remains, but its methods and goals have expanded from those advocated by W. H. R. Rivers and the Torres Straits Expedition of 1899 (Slobodin, 1997). Twenty-first-century anthropologists pay greater attention to culture and symbolic healing (Moerman, 2001). There is increased reliance on ethnographic methods and a greater emphasis on collaborative research (Chrisman, 2008). Additional research is needed to identify factors that promote collaborative relationships between indigenous and biomedical practitioners.

Conceptions of health and illness are also changing (Beyerstein, 1997). There is greater attention to native ethnobotany (Davis, 1988) and to exploring the possible efficacy of traditional healing techniques (Greenfield, 2008). Epistemological and phenomenological issues have come to the forefront (Kleinman, 1997; Littlewood, 2005). Last, CMA (Singer & Baer, 2007) has had a tremendous impact on the field and has broadened the scope of medical anthropology to include wide-scale international problems like malnutrition, limited access to health care (Farmer, 2000), environmental pollution, alcoholism (Heath, 2003), sexually transmitted diseases and AIDS, smoking, violence, traffic accidents, crime, and drug abuse (Fassin, 2007; Green, 2003). Twenty-first-century medical anthropologists have become less critical of biomedicine and more concerned about worldwide access to health care.

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PART XV

ONGOING ISSUES IN ANTHROPOLOGY

SOCIOBIOLOGY

Nature and Nurture

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Ever since the publication of Charles Darwin's *On the Origin of Species* in 1859, many attempts have been made to apply the insights of evolutionary biology to the study of humans. The first edition of *On the Origin of Species* gives only a small hint at the possible impact that the theory of evolution could have on anthropology:

In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation. Light will be thrown on the origin of man and his history. (Darwin, 1859)

But within about 10 years, Darwin himself had already given a first account of *The Descent of Man, and Selection in Relation to Sex* (Darwin, 1871) and developed an evolutionary explanation of the modes of the *Expressions of the Emotions in Man and Animals* (Darwin, 1872). In the edition of 1876 of his *On the Origin of Species*, Darwin appraised, in the same passage quoted above, H. Spencer's way of founding psychology on the principles of evolutionary biology (Spencer, 1873). From Darwin's time on, the application and extension of evolutionary biology to the study of human nature has gone through changing tides of "biologization" and antibiological demarcations, resulting in the nature-nurture distinction and in the debate of how much in human behavior is innate or inherited—and thereby a possible candidate for a biological explanation,

and how much is influenced by nurture—which can therefore only be explained by reference to cultural and intellectual influences.

From the first trials until today, the application of evolutionary biology in order to explain not only human morphological traits, but also human mind and human behavior, has been under attack from both social scientists and biologists alike, but it has also found enthusiastic support. Dawkins (1976) states in quoting G. G. Simpson (1966) that any effort to grasp human nature and humans' reason for existence that was undertaken before 1859 should be ignored, thereby putting the strongest possible emphasis on a Darwinian understanding of nature in the nature-nurture distinction. Tooby and Cosmides (1992) write that social sciences as they have been studied before without the incorporation of evolutionary biology have been extraordinarily unsuccessful as science just because of the shortfall of ignoring the evolved human nature.

On the other hand, in cultural studies, sociologists but also biologists have always emphasized that it is only nurture that can explain the richness and variety of human culture and behavior and have attacked biocentrism or gene-centrism as an oversimplification that is not sufficiently explanatory and may be even politically dangerous. These scientists include Sahlins (1976); Lewontin, Rose, and Kamin (1984); Gould (1978, 1981, 1997); Jablonka and Lamb (2005); Richerson and Boyd (2005); and Wilson and Wilson (2007).

Since nearly all important realms of human behavior—from gender roles, aggression, love, questions of altruism and egoism, questions of acquiring knowledge, and malleability of character ultimately to the question of freedom, responsibility, and individuality—are affected by the nature-nurture debate, this debate is and will continue to be a controversial issue in biology, social sciences, and even in everyday life and politics.

Nature and Nurture: Darwinism and the Nature of Nature

Darwin's theory of evolution by natural selection (Darwin, 1859) describes the world of organisms as a world of competition for survival and replication. Due to the high fertility rate of most populations, within a few generations the world would be overcrowded by most species, but in fact we observe in most cases an almost steady state of population. From that observation, Darwin infers that there must be strong competition for the resources organisms need; that is, not all individual organisms that are born are in fact able to survive and to reproduce (the *struggle for existence*). The next step is the fact that individuals of the same kind slightly differ in their qualities and that often certain varieties are inherited (Darwin refers to knowledge from the field of breeding). In the struggle for existence, those qualities that lead to better survival chances (natural selection in a narrower sense) and higher chances of reproduction (sexual selection) will thereby necessarily be more often present in the next generation than maladaptive features or disadvantageous traces.

This process is labeled by Darwin, in analogy to humans' selection in breeding, *natural selection*. Natural selection "chooses" from the occurring differences (*mutations*) those features that tend to increase fitness, and Darwin infers that this process leads over a long time of accumulation of small differences to the origin of new species and to the astonishingly complex and highly functional adaptations (designs) that we find everywhere in nature. Darwin was of course not the first scientist to hold the view that species have evolved, but he was the first to discover—independent from but consistent with the ideas of Wallace (Darwin & Wallace, 1858)—the causal mechanism (natural selection) that is responsible for the generation of all the observed adaptations of organisms.

The later combination of Darwin's theory with the discovery of the true mechanism of inheritance and with new insights from population genetics and cell biology led to a new powerful explanatory framework in biology, labeled *synthetic theory* (Huxley, 1942; Mayr, 1942). Within post-Darwinian biology, many features of Darwin's theory have been and are being critically discussed: What is the level or unit of selection? To what degree is, for instance, group selection possible (e.g., Dawkins, 1976, 1982, vs. Richerson & Boyd, 2005; Wilson & Wilson, 2007)? How much

emphasis should we lay on the adaptive side of the process instead of stressing the contingency and internal constraints within the development of organic systems? In the process of evolution, does randomness and contingency prevail, or are there certain trends and specific trajectories of adaptation and evolutionary pressure that make certain "inventions" more likely or even probable (e.g., Gould & Lewontin, 1979, vs. Conway Morris, 2003)? Is it true that there is no way of inheriting individually acquired traces, and is every mutation random, or can we revive some elements of Lamarckism? Is it reasonable to see the genes as the ultimate unit of selection and as a causal power using the individual organisms as their vehicle (Dawkins, 1976, 1982), or must we consider a complex interplay of evolution and environment, of the extraction of genetic information and independent laws and factors of development (e.g., Jablonka & Lamb, 2005)?

All these discussions, however, are discussions *within* the Darwinian framework; they all accept the idea that the combination of blind mutation, inheritance, and competition will lead to differential survival (natural selection). They all agree, therefore, that knowledge about the mechanisms and logic of natural selection is in fact the key to understanding the biological world: As Dobzhansky (1964, 1973) famously put it, "Nothing in biology makes sense except in the light of evolution" (1964, p. 499; 1973). The modern picture of nature in the nature-nurture distinction is thereby profoundly shaped by Darwin's theory of evolution.

Nature Versus Nurture: The Case for Nurture

Before and still after the rise of sociobiology in the 1970s, two ways of dealing with the biological side of human nature in the social sciences and philosophical anthropology can be distinguished.

Humans are either, first, regarded as a very special animal that has been equipped by evolution with a very peculiar nature. Since this peculiar nature has been brought forward by the forces of evolution, biological knowledge can to some degree be fruitfully applied in the enterprise of understanding humans (see Gehlen, 1940/1993; Plessner, 1928, 1940; Scheler, 1925, 1928). Since, however, human nature differs distinctly from animal nature, there are in this view limits for this application, and there is a clear distinction between the realm of animals and the human sphere: Evolution itself has led to a creature that has left the realm of pure biological determination.

Second, against this cautious incorporation of biological knowledge in the humanities, a strong antibiological tendency can be found in the doctrine of the antiuniversalistic character of human cultures and in the idea of the autonomy of cultural processes, an idea originally already put forward by Alfred Kroeber in his theory of the "superorganic" nature of cultural processes (Kroeber, 1917). Cultural processes that shape human behavior are considered to be

not at all biologically determined, and they might even be independent from the individual psychology of human beings (Durkheim, 1895/1982; Geertz, 1973; Kroeber, 1916, 1952; Sahlins, 1976; see also Lewontin, Rose, & Kamin, 1984; Richerson & Boyd, 2005).

The Case for Nurture: Nature Requires Nurture

Scheler, Plessner, and Gehlen all tried to give accounts of the difference between human actions and abilities and animal behavior by looking at the peculiar evolved *nature* of human beings.

Although Scheler praised the new insights in the abilities and capacities of animal intelligence, he insisted that the human mind could not be understood in terms of pure, survival-oriented “strategic rationality.” This capacity is only quantitatively different in humans and their capacity for technical inventions, and it might even be that animals in this realm are much more securely guided by instincts (Scheler, 1925). The new feature that places humans away from and above nature and biology is their ability to grasp objective reasons and values and to contemplate what value might be preferred to others. (Even abstract values might be preferred to the value of personal survival). Thus, humans seem to have freed themselves from the instinct-driven means-end rationality of other animals (Scheler, 1925, 1928).

Plessner (1928) emphasizes the “ex-centric” nature of humans that places them partly outside the realm of biology. He argues in favor of leaving the “body versus mind” or “nature versus human” distinction behind: Humans must place themselves within nature (they are not bodiless rational beings), but without betraying their peculiar position or special nature. Plessner tries in his philosophy of biology to capture the different modes of life in the three realms of plants, animals, and humans. While animals are centric insofar as they are guided by nature through their instincts, humans have the ability to consciously relate to themselves and to distance themselves from their nature. Humans therefore are in an ex-centric position; that is, they have an open, not biologically fixed, relation to the world. Consequently, due to the reduction of instincts, humans must heavily rely on nurture (culture and institutions) in order to survive. Plessner (1928) puts this in the famous phrase of humans’ *natürliche Künstlichkeit* (“natural artificiality”): By their very nature, humans must rely on human-made products, nurture, and culture.

Gehlen (1940/1993) follows the concept of Herder when he interprets a human primarily as an instinct-deprived animal, as a *Mängelwesen* (“deprived creature,” *Homo inermis*) that bears the stamp of an overall retardation.¹ Human infants are born premature, go through what might be called an extra-uterine embryonic year (compared to other primates), and have a very long phase of neoteny. Compared to other animals with their high specializations, humans are

weak in their morphology: They lack natural weapons and seem to be less specialized to cope with specific environments or to fulfill certain tasks. In order to compensate for this reduction of instincts and physical strength, humans must exert their rational capacities and intellect in order to survive. Technological tools can be regarded as “external organs” that help them. Gehlen calls this “the need for institutions,” and his definition of *institution* includes all kinds of nonbiological intelligent survival techniques, from tool use to social institutions. It is exactly humans’ extraordinarily *weak* or *deprived* nature that compels them, more than any other animal, to nurture and culture. Gehlen backs his thesis with contemporary scientific insights (Lorenz, 1943; Tinbergen, 1952), according to which there is a fixed nature of stimulus-response mechanisms in animals that cannot be the predecessors of the flexible, not-content-bounded mind of man. Whereas animal cognition seems to be constrained to certain well-defined stimulus patterns, humans are *weltoffen* (“open to the world”) and can think about all kinds of objects, theories, and even fictional events.

The common assumption of these views is the emphasis on “the *reduction* of nature” (fewer instincts, less physical power) that lead in a situation of Darwinian competition to the urge to compensate for these disadvantages through the further and further development of reasoning and intelligence. Humans must invent tools, invent clever hunting strategies, compensate for the lack of guidance through instincts, and so forth, thereby developing the ability for cognitive problem solving to such a high degree that this capacity itself becomes the basic foundation for nurture, and yes even for the overcoming of nature.

In contrast to old, pre-Darwinian dualistic views, the specialness of human nature (its rationality) is not given by a divine creator, nor is it a sign of human superiority, but is itself a product of a special evolutionary pressure that operates on the basis of the given human weakness and human physical inferiority. Nevertheless, this view emphasizes a distinction between humans and animals, nature and nurture, claiming that through reasoning humans eventually leave nature behind. The process of leaving nature behind may in this view be described in Darwinian terms “through the logic of selection pressure,”² but the result is viewed as a state in which humans have freed themselves from biological nature via “rational nurture.” This view became dominant in the European and Anglo American social sciences and shaped their accentuation of nurture over nature.

The Case for Nurture: The Autonomy and Pluralism of Cultures as a Counterargument Against the Influence of Nature

Modern anthropological and ethnographic researchers have been impressed by the vast variety of and innumerable

differences among human cultures all over the world, and by the human culture, behavior, and society in comparison to animal behavior. Modern ethnography and cultural studies, from the beginning of the 19th century onward, have put forward a strong antiuniversalistic stance, dismissing and heavily criticizing the idea of a single common human nature or common human culture.

In this view, there simply exists no such thing as *one* human culture, there are only human *cultures*. Geertz (1973), following Kroeber, even famously calls the so-called anthropological universals such as religion, marriage, trade, and property “fake universals” (p. 39). Mead (1949) also in her early studies stresses the cultural differences in gender roles; Whorf (Whorf & Carroll, 1964) famously claimed that the Hopi Indians did not possess a concept of time analogous to that of “Western thought”; Darwin’s view of a common human way of expressing emotions seems to be refuted by the richness of human habits and customs. Generally, modern studies along the lines of “postcolonial” approaches try to avoid at all costs the measurement of different cultures and habits with one common universal standard. (For a critical overview, see Brown’s important book on human universals [1991].)

Since a common biological nature of humans cannot, it seems at first sight, account for this pluralism of cultures among humans, the differences must be culturally induced; therefore nurture and cultural learning become in these approaches the most important factors in understanding human behavior. Human nature, it seems, only equips us with flexibility and does not bind us to a specific expression of behavior.

The alternative view, that these differences might be traced back to a different biological or genetic set-up of different groups, was from the time of its origins heavily criticized by Kroeber (1916) and can now be considered to be totally refuted. (See Tooby & Cosmides, 1990, for the Darwinian argument against the view that there could be fundamental biological differences between different human “races.”) Kroeber (1916) argues that, if Weismann’s (1885) neo-Darwinian doctrine is right, different acquired cultural habits, customs, and so forth cannot be inherited, and the idea of a biological basis for the differences in cultures is—according to the biological neo-Darwinian standard—*itself* absurd (Kroeber, 1916; see also Geertz, 1973).

Nevertheless, racist tendencies and ideas of biological determinism that gave rise to social Darwinism and eugenic ideologies were popular in science at the beginning of the 20th century. It is the merit of Boas and his pupils, including Alfred Kroeber and Margaret Mead and also Ruth Benedict (1934), that they emphasized the value of cultural plurality. They insisted from early on that this pseudoscientific thinking could not be rooted in neo-Darwinian evolutionary biology and that the idea of racial determinism of cultural behavior is completely misguided.

If differences in culture cannot be traced back to nature in this way, it is then, as argued above, plausible to consider

them to be a product of nurture. This insight and the misuse of biological views in the age of racism and eugenics have led to a strong disregard of human nature in social sciences. The difference between human capacities and those of an animal mind—conceptualized as being guided by stimuli and responses, narrow behavioral patterns, and content specificity—obviously seems to ask for a strong emphasis on nurture in order to account for human culture. The study of culture alone becomes therefore the main, sometimes the only, focus in social sciences and anthropology. In some of these views, human nature becomes almost completely irrelevant and negligible; human nature is only important insofar that it *enables* flexibility and cultural diversity. In order to do so, it cannot be regarded as fixed or as determining human action.

This line of reasoning has become even more dominant in the school of behaviorism (Skinner, 1938, 1957) that describes the human mind as a black box that can, in an astonishingly flexible way, be adjusted to almost any task simply by learning through reinforcement. While Pavlov developed the idea of classical conditioning (given stimulus-response reactions can be triggered by a different stimulus through association), Skinner expanded this idea to the more universal method of *operant conditioning*: Animal behavior can be influenced in a flexible way through positive or negative reinforcement (punishment or reward), leading to completely new stimulus-response connections. This idea led to the concept of a great flexibility of cognition that is expressed in Watson’s famous words that describe a strong *independence* of nurture (training/conditioning) over nature:

Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I’ll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief, and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. (Watson, 1925, p. 82)

Although this view does not claim that the human mind is a tabula rasa, the general ability to learn seems to make the human mind more similar to a general-purpose computer that can be programmed by nurture for almost any task, from riding bicycles to solving theoretical problems in proto-plasma physics. Only the fact that nurture is much more important than nature could, it seems, give an account that renders justice to the generality, flexibility, and diversity of human actions and capacities.

The Case for Nature: Ethology

In strong opposition to the autonomy thesis of culture, ethologists, sociobiologists, and evolutionary psychologists have stressed the dependence and deep connection between nature and nurture. The insights of Tinbergen and

Lorenz in animal behavior and cognition corrected the view of a simple stimulus-response model. Lorenz's work on the biological function of aggression is a good example of the ethological approach to behavior. Lorenz argues that he cannot accept the dualism of a life-fostering drive (*eros*) and a drive for destruction (*thanatos*) that Freudian psychology postulates. From a biological point of view also, the negative drive of destruction must have a positive or adaptive function for the organisms and cannot be seen as an antibiological drive of (self-)destruction.

Lorenz tries to give an account of how aggressiveness can have evolved and what its adaptive function in the animal realm is (Lorenz, 1963). Thereby he claims that aggression is simply a necessary feature of life, not something that is externally induced by frustration or stimuli: Since, for Lorenz, drives have a certain autonomy, one cannot avoid aggression simply by avoiding frustration or aggression stimuli. Lorenz draws conclusions for humanity: We should not try to overcome aggression but rather deal with it in a productive way. Lorenz hereby challenged the mainstream view of his time—that any education that avoids frustration will lead to nonaggressive personalities.

This inference from biological insights to the realm of human education has, however, met heavy criticism from the social sciences, but the school of ethology has also been criticized by biologist for *internal* Darwinian problems. Lorenz analyzes the positive function that aggression has for the preservation of the species, thereby postulating a drive to do what's good for the species. Such a drive, however, cannot be postulated and can only be assumed by making unreasonable claims about group selection. This problem has led to the rise of the new paradigm of *sociobiology* that replaced the dominant understanding of behavioral adaptation (“do what is good for the group”) in the framework of ethology.

The Case for Nature: Sociobiology—Theory and Application

Interestingly enough, the sociobiological application of evolutionary biology to the realm of humans was in part made possible by a view dominant in the social sciences that was still in the tradition of those views that stress the distance between humans and animals. Human beings are considered to be the *rational* animal. The rational choice theory or theory of games developed in economics (Von Neumann & Morgenstern, 1944) considered human beings to make rational choices: No one wants, for instance, to buy a product for a higher price than necessary; nobody wants to sell it for a lower price than possible. It is clear that the situation in the free market resembles a Darwinian scenario: It is a situation of competition for scarce resources (customers), in which any company that wants to survive will have to improve its products in direct competition or has to find its own ecological (economic) niches.

Looking at rational strategies of market participants therefore intrinsically resembles the task of searching for *evolutionarily stable strategies*, that is, for inheritable or programmed animal behavior that will increase the reproductive fitness of that animal using the strategy. An evolutionarily stable strategy is a strategy that, if the majority of a population uses it, cannot be outcompeted by any other strategy (Maynard Smith, 1982; Smith & Price, 1973). The same mathematical models, the same types of problems and questions (when and why cooperate, when and why “cheat”?) can be asked in both fields. Lewontin (1961), Hamilton (1967), and Maynard Smith (1982) successfully applied the models of game theory to biology.

Interestingly, both views were challenged by empirical facts. From an evolutionary viewpoint, it seems that programs for maximizing egoistic fitness would out-compete more altruistic strategies. But in the realm of biology, it is in fact true that the animal world is full of examples of mutual cooperation, even of acts of self-sacrifice: Parents sacrifice themselves for their offspring, mutual cooperation in groups is not rare, birds give alarm calls, thereby exposing themselves to danger, and so forth. Within the realm of social sciences, evidence was found that people executed “defections” from the ideal egoistic strategies in “dictator games” or “ultimatum games.” People in an ultimatum game are willing to altruistically punish certain behavior of others: They are willing to invest resources in a non-profit-maximizing way just to punish others who deviate from expected moral norms (Fehr & Fischbacher, 2003; Henrich et al., 2004).

How can this contradiction between the expected egoism in a game of competition and the observed cooperation and altruism be reconciled? How, in both Darwinian situations of fitness maximizing and rational (strategic) choice making, can altruism occur?

Darwin noted that there can be a conflict between activities that are good for the group and those that are beneficial for the individual organism. For a group of monkeys, for instance, it might be good to have courageous individuals that are willing to aggressively fight against other groups (for instance, in order to defend territory and resources). Such a group will have an advantage over a defenseless group. For the individual, however, it is better to let others do the violent and potentially dangerous job (see Darwin, 1871, p. 161). Freeloaders always have a higher chance for reproduction, simply because they avoid putting themselves in danger; therefore, this strategy must be much more successful and must over generations replace the strategy to defend the group in an altruistic fashion. If one does not want to impose implausible group-selectionistic theories or evoke the notion of a drive to preserve the species, a theoretical solution must be found to explain the existence of altruistic behavior in the animal realm. More dramatically, this problem is almost a Darwinian paradox. A biological definition of altruism would be the following: An altruistic act is an act by which an organism enhances

the chances of survival and reproduction of another organism by decreasing its own chances of reproduction. Acts of this kind exist, but at first sight *they cannot evolve* in the logic of Darwinism if one assumes that behavioral strategies must be genetically inherited. Altruistic organisms (in this sense) tend (by definition) to leave fewer offspring than egoistic organisms; therefore, they cannot have, it seems, a chance in the course of evolution.

There are three possible answers to this problem. First, you can try to unmask acts of altruism as being in fact egoistic. The gazelle might not jump in a self-sacrificing way to draw the attention of a lion away from a weak conspecific; it may be a selfish act to display her own strength and health, thereby signaling that the other weak conspecific is a much easier target (Dawkins, 1976). Similarly, giving an alarm call might have egoistic advantages: The bird's call might have the effect of asking the other birds to be quiet, thereby increasing its own chances of survival; it might also fly away with them, so that its chances of being caught are fewer than in a solitary attempt to escape (Dawkins, 1976). But there are many cases where it is implausible to find such an individual-egoistic advantage. A parent sacrificing itself for its offspring hardly has any individual egoistic advantages in terms of further reproductive success.

A second solution is to shift the perspective from the individual level to the gene level. This is one of the basic original insights of sociobiology in comparison to the group-level orientation of early ethology: If the level of selection *is not* the group and *not* the individual, but the genes, then altruism toward relatives is likely to occur. Hamilton's rule names the factors that make altruism in the animal realm likely to occur: If the costs of an altruistic act are smaller than the chances of reproduction of the same genes (these chances are dependent on the extent of relatedness between the altruist and the beneficiary), then selection should favor altruistic strategies (Hamilton, 1964). In this view, it is not important that the *individual* organism enhances *his own* fitness and reproductive success but that he increases the overall fitness of his *kin*, for many of his genes are also present in his kin. You can therefore foster the replication of your genes either directly or by helping your kin to reproduce.

The fact that altruism in the animal realm is indeed very often linked to kin and the fact that different social strategies (the astonishing social altruism of worker bees, for example) can be traced back to different mechanisms of inheritance indicates the great success of these theories in evolutionary biology. Insects of the group Hymenoptera, for example, are haplodiploid. This leads of course to different degrees of relatedness than in diploid species; therefore, it might for a worker bee be much more "rational" to invest in the offspring of the mother ($r = 3/4$) than in its own reproduction (Trivers & Hare, 1975).³ By shifting the focus in biology away from the idea that the individual is the unit of selection to the idea that the gene is the unit, many behavioral phenomena can be mathematically explained as a

natural outcome of selection. Altruism on the level of the organism must be traced back to "egoism" on the level of genes in order to solve the Darwinian paradox of altruism. Also, this leads to interesting biological research questions: If it is necessary to limit your altruism to kin, what mechanisms of kin-detection can we find? What different strategies apply to those species that are able to individually recognize conspecifics in comparison to those that can't? What possible counterstrategies can freeloaders find to break a rule of kinship detection? What could be possible refinements to counter the counterstrategy?

Given this view, one can, for example, ask what would be a good strategy of parental investment. Trivers (1972) and Maynard Smith (1977, 1982) regard the relation between the sexes as an "economic" enterprise: Both parties must try to invest as little as possible and try to gain the highest possible rate of replications of their own genes in this process. Because of the anisogamy, there is from the beginning an advantage on the male side; he brings 50% of his genes into the offspring, but he invests less than 50% of his energy in them, especially in those cases where conception takes place within the female. Therefore, in some fish, males are left behind in a cruel bind: The female fish can spawn the eggs some seconds earlier than the male fertilizes them, and can use this advantage to escape raising and protecting the young. The male fish must then decide whether to raise the offspring (defend the eggs) since he already made a parental investment, or whether to start a new investment. When conception takes place within the female, the advantage is at first sight on the male side.

Further interesting strategic questions can be asked: Should males be more cautious when investing in their offspring, because they are more insecure than females as to whether the offspring are in fact their own? Should parents invest more in healthy offspring, neglecting the weak ones? Is it in the interest of a "step parent" to kill his step sons, as we see with lions? Should sexual strategies differ fundamentally between the sexes? Does animal behavior in fact resemble these predictions? All these questions are useful tools and guidance for giving a truly evolutionary account of animal behavior, and the explanatory power—even if sometimes overstressed and even if many examples are still in debate—is impressive.

These two first steps, however, are limited to altruism to *kin*; they cannot explain cooperation or symbiotic relations that expand beyond kin. Altruism beyond kin can be interpreted as a malfunction of the kin-detection mechanism (e.g., in the case of cuckoo birds, who lay their eggs in the nests of other birds), but cooperation, altruism, sociality, and group living expand, in many cases in the animal realm, beyond the realm of close kin. The advantages of group living are obvious (for a discussion, see Lorenz, 1963), but again the freeloader problem emerges: For altruism of this level, the gene view must be left behind, and the focus must be set on insights from general game

theory (the theoretical analysis of successful strategies in different situations of competition).

Therefore, the third step to explain the necessary emergence of altruism in the Darwinian scenario of sociobiology is the idea of reciprocal altruism and the search for evolutionarily stable strategies (Axelrod, 1984; Axelrod & Dion, 1988; Axelrod & Hamilton, 1981; Trivers, 1971). The result of the empirical researches along this line was famously summarized in E. O. Wilson (1974, 1975). Hamilton's mathematical approach can in this way be further generalized if you regard the individual organism as a vehicle for executing selfish gene programs (Dawkins, 1976, 1982); then also other contingent facts in evolution might be explainable as consequences of the struggle of genes to maximize their frequency in the gene pool by finding the most successful strategy in balancing cooperation and defection.

An act of altruism among nonrelated organisms may in fact be likely if there is an act of retaliation. These considerations, however, lead to the well-known problems of strategic behavior that have been discussed for a long time in game theory and to the theory of the rational agent as noted above. Since there usually is a time span between the altruistic act and the act of reciprocity, it is tempting to defect. A betrayer naturally always gets the highest payoff: He receives the benefit from the altruistic act but does not bear the cost of reciprocation. This situation is known as *the prisoner's dilemma* in game theory: Both parties would be better off if they cooperate, both sides would individually profit more from defection (if the other cooperates), each side risks having the highest costs if it cooperates but the other side betrays it. If you assume that your aim is to maximize your profit, you will defect, and so should the other if he is a rational (strategic) agent.

How can cooperation among nonrelatives arise in a Darwinian scenario if there is always a higher possible payoff for betrayers? Trivers, Axelrod, and Hamilton have worked out mathematical models for these situations and searched for strategies that are sustainable, that is, strategies that will be able to evolve and survive in a Darwinian competition of strategies. The most striking example is the extraordinary success of the tit-for-tat strategy. For this mixed strategy, the choice for cooperation or defection depends on the other player. (Obviously, this strategy presupposes the ability to recognize individual players; it can therefore be applied only to certain species.) If the other one has cooperated in the last encounter, then you cooperate; if he has defected, you defect. Tit for tat is in many scenarios an evolutionarily stable strategy (Axelrod, 1984). Surprisingly, strategies that include cooperation might in many scenarios be much better off than pure egoistic strategies.

Due to the mathematical generality of this approach, it can also be used to describe cultural evolution in analogy to the biological situation. The theory of *memes* claims that "cultural units" (songs, ideas, theories, institutions—called

memes in analogy to genes) are also in competition for instantiation. Cultural history thus resembles a Darwinian scenario: Ideas or memes are more or less faithfully copied from generation to generation; better adapted memes out-compete others, and so forth. This extension of Darwinism can be understood in biological or in structural terms. Evolutionary psychology would emphasize the fitness of certain memes by pointing out that they fit with certain evolved biological traces of cognition: Memes that help the individual to gain a fitness advantage will be more likely to succeed. But this extension can also be interpreted in the strict sense of a structural analogy. Even if nonbiological entities such as robots had culture, cultural memes would have to be replicated, thereby being in competition for attention, and the mathematics of game theory and evolutionary biology would still apply. This view could stress the independence of meme evolution; memes are for Dawkins (1976) in a certain sense replicators *sui generis*. A meme might lead to a fitness disadvantage in the individual (the meme for celibacy or self-sacrifice) but can nevertheless be successful. It can, in Dawkins's terms, use the individual just like a vehicle, just like a gene can; it can therefore override or free humans from gene determinism, if only (in this view) to the price of meme-determinism (see also Blackmore, 1999). However, since memes must fit with brains as their environment, Dawkins and Blackmore stress the fact that memes are most likely selected if they increase and do not decrease the inclusive fitness of the individual.⁴

All these examples and considerations highlight the basic tenet of sociobiology: Seeking for egoistic advantages is seen as the natural outcome of evolution; however, since gene replication is the crucial goal, altruistic compromises may be possible or even necessary, but whenever the circumstances allow it, these compromises will be broken. This framework, however, can claim to be truly Darwinian and can give some good explanations both for altruism and egoism on the level of individual organisms, without demanding that altruism and cooperation must evolve *against* the laws and probabilities of natural selection. It is also clear that from this perspective, the interpretation of culture and humans in terms of adaptive, inclusive, fitness-maximizing behavior becomes an important key to understand human beings.

The Case for Nature: The Shift to Evolutionary Psychology

Evolutionary psychology shifts the focus from the sociobiological analysis of fitness-maximizing success of behavioral strategies to an inquiry about underlying evolved psychological mechanisms. Rather than finding out how far certain cultural behavior leads to increased inclusive fitness, the question is whether we can find basic psychological features in the human mind that might have been adaptive during the phase of hominization, especially in

the context of hunter-gather societies, even if they lead to disadvantageous behavior under modern circumstances. Tooby and Cosmides (1992) claim that in fact evolutionary psychology is thereby the missing link (Cosmides & Tooby, 1987) between biology and the social sciences: Society and culture are produced by humans, and humans are a product of biological evolution; thus, psychology links these fields. The program and basic tenets of this approach are summarized in Buss (1995) and Tooby and Cosmides (1992); the necessity of this shift after the dominance of sociobiology is argued in Barkow (1978, 1984).

Two developments in empirical sciences have led to the rise of evolutionary psychology. First, the conception of human cognition as a general-purpose computer has come under attack. Results from the analysis of the visual system, insights from the research on artificial intelligence, and studies on language acquisition suggest that cognition is a content-specific modular process. (For cognition in general, see Fodor, 1983.) Chomsky influentially attacked Skinner's view of learning as a general mechanism, leading to speculations about a special adaptation or an evolved module device for language acquisition (Chomsky, 1959, 1975, 1980; Pinker, 1984, 1994). Research on artificial intelligence stressed the idea that much more innate knowledge is needed for problem solving. To keep the computational possibilities reasonably small, artificial cognitive systems must already have implemented knowledge and biases. (For an overview over these, see Tooby and Cosmides, 1992, pp. 106 ff.)

Experiments with animals have further supported this idea of cognitive preparedness. A monkey raised in captivity can be trained (via a video tape showing a panic reaction to a snake by a conspecific) to show panic reaction to snakes; however, he cannot be trained to show this reaction to flowers (Mineka, Keir, & Price, 1980). Rats can learn avoidance only in a module-specific way: They can associate nausea with food and taste, shock with sounds and lights, but not vice versa (Garcia & Koelling, 1966). The facts that humans also learn certain things more easily than others, that all children are equipped to learn language, that they seem to have an innate physics (expectations about the behavior of objects), and so forth render the idea plausible that human cognition is in fact not all based on a reduction of instincts but relies heavily on instinctive knowledge, which can be recombined and generalized. Gould and Marler (1987) coined the phrase "learning by instinct," and Lorenz (1973) developed a complex account of the steps from animal to human cognition beyond the stimulus-response model, distinguishing between open and closed instinct programs. Not the reduction of innate programs but strongly relying on them makes learning possible. Accordingly, the human mind can no longer be conceptualized as a content free general-purpose computer (see Buller, 2005; Carruthers & Chamberlain, 2000; Carruthers, Laurence, & Stich, 2005).

Second, the idea of "human universals" has become more popular again, following the refutations of the claims

of Mead (see Freeman, 1983, and Gewertz, 1981), Whorf (see Malotki, 1983), and against the claim of the cultural dependence of the expression of emotions (see Ekman, 1973, 1992; Ekman & Friesen, 1986; Ekman, Sorenson, & Friesen, 1969; Ekman et al., 1987). Berlin and Kay (1969) discovered culturally independent ways of color classification. These results and new cross-cultural studies (summarized in Brown, 1991) led to the distinction of "innate evolved universals" with different cultural manifestations, in analogy to the genotype-phenotype distinction (see Cosmides & Tooby, 1989, Tooby & Cosmides, 1989a, 1989b, 1992). If one distinguishes innate universals from their local modes of expressions (their "display rules"), many differences seem to vanish. Culture may shape the *expressions* of certain universals, but the underlying cognitive mechanism might be the same in all humans (Brown, 1991).

These developments strengthened the research program of evolutionary psychology: Just as the study of the human visual system reveals a marvelous and complex computational and highly specific adaptive structure (Marr, 1982), might it not be plausible to search for complex information processing modules or "mental organs" (Chomsky, 1975, 1980) in the human mind that have been selected as solutions to recurring adaptive problems such as finding mates, detecting kin, and so forth? (For an overview, see Tooby & Cosmides, 1992, pp. 101 ff.) The questions that are asked in this approach are the following: What are the adaptive problems that humans faced during the phase of hunter-gather societies? What cognitive information processes could have been implemented by evolution into human cognition? Does human cognition show traces of this kind of adaptation? Symons (1979), Buss (1994), and Miller (2000) asked these questions concerning human sexuality, mating strategies, and gender roles. Pinker (1984, 1994) pursued this inquiry for the evolution of language. Even questions of aesthetic taste and moral judgments, prejudices, and preferences can be addressed in the same fashion. (See the selection of essays and topics in Barkow, Cosmides, & Tooby, 1992, and see Buss, 1999, 2005, and Buller, 2005.)

The difference with the sociobiological approach, again, is that the question is not whether these mental organs or domain-specific cognitive mechanisms are adaptive today but whether they were adaptive during the course of human evolution. The difference between this and the standard social sciences model (Tooby & Cosmides, 1992) is the search for a universal human nature beyond the cultural differences.

Conclusion and Future Directions

The view of nature and nurture in sociobiology and evolutionary psychology is and will remain a controversial issue within science. Since almost all fields of human

activity can be situated in relation to the nature-nurture distinction, it is not possible to even try to give an overview of the state of the art of ongoing discussions in the fields of human intelligence, aggression, emotions, gender roles, life history, evolutionary esthetics, ethics, cognitive sciences, and so forth.

However, while most of the empirical insights of evolutionary psychology and sociobiology in all the named fields cannot be ignored, their importance and fruitfulness for a full-fledged understanding of human nature has to be evaluated on a case by case basis (Kitcher, 1985). There is no clear method to give a precise and general account of what in humans is mere nature and what can be attributed to mere nurture. Furthermore, all the important debates within the framework of Darwinism that have been mentioned affect the relevance and shape of sociobiological insights into human nature. Two important avenues for criticism can, however, be highlighted.

First, after a strong emphasis on the possibilities of biological reductionism, a countertendency can be observed that puts humans again away from a biological or genetic determination (Lewontin, Rose, & Kamin, 1984). “Gene-determinism” has come under attack from both social scientists and biologists. Alternative theories to explain eusociality have been proposed, and it might even be necessary to “rethink the theoretical foundation of sociobiology,” as Edward O. Wilson himself put it (Wilson & Wilson, 2007, p. 327). New theories suggest that it is a complex interplay of environment, development, and selection at the gene level, the individual level, and even at the group or cultural level that shapes evolution (Jablonka & Lamb, 2005; Kerr & Godfrey-Smith, 2002; Okasha, 2006; Wilson & Wilson, 2007). These new multilevel approaches render a monocausal view more and more implausible; thereby, they also try to leave the dualistic nature-nurture divide and gene determinism behind (Lewontin et al., 1984; Oyama, 2000). If some of these theories can be sustained, then it might also be false to view culture as a mere evoked manifestation, because it is then itself a causal factor, as it is expressed in the theories about gene-culture coevolution or dual inheritance (see Boyd & Richerson, 1985; Lumsden & Wilson, 1981; Richerson & Boyd, 2005). Due to the fact that the first cultural exchanges in human history took place a very long time ago, it is further likely to assume that human nature has in part been shaped by human culture and that a causal interdependence or coevolution was in fact crucial in the evolution of mankind (see also Geertz, 1973, Chapters 2 and 3).

Second, we see along these lines the revival of the basic ideas of the nature-requires-nurture theorem: Human nature may not be driven by the reduction of instincts, but it is still a plausible possibility that evolution itself has brought forward peculiar features in human nature, leading to a take-off of cultural evolution. Humans’ ability to frame a complex theory of mind, to engage in an explicit “we-intentionality” (Searle, 1983) of doing things intentionally

and jointly together, might be a special ability that enables cultural evolution, as comparative studies of human and primate cognition seem to suggest (Tomasello, 1999; Tomasello et al., 2005). It is plausible to assume that social cognition and the challenges of group life, along with the extension of the human brain—the neoteny and so forth—gave rise to the peculiar human (growing) dependence on culture. It may well be that in fact a special ultrasociality or special tribal instincts fostered the shift to cultural evolution (see Richerson & Boyd, 2005). These approaches emphasize again the very special *social* or *altruistic* nature of humans, thereby distancing themselves from the selfish gene view (see also Sober & Wilson, 1998).⁵ To identify those uniquely human traits that enable the uniquely human cultural process *and* explain how these peculiar traits might have evolved, given the logic of selection, is one of the most important tasks for future research.

Cultural evolution might then, nevertheless, be spelled out according to a Darwinian logic (analogous or biocentric), but it is clear that cultural evolution resembles what is in fact a much more Lamarckian process: Acquired knowledge of individuals can be faithfully transmitted and become perfected over generations in an accumulative process (a “ratchet effect”), different traditions can be combined, new ideas can be brought forward not by chance of random mutations but through thoughtful guesses and intentional advancement, and human technology might free us more and more from a competition for survival. All of these factors allow a much faster evolution than biological evolution (Tomasello, 1999).

However, it remains true that shifting the power away from genes to a somewhat more autonomous understanding of cultural evolution is not in itself a claim for any autonomy of human behavior. Cultural determinism might be a dubious view just as biological determinism is. Only a theory that incorporates the peculiar ability of humans to follow and question reasons, to live out and to distance themselves from their own drives, preferences, prejudices, influences and predeterminations, might be compatible with the fact that sociobiology, evolutionary psychology, cultural determinism, and so forth are themselves theories—theories that appeal to us because they might be true and convincing, and because we might be able to follow their reasoning.

Notes

1. Gehlen relies on the biological studies of Portmann (1942).
2. Gehlen, however, does not want to attribute the reduction of instincts to natural selection or evolution.
3. New theories are critical toward this explanation, and alternative reasons for this kind of eusociality have been proposed, see especially Wilson and Hölldobler (2005) and Wilson and Wilson (2007).
4. For an overview of the meme debate, see Aunger (2000). A recent critical assessment of common assumptions in relation

to the meme approach and cultural evolution in general can be found in Henrich, Boyd, and Richerson (2008).

5. Eldakar and Wilson (2008) give an account of cases where selfishness can be understood as second-order altruism, thereby reversing Dawkins's view. Against Dawkins's view, it can in general be stressed that the metaphor of selfishness is misleading: Genes are self-replicating entities; if they "care for themselves," they do in fact (have to) care for *other instances* of themselves. If like egoists, they only "cared for" their own instantiations in one specific vehicle, they would disappear. Therefore, they are, metaphorically speaking, not egoists but more like "coterie altruists": They have to care for others of their kind, just like a decent altruist should in fact care more for other altruists than for egoists (see Hösle, 2004).

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PSYCHOLOGY AND ANTHROPOLOGY

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Researchers doing work at the intersection of anthropological and psychological phenomena often bemoan the fact that anthropology and psychology are by and large considered separate and distinct disciplines. There are certainly distinct theoretical and methodological differences between what might be considered the prototypical work that mainstream psychologists and anthropologists do, such as controlled laboratory experiments versus ethnographic participant observation. However, historically this has not always been the case, and some contemporary researchers bridge this divide in several interdisciplinary fields that seek to account for both cultural and psychological influences in the mental worlds of people.

While space does not permit a complete overview of even these interdisciplinary efforts to integrate research on cultural and psychological phenomena, this chapter will discuss a few of the key figures and movements in the historical relationship between psychology and anthropology as disciplines, as well as some work that has transgressed these disciplinary divisions. Further, some key theoretical, methodological, and epistemological tendencies in mainstream psychology and mainstream anthropology will be discussed, with particular attention given to differences that have contributed to fragmentation and mutual critique between the two disciplines. Several interdisciplinary fields in which researchers seek to bridge these differences will then be discussed, followed by a summary of some

examples of the main areas of human life and mental function where researchers who are concerned with both mental and cultural phenomena are doing their work. Finally, some future directions for integrated research in psychology and anthropology will be laid out.

This summary cannot account for all of the variations in either discipline, and there will most certainly be areas of each discipline that contradict the summary characterizations made here. This account is not designed to represent either discipline in its totality or to characterize psychological or anthropological research agendas in their entirety, but more to point to general trends in the mainstreams and interstices of these two disciplines that are clearly observable. The references cited and further readings list at the end of this chapter, including the literatures cited by those sources, should be consulted for further consideration of psychology and anthropology as separate disciplines, as well as the interdisciplinary fields that engage both.

A Brief History of Psychology and Anthropology

Before the canonization of psychology and anthropology into separate disciplines, social theorists in the late 19th and early 20th centuries had all things both psychological and cultural on the table in their work. During the latter

half of the 19th century, for example, unilinear cultural evolution was a primary paradigm among theorists that anthropologists claim as intellectual ancestors, namely Lewis Henry Morgan, Edward Burnett Tylor, and James Frazer. (See the entries on Culture Change and Social Evolution in this volume for a complete summary of this paradigm.) Chief among their theories was the notion of “the psychic unity of mankind,” an idea propagated by Adolf Bastian, a founding figure in German anthropology (Köpping, 1983/2005). The basic premise of psychic unity is that all humans have the same basic psychological structure, makeup, or evolutionary potential. (For a more comprehensive history of the meanings and assumptions underlying psychic unity as it relates to both anthropology and psychology, see Shore, 1996, Chapter 1.)

Importantly, for the cultural evolutionists, this characteristic made all human societies comparable for placing them on an evolutionary scale from primitive to modern. Without psychic unity, cultural evolution as a framework would dissolve into simple biological differences, and no framework beyond Darwinian evolution would be necessary to explain differences between societies. For cultural evolutionists, however, psychic unity did not equate to cultural relativism. On the contrary, it meant that all humans had the same cultural or psychological (one could argue that these were equated in this framework) evolutionary *potential* but that this potential was realized to differing degrees in differing societies. Thus, industrial societies (i.e., the “West”) were more culturally and psychically evolved than hunter-gatherer societies. However, these more “primitive” societies were seen as having the potential to evolve through the same evolutionary phases as more “advanced” societies, in order to realize the same psychic potential that industrialized peoples were said to have under this framework.

The cultural relativist turn among anthropological theorists in the early 20th century disregarded this evolutionary take on psychic unity for a more relativizing perspective. In *The Mind of Primitive Man*, Franz Boas (1911) argued against the scientific racism inherent in cultural evolutionary approaches. Importantly, during this period and even preceding it, there is no firm line drawn between “mind” and “culture” for these theorists. A modern-day reading of *The Mind of Primitive Man*, for example, leaves one wondering where the psychological content is, but one is left to realize that, for Boas, mind and the cultural milieu are not easily extracted from one another and in fact form elements of the same phenomenon. Similarly, for unilinear evolutionists, cultural practice was conceptualized as indicative of the more-or-less evolved underlying psychic conditions of members in a given society.

Thus, up until the late 19th and early 20th centuries, and even afterward, many of the major figures concerned with both culture and psychology did not necessarily separate the two into different domains for research. Certainly, until this point, there existed no institutional

structures to separate them. For example, Franz Boas, who established the first department of anthropology in the United States in 1896 at Columbia University and is widely considered a founding figure of American anthropology, had prior training and taught alongside psychologists. Boas was a student of Wilhelm Wundt, a figure claimed by modern psychologists as a founding figure of their discipline and the developer of the first psychological laboratory. Wundt was also interested in folk psychology (see below), and among his students were both Boas and Bronislaw Malinowski, another important early figure in both American and British anthropology (Mattingly, Lutkehaus, & Throop, 2008). Further, one of Boas’s early academic jobs was in the anthropology division of G. Stanley Hall’s psychology department at Clark University (LeVine, 2007). Hall founded the American Psychological Association and was a key figure in shaping the discipline in America. Briefly, among foundational figures in both psychology and anthropology as modern-day disciplines, there was a significant interchange of ideas, and the institutional and disciplinary boundaries observed in the present day were of little or no issue.

Disciplinary Fragmentation

Shortly after Boas established the first anthropology department in the United States and helped found the American Anthropological Association, the discipline began to take root in its modern institutional form, including the four-field approach (i.e., emphases on the teaching of biological anthropology, archaeology, sociocultural anthropology, and linguistic anthropology). For its part, psychology in the 19th century was not clearly delineated from philosophy or even medicine, but it also began to separate and become a distinct academic discipline in the early 20th century. Originally, this disciplinary fragmentation did not preclude productive research that crossed these disciplinary lines. Some of the founding figures of American anthropology continued to engage psychological theories and research psychological topics within their newly formed discipline (e.g., Benedict, 1934; Malinowski, 1927). Formative figures in psychology also continued to see culture as an essential consideration in their theorizing and empirical work.

However, throughout the course of the 20th century, one could argue that the centers of each discipline drifted away from one another, both theoretically and methodologically, pushing the work that sought to integrate cultural and psychological phenomena further into the peripheries of each discipline. This continued until a recent, reinvigorated interest in the intersection of psychology and anthropology (Cole, 1996; Shweder, 1990) led to increased activity and recognition of the interdisciplinary fields that focus on both culture and psyche in a holistic research agenda. The future looks bright for these interdisciplinary endeavors, but before discussing them, it is important first to outline

some of the different orientations that resulted from the increased factionalization of psychology and anthropology over the course of the 20th century.

Theoretical Orientations and Explanations

In contemporary psychology and anthropology, each discipline's mainstream has come to adopt distinct theoretical orientations for the explanation of human behavior and the human condition, and these divergent orientations have led to mutual critique. Note that the description that follows temporarily sidelines the interdisciplinary efforts that are designed specifically to either overcome or answer these mutual critiques, in an effort to draw out in high relief the different types of scientific and social explanations that tend to be offered in each discipline. These interdisciplinary efforts and their work will be discussed subsequently.

Centrality of Individual Psyches

Brent Slife and his colleagues have written extensively on the taken-for-granted assumptions in contemporary psychology in order to analyze the theoretical approaches in the field and offer alternatives to the normative stances. Their work is useful in understanding how these assumptions vary from those normative assumptions that one might find among anthropologists. Perhaps one of the most relevant analyses in this comparison is what Slife terms *atomism* (Slife, 2004). Atomism can be applied to separate levels of psychological analysis, from individuals to individual constructs, but for present purposes one could say that atomism assumes that individuals are akin to hermetically sealed units, self-functioning and self-contained. In other words, under this assumption, an individual's psyche is perceived to be a self-contained unit that can be studied under a microscope, as it were, by itself, in order to discover its nature. This assumption makes the context in which the psyche develops or operates from day to day less important, since the psyche is perceived to *contain* all of the necessary characteristics or attributes worthy of its investigation. Thus, the individual becomes the primary unit of analysis for mainstream psychology.

This assumption becomes clear in a consideration of prominent Western psychological conceptions of personality. The "big five" personality enterprise (see Goldberg, 1993, for a summary and history of the development of this model of personality), for example, is built around the notion of five salient factors that are said to be descriptive at the highest level of personality traits located in individual psyches. Since the emergence and psychometric validation of this model, much psychological research has been devoted to explaining individual psychological differences in many domains and how these variations relate to these personality traits, including the advocating of job

selection and training according to individual personality profiles (Goldberg, 1993). Importantly, this entire conception rests on the explanatory value of individual psyches and their "content." The way that culture often factors into these explanations is on the order of affecting the personality trait outcomes in individuals. Within such a framework and in mainstream psychology in general, culture is primarily conceived of as an explanatory variable for individual psychological variation. This can be juxtaposed to the conceptions of culture in anthropology, as well as the interdisciplinary efforts to integrate psychological and cultural phenomena in research agendas (see below). Suffice it to say that the assumption of atomism and the resulting conception of individuals as hermetically sealed psychic units to be either explained or used as explanatory variables results in a quite different theoretical enterprise than when culture is taken as the primary object of study.

A second important aspect of theoretical work in psychology regards the importance of psychological constructs. A construct is an unobservable entity that is presumed to exist within an individual psyche and that gives rise to observable phenomena, such as behavior. An example would be depression. One cannot directly observe depression, but one can observe the behavioral outcomes of this theoretical construct (e.g., crying, sad facial expressions, etc.). Given the theoretical centrality of individual psyches, different subdisciplines of psychology have built up research enterprises around studying the theoretical constructs in the psyche. The five factors of the big five model are examples. Great effort is devoted to developing psychometric instruments that use information from the supposed observable effects of these constructs in order to test for their salience, nature, or even theoretical existence. Measures of these constructs are often used to predict behaviors or the strength of other constructs.

Centrality of Culture as an Explanatory Framework

Anthropologists have historically been much less concerned with individual variation but instead have focused on collective differences at the level of a society, group, or subculture. Ever since the time of Boas, fighting scientific as well as banal racism and propagating cultural relativism have been central projects of the anthropological discipline. When translated to theoretical work, this project has often been directed toward taking the findings of other social scientists, or even everyday common sense in Western society, and delivering rich ethnographic detail to show how groups vary (or occasionally how they are similar) on different dimensions, given their cultural milieus. Some prominent examples include Margaret Mead's argument that the social dimensions of the sexual tension and upheaval of adolescents perceived to be universal in the West are not necessarily the case among Samoan adolescents (Mead, 1928/1964). While the ethnographic validity

of this project (her first significant fieldwork) has been questioned, the argument was influential and contributed significantly to this anthropological project of relativizing scientific universalizations derived from Western cultural contexts. Importantly, as compared to normative research among psychologists, the unit of analysis here becomes a group; it is larger than one individual.

Clifford Geertz remarked that psychologism, or psychological reductionism, is one of two “great saboteur[s] of cultural analysis,” along with logicism (Geertz, 1973, p. 405). By this, he means to argue that the reduction of all human phenomena to some addition of individual psychological processes misses a fundamental point. Geertz makes the case that psychologism overlooks the entire world of meaning that predates such individuals and that shapes and gives interpretive tools for the psychological experience of individuals. Thus, Geertz’s realm of analysis is meta-individualistic and is particularly critical of the universalizing explanations offered by psychologists that place an individual psyche at the center of explanatory or predictive models. Geertz seeks to replace the prospect of psychological reductionism with what he terms the “scientific phenomenology of culture.” While Geertz’s analytic material and observations certainly contain what psychologists might label as psychological content, his emphasis is on the process of meaning-making at a level that extends what goes on in individual minds.

Specifically, in his essay “Person, Time, and Conduct in Bali” (1973), Geertz argues that thought is inherently social. In other words, a system of meaning-making must presuppose the interpretation that is engaged by individuals. It is this system of meaning-making—the culture that resides outside of individual minds and in the social interstices of human life (Shore, 1996)—that Geertz took as his object of study. In this essay, he goes on to delineate the rules of naming and keeping time in Bali. Using these ethnographic data, he argues that Balinese conceptions of the person and, indeed, time itself are fundamentally distinct from the corollary Western concepts, which are often held as universal by philosophers and psychologists. The psychological worlds of the Balinese are thus affected, as they see time, for instance, in more qualitative than quantitative terms (i.e., “what kind of time it is” as opposed to “what time it is,” respectively). Compared to the aforementioned psychological emphasis on how individual psychological constructs drive behavioral outcomes, the tension in theoretical orientations between mainstream psychology and anthropology becomes clearer.

Positivism and Antipositivism

Again, these comparisons certainly cannot account for the variation in approaches and dispositions of variegated theorists in either psychology or anthropology but are designed to point the reader to some trends among prototypical work in each field and some significant differences

between these disciplines. Another significant difference that merits pointing out regards orientations toward positivism. Without consciously doing so, many psychologists tend to see their discipline in more positivistic terms. Importantly, the term would rarely be used among researchers of similar orientations in the nature of science. When referring to *positivism* in this context, one might say that psychological research is generally considered to contribute to additive knowledge toward the supposed end of a complete understanding of the individual psyche, thus conceiving the psychological discipline(s) as a positive science working toward an end of some final or complete truth of their object of study.

While there is certainly wide disagreement among anthropologists on this point, many recent theoretical strains in the discipline have come to use the terms *positivism* and *positivists* in degrading terms, understood by these postmodern critiques to be indicative of some sort of modernist naïveté. This mode of critique is particularly typical of postmodern or poststructural camps in anthropology, and generally it might favor a more socially or culturally constructed view of scientific truth, in which science itself is seen as a cultural endeavor in the most extreme sense. This point is important because of the extent to which interdisciplinary critiques between psychologists and anthropologists focus on the scientific value of each other’s work or question that category in the first place. As a natural response, psychologists, who tend to see their discipline more as an additive or positive science, argue that these modes of analysis are rather unscientific and do not contribute to the greater understanding of human life. This point leads to the next important comparison between these disciplines: epistemological approaches.

Differing Epistemologies and Methodological Approaches

Generalizability Versus Deep Understanding

The normative epistemological approaches between anthropologists and psychologists during the 20th century have led to the development of vastly different sets of methods for each discipline. At least to some extent, the differing objects of inquiry in theoretical underpinnings, as outlined above, have driven these epistemological differences, but certainly do not account for the entirety of their divergence.

Most university psychology departments offer methodological training to students in the form of statistical techniques and psychometric measurements. Anthropology departments, on the other hand, tend to stress the importance of in-depth fieldwork, which typically consists of extensive interviewing, observation, linguistic analysis, or archival research. At the heart of this divergence is the

question of how one can “know” one’s subject, be it a cultural system or the nature of the human psyche. Anthropologists tend to argue that depth is the important factor in figuring out the important aspects of one’s research context. This depth tends to be qualitative in nature (see below) and is generally focused on tracking the phenomenon that is of interest instead of taking more superficial observations that might be generalized to some sampled population. This is certainly not the case for all anthropologists and has varied widely throughout the history of the discipline. Indeed, many prominent anthropologists in the 20th century were primarily concerned with quantitative techniques and sampling issues, but the trend at the moment favors other forms of knowing.

Geertz’s oft-quoted term *thick description* (Geertz, 1973) is commonly mobilized to describe the dominant methodological field among anthropologists. By thick description, Geertz meant the extensive documentation of cultural milieus themselves and coming to understand local symbols and phenomena on their own terms and in their own contexts. The object of this form of cultural analysis is to come as close as possible to seeing these symbols through the eyes of members of the community that deal in them, thus enabling the ethnographer to comment comparatively (given one’s native worldview) on them and their significance. Embedded fieldwork has become a hallmark of anthropology. Indeed, it is often seen as essential to anthropology’s identity as an academic discipline. Cultural relativism, as a principle, is partially responsible for this, as early anthropologists sought to refute or at least overcome supposedly superficial observations of armchair anthropologists of the late 19th century, whose accounts were largely based on the reports of missionaries who encountered various peoples around the world. Cultural relativism became important for refuting evolutionary or simply ethnocentric claims about universal humanity, and embedded fieldwork provided the deep perspectives and data to engage in that effort. Briefly, given assumptions of cultural specificity, in order to truly understand local variations in all their idiosyncrasies and permutations, one must become immersed in the cultural contexts in order to be a subject of one’s own analysis.

Psychologists, for their part, have historically largely assumed that, despite cultural superficialities, the psychological structures and processes of all humanity are universal (Shweder, 1990). This assumption, coupled with that of naturalism (Slife, 2004), has led to an epistemology quite distinct from anthropology’s hallmark of qualitative fieldwork. Instead, psychologists have historically favored the testing of psychological phenomena across populations in order to derive generalizations about psychological processes that are assumed to permeate those populations. Methods developed toward this end have been largely quantitative in nature, such that assertions made about samples could theoretically be generalized to embrace entire populations from which samples are drawn.

With regard to psychological constructs, population distributions of constructs and developing quantitative techniques of measuring the existence and correlation of constructs with other phenomena have been central. Ideally, sampling is an essential consideration in this epistemology, but practical concerns sometimes outweigh this importance. Those outside the subdiscipline often levy the criticism that social psychological theories tend to overproject the psychodynamics of undergraduate psychology students to the entire population, as this is certainly the most studied group in this line of research, given their availability for research participation in academe. Even considering sampling limitations, however, the important distinction with regard to epistemological comparison regards the anthropologist’s ethnographic emphasis on deep local knowledge, in contrast to the typical psychologist’s interest in quantitatively deriving the nature of a psychological construct or its relationship to a behavior or characteristic of personality.

Conceptions of Culture

Interpenetrating both the epistemological and theoretical differences outlined here are the varying conceptions of culture in each discipline. It is certainly not the case that all or even most anthropologists have arrived at a consensus on the nature of culture. In fact, the culture concept has been at the center of the discipline’s most intense debates. (See the “Concept of Culture” entry in this reference handbook.) Psychologists, for their part, have not historically engaged in the philosophical arguments surrounding the nature of culture to any comparable extent. However, this is not to say that one cannot point to systematic differences in the ways that psychologists and anthropologists have treated culture in their work, whether or not the assumptions about the nature of culture are explicit in such work.

As outlined above, prominent anthropologists such as Geertz have strongly advocated that culture is not something that resides in the heads of people but rather in the interstitial social spaces where people live and interact. He famously remarked,

The concept of culture I espouse . . . is essentially a semiotic one. Believing, with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning. (Geertz, 1973, p. 5)

One might well say that the “experimental science in search of law” refers to, among other things, the psychological sciences that tend to operate under the assumptions of naturalism (Slife, 2004).

Not all psychologists are concerned with cultural phenomena or testing their theories in various cultural milieus.

However, for those that do take culture into account, such as the subdiscipline of cross-cultural psychology (see below), the assumption of psychic unity writ large reigns (Shweder, 1990). In other words, it is largely assumed that humans are all basically the same type of psychological beings, but that cross-cultural work should be dedicated to uncovering or revealing the cultural variation in certain constructs. The deep psychological structure, however, is perceived to remain universal across all peoples (Shweder, 1984). In much of the psychological research where culture factors into the models, it is often seen (or at least treated) as one of many variables in a person's psychological profile, much like gender or age. Thus, it can be codified and worked into a regression or correlation model of the psychological construct or phenomena of interest. In this way, as many anthropologists tend to argue, culture is reduced to near insignificance, and the entire point is missed. For Geertzian anthropologists, the webs of meaning that constitute a cultural context are the very phenomena of interest, and they cannot be simply reduced to a variable in a statistical model. Instead, such a context must be treated as the very means through which psychological worlds are enabled to exist. Thus, anthropologists tend to have a much deeper and richer sense of culture per se, or at least a more substantive debate on the topic, and these different disciplinary orientations certainly drive the different epistemological approaches outlined above.

It is also important to note that a similar debate wages around the topic of individual psychological variation. On this topic, psychologists certainly have a more rigorous and developed methodology for dealing with population distributions and individual deviations from the norm. However, these methods are largely quantitative, except perhaps in certain domains of clinical psychology. Thus, psychologists might criticize anthropologists for overemphasizing norms and not paying significant attention to variations.

Interdisciplinary Fields of Relevance

Despite the above outlined mainstream trends and comparisons of psychological and anthropological approaches to understanding human life, several important interdisciplinary fields have emerged at the intersection of psychological and anthropological research. Each of these various subfields has a slightly different focus, but they share the effort to integrate cultural explanation and meaning with the psychological dynamics of individuals. What follows is a brief description of each field and how they relate to one another. It is important to note that many of the mutual critiques and incompatibilities outlined above are the precise obstacles that researchers in the following fields often strive to overcome in order to develop a more holistic model of both mind and culture. While this description seeks to classify some of

the interdisciplinary approaches into different areas of emphasis, these divisions are not hard and fast, and much research might extend beyond the boundaries of categories laid out below. Indeed, the point here is not to draw boundaries around the different subfields, but rather to signal some of the important trends at the nexus of psychological and anthropological research.

Cultural Psychology

In an essay designed to clear the field and set an agenda for the (re-)emerging discipline of *cultural psychology*, Richard Shweder describes his take on the historical development of the field as well as many of its distinctions from other, related fields (Shweder, 1990). In this essay, Shweder argues specifically for a model of people and culture that inextricably links them together, so that it is impossible to ferret out the person and the cultural context into separate, distinct, independent, and dependent variables. Instead, Shweder argues that cultural psychology takes an integrated, holistic view of culture and mind where, in fact, these two categories are impossible in the absence of the other. In this view, culture penetrates mind, and vice versa, to the extent that, in Shweder's terms, "You can't take the stuff out of the psyche, and you can't take the psyche out of the stuff" (Shweder, 1990, p. 22). In other words, this approach to the person and his or her cultural context must take account of the dynamics of both in order to understand either.

This theoretical model has led to some methodological preferences in the field as well. But, as in many interdisciplinary fields, the range of methods spans the gamut of quantitative and qualitative, psychometric and ethnographic methods. Ethnography and a deep understanding of ethnographic context are essential in this approach, which has certainly been influenced by Geertz and his conception of culture. Some cultural psychologists, on the other hand, use more traditional psychological techniques, informed by ethnography. (See, for example, Markus & Kitayama, 1991, including many of the cultural psychological studies they cite.)

In addition to utilizing methods from general psychology and anthropology, many working in this discipline have also developed new techniques designed to investigate the interpenetrating nature of culture and psyche, such as person-centered ethnography and interviewing (Hollan, 2001; Levy & Hollan, 1998). Epistemologically, cultural psychologists tend to be less dedicated to particular methods in an a priori basis but tend to value the approach of any method, qualitative or quantitative, that allows the researcher to investigate psychological and cultural dynamics without the types of reductionism (both cultural and psychological) outlined above. Given this conception of the psyche's coconstitution with the cultural world it inhabits, this orientation would include both sides of the theoretical and epistemological critiques outlined in the sections above, leveled

at both mainstream psychology and anthropology. An overemphasis of the individual psyche at the expense of cultural context, as well as a focus on the context itself without significant regard to the mentalities of those inhabiting the context, are equally seen as partial and inadequate from this point of view. To be clear, it is not the case that all researchers working in the field of cultural psychology have derived an epistemological or methodological consensus. In fact, Shweder points out that this is an important arena for future debate in the field (Shweder, 1990).

Psychological Anthropology

One caveat to these descriptions is that much of the contemporary work being done under the umbrella of *psychological anthropology* would actually fit Shweder's classification of cultural psychology (Schweder, 1990), and not all or even most scholars have taken to his classification of the field as such. This cultural psychology–psychological anthropology distinction is one particular area where these classifications of subdisciplines are rather nebulous. In Shweder's description, "classical" psychological anthropology is constituted by the work of people such as Ruth Benedict (Benedict, 1934, 1946) and others of the "culture and personality" school. He points to developments in cultural psychology as an important break with this classical school, particularly with regard to the assumption of psychic unity. However, many contemporary researchers at the nexus of anthropology and psychology use the term *psychological anthropology* to classify their own work, even if it meets the criteria laid out above. Further, the term *psychological anthropology* tends to be more inclusive than Shweder's and others' delineation of cultural psychology. Indeed, one of the more significant professional organizations for this type of multidisciplinary work is the Society for Psychological Anthropology, a section of the American Anthropological Association. As a result, this classificatory title may be said to encompass the work in anthropology that has psychological ramifications, but perhaps it does not fit under the banner of cultural psychology. As such, ethnography tends to be more central and indispensable for psychological anthropologists than it is for cultural psychologists, particularly in comparison to those who might solely claim cultural psychology but not also psychological anthropology as their discipline.

Beyond what overlap psychological anthropology has with the previously outlined cultural psychology, this field tends to be considered inclusive of several subfields in anthropology, such as cognitive anthropology, psychoanalytic anthropology, and ethnopsychology.

Cognitive Anthropology

Roy D'Andrade defines *cognitive anthropology* in its simplest terms as "the study of the relation between

human society and human thought," particularly with regard to "the objects and events which make up their world, including everything from physical objects like wild plants to abstract events like social justice" (D'Andrade, 1995, p. 1). While on the surface this may seem to coincide with the general emphasis of psychological anthropology or cultural psychology, the emphasis here is on thought. Similar to the emphasis in cognitive psychology on thought processes such as memory or learning, the emphasis in cognitive anthropology is on the thought content in various cultural contexts and on understanding how culture shapes these thought processes. The domain of cognitive anthropology can thus be seen as a subset of psychological anthropology.

A central concept in cognitive anthropology is the notion of a *cultural model*, sometimes also referred to in psychological terms as a *schema*. The basic idea behind a cultural model is the collection of knowledge about a topic in a form that is intersubjectively shared among a group of people, although the group need not be explicitly recognized as such (D'Andrade, 1990). These models organize cultural information, such as what constitutes a goal in soccer, a good person, or a shamanic ritual. Bradd Shore argues that this concept is useful for anthropologists in overcoming some of the debates surrounding the nature of culture and the recent poststructural relegations of culture to the ambiguity of "power" and "discourse" (Shore, 1996). Shore presents a more extensive theorization of cultural models toward this end.

Psychoanalytic Anthropology

Psychoanalysis influenced early anthropologists, particularly those identified with the history of *psychological anthropology*, although the modern field of psychoanalytic anthropology did not solidify as such until the 1960s (LeVine, 2001). Some prominent earlier works did engage psychoanalytic theories in fieldwork, however. A notable example is Bronislaw Malinowski's *Sex and Repression in Savage Society* (1927). As psychoanalytic theory was gaining ground in society, Malinowski challenged the presumed universal nature of the Oedipus complex, using his ethnographic account of family life in the Trobriand Islands. Importantly, Malinowski did not completely reject psychoanalytic theory on this point, but instead proposed a culturally specific, parallel nuclear complex with similar psychodynamics as the Oedipal complex proposed by Sigmund Freud and his colleagues.

More recently, Anne Parsons carried out a similar effort in proposing a "Madonna complex" in southern Italy as another, culturally specific alternative nuclear family complex (Parsons, 1964). Melford Spiro, an ardent critic of cultural relativism, argues against both Malinowski and Parsons in favor of the universal Oedipal model (Spiro, 1982). Spiro has extended psychoanalytic theory

to functional analyses of his ethnographic data in Burma as well, arguing that the special place of monks in Burmese society provides an acceptable outlet for what might otherwise be dysfunctional psychodynamic problems of the people that fill those roles (Spiro, 1965). These few examples illustrate but a few of the many inroads that anthropologists have found for integrating, critiquing, or adapting psychoanalytic theory and ethnographic accounts.

Ethnopsychology and Folk Psychology

Two related fields, *ethnopsychology* and *folk psychology*, constitute efforts to derive emic theories about psychological function or how people operate in different societies. These are to be contrasted with the etic theories developed by outsiders to the cultural group of interest. Linguistic data are commonly used in order to gain insight into the (often latent) models of psychological function within a given group, such as moral development, emotional socialization, interpersonal interaction, and so forth. As a brief example, Catherine Lutz used linguistic and ethnographic insight to reveal the Ifaluk model of both the everyday function and the development of emotion (Lutz, 1983). This emic model is important for Lutz's work; if the ethnopsychological model is made apparent, then one can gain deeper insights into the process of socialization among those who ascribe to the model. Notice the affinity of this approach to the emphasis on cultural models by cognitive anthropologists.

Psychiatric and Medical Anthropology

One large area of research with psychological import, which has gained a lot of ground and grown recently, regards comparative cultural research on mental health. Researchers working on this and related topics find themselves straddling medical and psychological anthropology, and some refer to their field as *psychiatric anthropology*. The important distinction between this vast research agenda and other areas of psychological anthropology regards its focus on the cultural construction, labeling, and means of dealing with mental illness. However, it is construed in different contexts. Some researchers in this domain also integrate psychoanalytic perspectives and many even gain training as mental health care providers as a gateway to understanding the process of mental health treatment ethnographically (Luhmann, 2000).

Cross-Cultural Psychology

The previously delineated category of cultural psychology is designed to be inclusive of research being conducted from a psychological frame of reference that also ascribes to a notion of the person and culture as interpenetrating

one another and to a need for ethnographically informed research in order to gain an understanding of both the context and the happenings of the mind. However, there is certainly much work being done in psychology that deals explicitly with cultural variation (or lack thereof) in the various phenomena of study, without necessarily ascribing to this particular model of the person-in-context/context-in-person. Much of this would be considered *cross-cultural psychology*. The essential distinction that Shweder makes between cultural and cross-cultural psychology regards the tendency of both to assume psychic unity, albeit at varying levels. Examples of this work abound and often take the form of developing a psychometric technique, such as the big five personality inventory mentioned above, performing a translation of the inventory into another language, and conducting the necessary psychometric techniques (e.g., factor analysis) to validate the measure in the target culture. The objective is to develop psychometric measures that are presumed to measure the same constructs in different linguistic and cultural communities, in order to study the geographic distribution of these constructs, be it personality factors or depression or self-esteem. Cultural psychologists are quick to offer critiques of this enterprise on the basis of the lack of ethnographic grounding of these measures in target cultures in order to derive their cultural relevance in the first place. Thus, cultural psychologists and psychological anthropologists have been quick to criticize such endeavors as scientific imperialism at worst, or preemptive universalizing at best (Triandis & Suh, 2002).

Theoretical and Philosophical Psychology

It is worth noting briefly that an emergent subfield of psychology is dedicated to dealing with the taken-for-granted assumptions of various subdisciplines of psychology and proposing alternatives to the status quo when it comes to conventional methods and theoretical approaches (see, for example, Slife, Reber, & Richardson, 2005). While the field of *theoretical and philosophical psychology* is not dedicated to psychological matters with cultural import per se, the theoretical work and philosophical critiques leveled in this vein of psychology have great potential to open doors for a more serious consideration of cultural issues in general psychology. These critiques often directly engage many of the assumptions that preclude a more serious and in-depth consideration of the fundamental importance of cultural considerations in psychological research. They address these assumptions in ways that prevent culture from being reduced to a mere independent variable in a person's psychological profile. As but one example of these potential inroads, challenging the assumption of atomism lends itself to a more thorough consideration of the model of person and culture laid out by Shweder as a hallmark for cultural psychology (Shweder, 1990).

Future Directions

One of the hot forefronts of psychology concerns the major advances in neuroscience that have the potential for technologies, such as neuroimaging, to reveal new findings on the workings of the brain and correlate these with observed behavior and psychological trends. An interesting nascent subfield of anthropology is emerging to take such findings and relate them to cultural data and analysis as well. While some scholars may be cautious about such advancements, particularly with regard to the potentials for biological reductionism, this new field—sometimes termed *neuroanthropology*—shows promise for integrating new findings on the substrates of the brain with anthropology's historical expertise—cultural analysis. (For an example of what these analyses may look like, see Quinn, 2006.) It will be interesting to see the directions in which this field develops.

In conclusion, even given the current directions in which academe and its institutions are proclaiming an increased valuation of interdisciplinary research, institutional structures and practices still remain that hamper genuine interdisciplinary exchange, including theoretical and methodological exchanges between psychologists and anthropologists. Overcoming these challenges and engaging in deeper interchanges will be an important task for those working on psychological issues from an anthropological approach. Those working on issues of anthropological import from a psychological perspective will no doubt contribute to increasing interdisciplinary values at academic institutions. That is not to say that this is not happening on the fringes of each discipline, or that there are not people who genuinely straddle both disciplines, such as many of the authors cited here and the work of other scholars engaged in some of the interdisciplinary fields of study outlined above. These interdisciplinary efforts have certainly gained more traction recently, but varying levels of disciplinary marginalization still remain, and they often revolve around the lack of adherence to methodological orthodoxy of each field. Overcoming these methodological and theoretical tensions between psychology and anthropology will be an important continuing task for researchers cutting across these two disciplines. A related task will be to outline and further develop the methodological foundations of interdisciplinary fields themselves (Mattingly, Lutkehaus, & Throop, 2008), which may indeed help them gain further traction as well as further the research agenda that seeks to genuinely engage phenomena both psychological and anthropological.

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IQ

Viewpoints and Controversies

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All cultures value intelligence; however, definitions of what constitutes intelligence vary across cultures. The term *intelligence quotient* (IQ) was coined by German psychologist William Stern (1871–1938) in 1912. IQ tests measure specific skills and specific knowledge that have been used to represent overall intelligence. The exporting and translation of Western measurements of intelligence through IQ testing has influenced views of intelligence globally. In the West, IQ testing has generated controversy as beliefs and assumptions have been challenged. There are three major issues for IQ testing: the question of whether there is a single general intelligence or multiple intelligences, the nature-nurture debate, and the use of IQ tests in policy and legal decisions.

Western psychometric IQ testing is based on the assumption that humans have a general intelligence that can be measured quantitatively. However, this assumption is not universally accepted. Opposing theorists such as American psychologists Louis Thurstone (1887–1955) and Howard Gardner (b. 1943) claim that intelligence is really composed of discrete abilities and cannot be viewed as a single cognitive entity.

The nature-nurture debate has generated a great deal of controversy. While many researchers accept an interaction between genetics and heredity, others have taken more extreme positions. British psychologist Cyril Burt (1883–1971) used twin studies in the 1950s to claim that

genetics play the only important role, while Canadian cultural psychologist John Berry (b. 1939) argued in 1974 that intelligence can be viewed only as a cultural construct.

The use of IQ tests for policy and legal decisions has been and continues to be highly controversial. IQ testing has been involved in the areas of education, employment, immigration, and law, this last with respect to sterilization. IQ testing continues to play a role in screening for special needs students and as a gatekeeper for programs for gifted students in the United States. Related standardized aptitude and achievement tests are used for admissions in higher education and for job placement in the military.

The General Intelligence Controversy

Views of intelligence are dependent on the metaphors and assumptions of a culture. The Western concept of a generalized measure of intelligence can be traced back to the ancient Greek philosopher Plato (427–347 BCE), who compared people's intelligence to blocks of wax differing in size, hardness, moistness, and purity. The view of multiple intelligences can be traced back to the 18th-century German philosopher Immanuel Kant's (1724–1804) portrayal of intelligence as a multifaceted structure. More recently, the emergence of psychology as an academic field has driven Western concepts of intelligence and the emergence of IQ testing.

IQ testing has two main branches of development, with one branch following the assumption of a general intelligence and the other advocating the view of multiple intelligences. The first branch has become accepted in educational psychology, and its assumptions are those that are widely used in screening students for special programs. The multiple intelligences view had been incorporated into educational curricula and is used in cross-cultural research.

Development of General Intelligence Testing

British biologist Francis Galton (1822–1911) was a 19th-century pioneer of mental testing research. Galton was influenced by the work of his cousin, Charles Darwin, and the philosophy of Wilhelm Wundt (1832–1920). Wundt's psychological laboratory in Leipzig, Germany, studied the general principles of sensation, perception, and other mental processes using laboratory techniques that were state of the art for that time period. Galton believed that intelligence was a general inherited characteristic composed of an individual's perceptual sensitivity and the capacity to exert effort. Galton assumed that this general mental ability could be objectively measured using tests for sensory discrimination and reaction times. Galton devised and ran tests to measure differences in the ability to discriminate differences in weight, tone, color, and other perceptual differences. His book *Hereditary Genius: An Inquiry Into Its Laws and Consequences*, which was published in 1869, influenced the thinking of subsequent researchers. Galton was the first researcher to use a normal distribution curve to map out differences in intelligence. This was an important contribution that is still utilized today.

Some of Galton's beliefs have generated controversy, especially his assumptions that intelligence is biologically based and varies by race and social class. Galton believed that members of higher social classes should perform better on sensory-based intelligence tests. He coined the term *eugenics*, the practice of selective reproduction, as a way to improve mankind as a species.

In 1890, American psychologist James Cattell (1860–1944) proposed 50 tests, including tests for physical strength, movement speed, reaction time, and memory, which he believed would correlate with intelligence. He conducted large-scale testing of college students in an attempt to correlate his tests with each other and with measures of intelligence, such as college grades. The research did not produce the desired results. However, British psychologist Charles Spearman (1863–1945) believed that poor methodology was responsible for Cattell's failure to show correlations among tests associated with intelligence.

Spearman was attracted to Galton's concept of a general mental ability with a strong biological basis. In 1904, Spearman used factor analysis to postulate the existence of

general intelligence as the correlation among all complex mental tests. He developed a two-factor theory of general (*g*) and specific (*s*) intelligence, with *g* describing the variance attributed to general intelligence and *s* describing the variance that is unique for each individual test. Because he was able to connect a theoretical construct with a mathematical correlation, Spearman's work helped to establish a school of thought that assumes intelligence as a single mental reality with an inherited biological basis. This has given rise to the continued practice of measuring overall intelligence using tests believed to measure components of general intelligence. In addition to his impact on the field of intelligence, Spearman made important contributions to the field of statistics. Statistics continues to be used as an important tool in intellectual assessment.

Alfred Binet (1857–1911) and Theodore Simon (1863–1961) published the first modern intelligence test in *L'année psychologique* in 1905. The goal of their assessment scales was to identify children who would benefit from special education classes. Binet and Simon believed in a general intelligence based on higher-level judgment skills. The original Binet-Simon test was an untimed test administered individually by a trained examiner. The test consisted of a series of tasks of increasing difficulty. Binet and Simon believed that each task represented the normal level of performance for a given age. The highest level that a child successfully performed was designated as his or her mental age. The Binet-Simon test laid the foundation for all individually given IQ tests today.

American psychologist Henry Goddard (1866–1957) was the first to translate the Binet-Simon test into English, distributing thousands of copies throughout the United States for testing students in public schools. Goddard's work was influential in advocating a strong heritability of intelligence. His book *The Kallikak Family: A Study in the Heredity of Feeble-Mindedness*, first published in 1912, argues for a strict genetic view of feeble-mindedness (very low intelligence). Goddard also proposed the controversial solution of involuntary sterilization of the feeble-minded to improve the intelligence of the American people.

Goddard was invited to test immigrants at Ellis Island in 1913. Using his version of the Binet-Simon intelligence test, Goddard concluded that the intelligence of the average steerage passenger was very low. Because the immigrants tested came from Southern and Eastern Europe, public perception of the people from these regions was negative. This negative view of the intelligence of immigrants from these countries influenced the establishment of immigration quotas.

American psychologist Lewis Terman (1877–1956) translated and adapted the revised Binet-Simon Intelligence Test Scales for use in the United States in 1916. Terman also incorporated the intelligence quotient that had been introduced by William Stern in 1912. Stern defined the intelligence quotient (IQ) as the ratio of the mental age and the chronological age multiplied by

100 (e.g., 10 years/8 years \times 100 = 125). Terman called his new version the Stanford-Binet Intelligence Test Scales (SBITS). The SBITS is in its fifth revision and is still used today as a measure of general intelligence. It is not without controversy and has been criticized as culturally biased.

The United States entered World War I in 1917. During this critical time the military worked with psychologists to adapt the Stanford-Binet for group testing. In 1917, Robert Yerkes (1876–1956), head of the American Psychological Association, lobbied and received permission from the National Research Council to create a Committee on Psychology. As chair of this committee, Yerkes was responsible for bringing together psychologists (including Henry Goddard and Lewis Terman) to modify the SBITS for use by the U.S. Army. The army was interested in classifying recruits according to their mental abilities for job placement.

Yerkes's group designed two multiple choice tests that could be administered to groups. The alpha test was given to literate recruits, and the beta test was given to recruits who could not read and write in English, if at all. The army tests are significant for two reasons. First, the change in format provided a model for group testing, and second, the results were interpreted to indicate that recent immigrants from Southern and Eastern Europe were of lower intelligence than immigrants from Western Europe, who tended to have been in the country longer. Although the results showed a strong correlation between years living in the United States and scores on the Army Beta test, this explanation was rejected by Yerkes in favor of a biological explanation.

David Wechsler (1896–1981), who had been involved with Army intelligence testing during World War I, published the Wechsler-Bellevue Intelligence Scales in 1939. Wechsler was influenced by Spearman's work on generalized intelligence. His intelligence scales comprised the verbal and nonverbal factors believed to compose general intelligence. The Wechsler scales are performance tests that measure a person's ability to complete a drawing or provide verbal definitions of orally presented words. Because Wechsler worked initially with adults, he rejected the concept of a mental age. He developed a point system that could be used effectively for both children and adults. Each subtest reflected an ability that expressed general intelligence. A major innovation came in 1949 with the introduction of the deviation IQ score. Wechsler scales yield IQ scores with a mean (or average) score of 100 and a standard deviation of 1.5. Individuals are compared to others their own age when computing the IQ score. The deviation score has replaced the mental age score as the standard way for measuring IQ. Tests derived from the original Wechsler intelligence tests are still used today.

Wechsler's biggest contributions to the field of intelligence testing were his use of standardization sampling and normalizing procedures. However, despite these procedures, the Wechsler tests generated criticisms of cultural bias. Researchers looked for ways to get beyond the limitations of

language problems and culture-specific knowledge. In 1936, John C. Raven (1902–1970) developed Raven's Progressive Matrices Test, an untimed nonverbal assessment of abstract reasoning. To answer test questions, participants identify the missing segment necessary to complete a larger pattern. In 1940, Raymond Cattell (1905–1998) introduced the concept of the Culture-Fair Test. The purpose of this test is to avoid test bias based on linguistic skills and general knowledge. This was the first test designed to distinguish between genetic and environmental factors in intelligence. Both tests are still in use today in the United States and internationally. They have both generated criticisms that they are not free of cultural bias.

In the mid-1950s, English psychologist Cyril Burt (1883–1971) published a series of studies on monozygotic twins. Burt claimed that monozygotic twins reared together had an almost perfect correlation on tests of intellectual ability. He went on to claim that monozygotic twins reared apart showed only slightly less similarity on intellectual tests. Burt used his data to argue that the environment played no role in differences in intelligence and to argue for biological differences between social classes in Great Britain. Subsequent research has shown that Burt was careless or dishonest in reporting his data and that the correlations were lower than he reported. However, Burt's work formed the basis of subsequent research by Arthur Jensen (b. 1923), who claimed in a 1969 article in the *Harvard Educational Review* that biological differences between individuals of different races are responsible for differences in IQ between white and African American students. Jensen's article incited sharp reactions from the American Anthropological Society and the Society for the Psychological Study of Social Issues, a division of the American Psychological Association.

John L. Horn (1928–2006) and Raymond Cattell published several important articles on the theory of fluid and crystallized intelligence in 1966. This theory assumes the existence of a general entity of intelligence and divides it into a fluid general intelligence (*fg*) and crystallized general intelligence (*cg*). The former refers to the ability to draw inferences and understand relationships in new situations, while the latter refers to abilities dependent on knowledge and experience. In its simplest version, crystallized intelligence is said to increase over time, while fluid intelligence declines with age. This theory generated controversy because of test results indicating racial group differences in fluid intelligence.

American psychologist Richard Herrnstein (1930–1994) and political scientist Charles Murray (b. 1943) published *The Bell Curve* in 1994. This book claims that intelligence is one of the most important factors in socioeconomic success in the United States. It also claims that IQ plays a role in socioeconomic differences among races. Both the American Anthropological Association and the American Psychological Association responded to the controversy surrounding publication of *The Bell Curve*. In December 1994,

the American Anthropological Association issued an official statement in response, disputing the existence of biological racial categories as a concept with any value for explaining human variation in intelligence or other traits. In 1996, the American Psychological Association published “Intelligence: Known and Unknowns” (Neisser et al., 1996). This paper acknowledges group differences between whites and African Americans, but claims that the reasons for these differences are unknown.

Development of Multiple Intelligences Testing

Although many researchers in the early 20th century believed that intelligence was a single biological entity, others challenged this view. American psychologist Louis Thurston (1887–1955) disputed the results of Spearman’s factor analysis. Thurston’s 1938 book *Primary Mental Abilities* proposed that intelligence is not a single factor. Thurston claimed that intelligence is composed of seven primary abilities or factors: word fluency, verbal comprehension, spatial processing, ability to perform numeric calculations, memory, induction, and perceptual speed. Thurston’s work in statistics has been disputed; however, it laid a foundation for the view that does not accept the concept of a general intelligence.

Canadian psychologist George A. Ferguson (b. 1914) published “On Transfer and the Abilities of Man” in 1956. Ferguson argued that culture plays a critical role in learning. Ferguson admitted that biology fixes limits for learning but disputed the idea that intelligence is biologically determined. He argued that society has an obligation to provide educational processes to improve outcomes for its people. Ferguson influenced the work of John Berry.

Canadian cultural psychologist John Berry (b. 1939) published the controversial book chapter “Radical Cultural Relativism and the Concept of Intelligence” in 1974. Berry rejected assumed universals across cultural systems, claiming that intelligence can only be understood as an indigenous construct within a cultural context. This work challenged the practice of using Western intelligence testing cross-culturally. In subsequent publications, Berry accepted biologically universal concepts such as memory but posited ecological influences as the most important factors in determining intelligence.

In 1974, American psychologist Leon Kamin (b. 1928) published *The Science and Politics of IQ*, in which he claimed that there was no evidence that IQ was heritable. Kamin’s book was instrumental in discrediting Cyril Burt’s research on identical twins reared apart. German-born psychologist Hans Eysenck (1916–1997), who had studied under Burt in London, challenged Kamin’s attack on Burt. However, Kamin’s criticism of Burt was followed by further examination, resulting in a

general disbelief in Burt’s results. Kamin’s claim that there is no evidence for the genetic basis of intelligence remains controversial. However, his work has been influential on educational practices, such as tracking students by ability.

In 1977, two issues of the journal *Principal* were brought out in the book *The Myth of Measurability*. This book, edited by Paul L. Houts (b. 1937), the journal’s director of publications and editor, contains 29 papers that are highly critical of general tests for intelligence. The book includes articles dealing with issues of cultural bias and articles claiming that general intelligence does not exist. This controversial book encouraged the development of theories of multiple intelligences.

American paleontologist, evolutionary biologist, and historian of science Stephen J. Gould (1941–2002) published *The Mismeasure of Man* in 1981. Gould argued against the concepts of generalized intelligence, the heritability of intelligence, and the ranking of individuals by IQ. This book generated a great deal of controversy and there were claims that the book contained inaccuracies.

In 1983, American psychologist Howard Gardner (b. 1943) published *Frames of Mind*. Gardner reviewed the data in studies of intelligence using eight criteria for indicators of intelligence:

1. Potential isolation by brain damage
2. The existence of idiots savants, prodigies, and other exceptional individuals
3. An identifiable core operation or set of operations
4. A distinctive development history, along with a definable set of “end-state” performances
5. An evolutionary history and evolutionary plausibility
6. Support from experimental psychological tasks
7. Support from psychometric findings
8. Susceptibility to encoding in a symbol system

Gardner suggested the existence of seven separate intelligences: linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial, interpersonal, and intrapersonal. This work played an important role in setting criteria that could be used to evaluate separate intelligences and has been incorporated into teaching methods. However, a way of assessing the individual intelligences has not been published or endorsed by Gardner.

Robert Sternberg (b. 1949) published *Beyond IQ: A Triarchic Theory of Human Intelligence* in 1985. Sternberg believes intelligence comprises three components: the analytical, the creative, and the practical. Sternberg believes intelligence must be translated into real-life success and is dependent on motivation, perseverance, and self-control. In 1991 he proposed the Sternberg Triarchic Abilities Test (STAT) to measure his theory of intelligence. Because the triarchic theory includes an assessment tool, it provides a possible alternative to IQ testing that assumes an overall general intelligence. This test is used in cross-cultural research.

Cultural Bias in Modern General Intelligence Tests

The existence of a general intelligence that drives the ability to reason, plan, problem solve, and think abstractly remains theoretically controversial. The main criticism of these tests has been that they are culturally biased. Cultural bias can be a problem for use internationally and for use with minority ethnic groups in the country that developed the test. An example of a culturally biased test item would be an analogy question involving snow given to young children in Hawai'i, who may have never experienced snow.

The Stanford-Binet V of 2003 is an IQ test that is used to assess individuals between the ages of 2 and 90. Some important characteristics of the original test have remained. The test is still untimed and given individually by a trained examiner. However, it has been altered so that verbal and nonverbal skills are weighted equally. Also, it is no longer based on mental age. Instead the deviation IQ measures a person's performance relative to others of the same chronological age. The test has been statistically renormalized against a large population so that the results of individual assessments can be statistically compared with those of a large up-to-date base population. However, there is still some controversy as to the accuracy and cultural bias of the test.

The Wechsler Intelligence Scales include the Wechsler Adult Intelligence Scale (WAIS), Wechsler Intelligence Test for Children (WISC), and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI). The WAIS IV of 2008 and the WISC IV of 2003 include a composite general intelligence score and subtests measuring verbal comprehension, perceptual reasoning, working memory, and processing speed. The WPPSI III of 2003 provides subtest scores in verbal and performance cognitive domains, and includes a composite general intelligence score. Although the tests have been modified and updated, there are still claims of cultural bias in the Wechsler Intelligence Scales.

Raven's Progressive Matrices Test is an untimed nonverbal assessment of abstract reasoning. The test questions require the participant to identify the missing segment necessary to complete a larger pattern. Three versions of the test exist: Standard Progressive Matrices (all ages), Colored Progressive Matrices (children only), and Advanced Progressive Matrices (all ages with above-average intelligence). This test can be used for assessing individuals with language deficits. Because the test does not require competence in any language, it is useful internationally. This test has generated some controversy over its use in some third world countries, such as South Africa. It is claimed that cultural differences render the test inappropriate to some groups.

The theory of fluid and crystallized intelligence put forward by John Horn and Raymond Cattell was incorporated into the Kaufman Adolescent and Adult Intelligence Test (KAIT), first published in 1993. The fluid portion of the

KAIT tests for the ability to decode picture-words and to solve logic problems. The crystallized portion tests comprehension of oral stories, words with double meanings, and definitions. The KAIT has been criticized for its lack of multicultural consideration.

Cultural Bias and Achievement Tests/Aptitude Tests

While intelligence tests are designed to measure general thinking abilities, achievement/aptitude tests are designed to test specific knowledge acquisition. However, standardized achievement/aptitude tests are highly correlated with IQ scores and are frequently included in the controversy of cultural bias. Examples include the Armed Services Vocational Aptitude Battery (ASVAB), the SAT (formerly Scholastic Aptitude Test or Scholastic Assessment Test), the Graduate Record Examination (GRE), and the Law School Admission test (LSAT).

The SAT, originally known as the Scholastic Aptitude Test, was first used in 1926 as a measurement of a student's level of preparation for college work. The SAT was most recently updated in 2005, with the introduction of a writing section. The current version assesses critical reading, mathematics, and writing. Use of the test as an assessment of college preparedness is controversial because of charges that it is culturally biased. A 2006 *USA Today* article (Bruno, 2006) reported that many liberal arts colleges, including Bowdoin, Middlebury, Hamilton, and Bates, have made the SAT optional. The National Collegiate Athletic Association 2008 eligibility requirements for incoming Division I freshmen do not have a minimum SAT requirement. Instead, freshman eligibility is judged on a sliding scale incorporating both grade point average (GPA) and combined scores of the reading and mathematics sections of the SAT. A Division I incoming freshman with a GPA of 3.5 or over requires a combined mathematics and reading score of 400; a student with a GPA of 2.0 must have a combined score of 1010.

The ASVAB was introduced as an assessment tool in 1968 and was most recently updated in 2002. Although the official ASVAB site claims that the test is not an intelligence test, the test is used to sort individuals for military placement and as a tool for career placement in high schools. The ASVAB is controversial both because of charges that it is culturally biased and because the military uses it to recruit high school seniors who are given the test for occupational testing. The ASVAB tests knowledge in eight areas: general science, arithmetic reasoning, word knowledge, paragraph comprehension, mathematics knowledge, electronics information, auto and shop information, and mechanical comprehension.

A group called FairTest, first formed in 1985, monitors standardized tests for evidence of bias. This group tries to

ensure that tests are reliable, valid, and used appropriately. FairTest has also been active in lobbying for more access to test data and the establishment of alternative testing procedures.

The Nature-Nurture Controversy

Most researchers accept that intelligence is based on both genetic and environmental factors. Some researchers have taken extreme positions, such as those mentioned above of British psychologist Cyril Burt and Canadian cultural psychologist John Berry.

Genetic Factors and Intelligence

Heritability of Intelligence

Heritability refers to the proportion of a characteristic that is attributable to genetic variance. It is a population concept that ranges from a proportion of 0.0 to 1.0. A heritability of .50 would indicate, on average, 50% of the individual differences that we observe in a trait or behavior are attributable to genetic individual differences in the population. It does not mean that 50% of any person's trait or behavior is due to genes and the other 50% is due to environment. Heritability depends on the range of typical environments in the population that is studied. If the environment of the population is fairly uniform, then heritability can be high, but if the range of environmental differences is large, then heritability can be low.

According to a 1996 review of the literature on intelligence published by the American Psychological Association, the heritability of intelligence varies with age. Research indicates that in children it is estimated to be about .45, while in adults it is estimated to be .75. This means that as children grow up, intelligence test scores tend to increasingly reflect their specific genes and individual experiences rather than differences among the families in which they were raised. The reasons for the shift are unknown. It should be noted that most of the available studies included in the review dealt with white Americans and that the lack of subjects from other cultural backgrounds in the study is a known limitation.

Twin Studies

Although Francis Galton did not originate the use of twin studies, he was the first researcher to make use of the genetic similarity between twins to study the nature-nurture question. The results of his study were published in an 1876 article, "The History of Twins as a Criterion of the Relative Powers of Nature and Nurture." Unfortunately, the difference between monozygotic (identical) and dizygotic (fraternal) twins was not understood at that time, which limits the usefulness of his research.

Monozygotic twins have 100% genetic similarity, while dizygotic twins have approximately 50% genetic similarity. The most powerful type of twin study involves comparing adopted monozygotic twins reared separately with monozygotic twins reared in the same home. These studies assume that twins reared in the same home will experience the same environment, while twins reared apart will have different environments. Since ethics prevents twins being deliberately placed in extreme environments, the effects of environments that are radically different cannot really be tested.

The first well-known modern twin studies were performed by British psychologist Cyril Burt in the 1950s. Burt reported in several studies that monozygotic twins reared together had almost perfect correlations in intelligence tests and that monozygotic twins reared apart had only slightly less strong correlations. He used his test results to claim that biology is the only important factor in intelligence, as noted earlier. American psychologist Leon Kamin discredited Burt's work in 1974. It is now believed that Burt was either extremely careless or dishonest in reporting his results. A literature review published in 1997 by Thomas Bouchard (b. 1937), director of the Minnesota Center for Twin and Adoption Research at the University of Minnesota, gives the average correlation of intelligence tests between identical twins reared apart as 75%.

Intelligence as a Cultural Construct

The strong view that John Berry posited in 1974 claims that intelligence can only be viewed as a cultural construct. In later publications with other researchers, Berry proposed the law of cultural differentiation or Ferguson's law based on the following quote from Ferguson's 1956 paper on cognitive transfer: "Cultural factors prescribe what shall be learned and at what age; consequently different cultural environments lead to the development of different patterns of ability." This view of intelligence is controversial.

Researchers such as Hans Eysenck and Arthur Jensen, who believe that intelligence is the same cross-culturally, contest this view and believe that properly translated tools can be successfully used internationally. American psychologist Robert Sternberg has argued for a middle position, claiming that intelligence is the same across cultures but that the instruments of measurement are not. Sternberg believes that the components of intelligence are universal but that the types and items of knowledge vary across cultures.

A literature review by Sternberg in 2007 provides examples of modern views of intelligence in China and Africa. A 1994 study conducted in Taiwan argues that the Chinese conception of intelligence involves three factors: nonverbal reasoning ability, verbal reasoning ability, and rote memory. A 1997 study also conducted in Taiwan argues that the

Chinese view of intelligence involves five factors: a general cognitive factor, interpersonal intelligence, intrapersonal intelligence, intellectual self-assertion, and intellectual self-effacement. A 1996 study of Chewa adults in Zambia claims that this group considers intelligence to consist of performance in three areas: social responsibilities, obedience, and cooperativeness. Sternberg's review of the literature makes clear the need for more cross-cultural research on intelligence.

Intelligence and Gender

Before educational opportunities for women were equal to those for men, it was frequently assumed that males had intelligence that was superior to that of females. Modern research has not found significant gender effects for intelligence. Most research has found differences in patterns of mental abilities rather than differences in overall intelligence. Visual-spatial and mathematical abilities are generally superior for males, while verbal and memory abilities are generally higher for females.

However, some researchers are still pursuing this line of research. Canadian psychologist Phillippe Rushton (b. 1943) and other researchers used biological measures, such as head size, and academic achievement tests, such as the SAT, to claim that males have superior intelligence (Jackson & Rushton, 2006). The addition of the writing section to the SAT may address this issue, since females generally outperform males in language abilities.

Intelligence and Race

General intelligence tests in the United States consistently find group differences for race. Some researchers, such as Arthur Jensen and Phillippe Rushton, continue to argue that biological differences between races are responsible for group differences in intelligence test results. Other researchers, such as Leon Kamin, argue that environmental factors are responsible for group differences. The American Psychological Association acknowledges differences in group results but claims that the reasons are unknown. The American Anthropological Association claims that race is not a valid category.

The Bell Curve

American psychologists Richard Herrnstein (1930–1994) and political scientist Charles Murray (b. 1943) published *The Bell Curve* in 1994. This book claims that intelligence is one of the most important factors in socioeconomic success in the United States. It also claims that IQ plays a role in socioeconomic differences between races. Both the American Anthropological Association and the American Psychological Association responded to the controversy surrounding publication of *The Bell Curve*.

Official Statement of the American Anthropological Association

The American Anthropological Association released the following statement in December 1994 in response to the controversy surrounding the publication of *The Bell Curve* earlier that year:

The American Anthropological Association (AAA) is deeply concerned by recent public discussions which imply that intelligence is biologically determined by race. Repeatedly challenged by scientists, nevertheless these ideas continue to be advanced. Such discussions distract public and scholarly attention from and diminish support for the collective challenge to ensure equal opportunities for all people, regardless of ethnicity or phenotypic variation . . . ,

WHEREAS all human beings are members of one species, *Homo sapiens*, and

WHEREAS, differentiating species into biologically defined "races" has proven meaningless and unscientific as a way of explaining variation (whether in intelligence or other traits),

THEREFORE, the American Anthropological Association urges the academy, our political leaders and our communities to affirm, without distraction by mistaken claims of racially determined intelligence, the common stake in assuring equal opportunity, in respecting diversity and in securing a harmonious quality of life for all people.

Literature Review From the American Psychological Association

The following quote is taken from a paper published by the American Psychological Association in 1995. Prompted by the public controversy surrounding the publication of *The Bell Curve* in 1994, this paper reviews the relevant literature on intelligence and summarizes important findings:

Differences in genetic endowment contribute substantially to individual differences in (psychometric) intelligence, but the pathway by which genes produce their effects is still unknown. The impact of genetic differences appears to increase with age, but we do not know why.

Environmental factors also contribute substantially to the development of intelligence, but we do not clearly understand what those factors are or how they work. Attendance at school is certainly important, for example, but we do not know what aspects of schooling are critical. . . .

The differential between the mean intelligence test scores of Blacks and Whites (about one standard deviation, although it may be diminishing) does not result from any obvious biases in test construction and administration, nor does it simply reflect differences in socioeconomic status. Explanations based on factors of caste and culture may be appropriate, but so far have little direct empirical support. There is certainly no such support for a genetic interpretation. At present, no one knows what causes this differential.

Controversies in Group Results

Controversies in education, immigration, hiring practices, and reproductive freedom have all been affected by group results in general IQ tests. The manner in which the results affect society is influenced by views of the nature-nurture debate.

Policy and Legal Controversies in Education

Head Start

American educational researcher Benjamin Bloom (1913–1999) published *Stability and Change in Human Characteristics* in 1964. Bloom's book rejects the view of biological determinism for intelligence and advocates the mastery of educational goals for all children. Bloom's work was influential in the establishment of the Head Start program in 1964.

In 1969, Arthur Jensen, an educational psychologist at the University of California, Berkeley published the highly controversial article mentioned previously, "How Much Can We Boost IQ and Scholastic Achievement?" In this article, Jensen argues that programs such as Head Start, which were designed to promote school readiness by enhancing the social and cognitive development of children, could never succeed because of the heritability of IQ. Jensen claims that the lower IQ scores of African Americans are caused primarily by racial differences. The article led to protests outside his office in Berkeley and numerous publications disputing his claims. The Society for the Psychological Study of Social Issues, a division of the American Psychological Society, issued a five-page statement to news agencies outlining their disagreement with Jensen's conclusions. The 1969 convention of the American Anthropological Society passed a resolution condemning him. The controversy surrounding Jensen brought to light the polarized views of the nature-nurture controversy and the way in which they impact views of educational policy.

In 2005, a review of the intelligence literature by Rushton and Jensen was published in *Psychology, Public Policy, and Law*. The authors defend Jensen's original position on Head Start and argue for the abolishment of affirmative action. A reply by Robert Sternberg challenging this view was printed in the same journal issue (Sternberg, 2005).

Tracking and Special Education

The federal suit *Hobson v. Hansen* in 1967 had a huge impact on the use of group-administered IQ tests for school tracking. The Hobson case claimed that the tracking program then in place in the Washington, D.C., public schools violated Title VI of the Civil Rights act of 1964. The evidence in the case was based on the disproportionate number of African American children in the lower-ability

tracks. Judge Skelly Wright ruled that the tests were racially biased. This ruling eliminated the tracking system in the D.C. public schools.

One of the most important legal cases involving education policy is *Larry P. v. Wilson Riles*. The parents of seven African American children brought suit against the State of California in November 1971, claiming that their children had been incorrectly placed in classes for the educable mentally retarded (EMR), based on the children's scores on an IQ test. This suit claimed that the individually administered IQ test was culturally biased. During the course of the trial, Judge Robert Peckham granted a temporary injunction halting any future placement of African American children into EMR classes on the basis of intelligence tests. In 1979, Judge Peckham ruled that the tests were culturally biased. The verdict was upheld by the U.S. Court of Appeals for the Ninth Circuit in 1984. In 1992, a federal judge ruled that African American students could be given intelligence tests at the request of their parents.

Employment and IQ Testing

U.S. employers' use of intelligence testing in hiring practices increased from 26% in 1940 to 63% in 1957. The federal government played a role in increasing employer testing by making intelligence tests available free of charge through the U.S. Employment Service, which was founded by the Wagner-Peyser Act of 1933. However, controversy over the use of intelligence testing in the workplace led to lawsuits.

The case of *Griggs v. Duke Power Company* set important precedent for the use of intelligence testing by employers. A group of African American employees brought suit against the power company, claiming that their rights were being violated under the Civil Rights Act of 1964. The company had a policy of requiring a high school diploma and a satisfactory intelligence score for certain jobs. The effect of the policy was to maintain the practice of segregation that had been in place prior to the passage of the Civil Rights Act. The U.S. Supreme Court ruled on March 8, 1971, that employers could use general intelligence test scores only in special circumstances. The ruling specified that high school diplomas and minimum scores on general intelligence tests could be used as job requirements only if they could be shown to significantly relate to job performance.

In 1989, the Committee on the General Aptitude Test Battery published *Fairness in Employment Testing*. This report deals with a proposal by the U.S. Department of Labor to promote use of the General Aptitude Test Battery throughout the U.S. Employment Service. The report concludes that test score adjustments are necessary for African Americans and Hispanics because of test bias.

The Law and Sterilization Based on IQ

The eugenics movement in the United States advocated for the use of compulsory sterilization of individuals with

low intelligence or mental illness. Indiana became the first state to pass a compulsory sterilization law in 1907. California and Washington passed similar laws in 1909. In *Buck v. Bell*, the U.S. Supreme Court upheld the 1924 Virginia law requiring sterilization of the mentally retarded. The ruling on this case encouraged other states, and eventually 33 states passed compulsory sterilization laws. The Virginia law was repealed in 1974, following a national trend to discontinue the practice.

In Canada, the province of Alberta passed the Sexual Sterilization Act in 1928 (Grekul, Krahn, & Odynak, 2004). A four-member Alberta Eugenics Board was created to oversee approval of procedures. The Sterilization Act was used as a basis for compulsory sterilization of over 2,800 people between 1929 and 1972, when the act was repealed. Aboriginals were particularly targeted by the Alberta Eugenics Board. In 1995, Leilani Muir successfully sued the Alberta government for performing a wrongful sterilization on her in 1959, and she was awarded \$740,000 in damages and \$230,000 in legal costs. After Muir's case was decided, a class action lawsuit on behalf of other sterilized individuals reached an out-of-court settlement with the government of Alberta. Approximately 700 people were awarded damages for wrongful sterilization.

After taking power in Germany, the Nazi government introduced the 1933 Law for the Prevention of Offspring with Hereditary Diseases. This law required all physicians to register every case of hereditary illness, including low IQ. Only women over the age of 45 were exempt, since they were considered too old to produce children. The law was used as a basis for the forced sterilization of over 400,000 people between 1934 and 1937.

IQ Testing and Immigration Policy

The public perception of immigrants from certain countries was influenced by Henry Goddard's work on Ellis Island in 1913 and Robert Yerkes's work on U.S. Army testing during World War I. Belief in the intellectual inferiority of certain peoples led to passage of the Immigration Restriction Act of 1924. This law introduced quotas for countries in Southern and Eastern Europe and eliminated immigration from Asia. This law remained in effect until passage of the Immigration and Nationality Act of 1965.

Conclusion

All cultures value intelligence. Western culture developed IQ testing that reflected the cultural values and scientific beliefs that were held at the time the tests were developed. Divergent beliefs and values are reflected in the controversies surrounding IQ testing. There are three major issues for IQ: the question of whether there is a single general intelligence or multiple intelligences, the nature-nurture debate, and the use of IQ tests in policy and legal decisions.

The first of these three questions has not been answered. Instead the two views are reflected in different usages. General intelligence tests are used to screen for special education and as a gatekeeper for gifted programs in public schools. The theory of multiple intelligences has been incorporated into curriculum theory for teaching purposes and is used for cross-cultural research. Although most researchers accept that the interaction of genetics and environment determines intelligence, the topic still excites controversy. The use of group results for policy and legal decisions remains an important controversy. As recently as 2005, Rushton and Jensen advocated changing public policies, such as affirmative action, because African Americans' scores on intelligence tests were lower than those of other groups.

Recent research has provided new insights about the views of intelligence in other cultures. Further cross-cultural research is needed to help answer the controversial issues in intelligence testing.

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HUMAN LONGEVITY AND WORLD POPULATION

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The link between human longevity and world population seems direct and obvious: The world population is increasing, and the proportion of elderly is increasing as well, as more humans are living longer. Will human life span increase infinitely? Why is there an aging process? How does human longevity compare to that of other primates? How did longevity change over human evolutionary history? What follows is a review of research examining these questions and other aspects of human longevity and a discussion of world population growth.

Definitions of Longevity

Longevity, or life span, is the period of time between the birth and death of an organism. This definition is misleadingly straightforward, because the point when life begins and ends is a matter of some arbitrariness. Although most definitions of life would begin with birth, arguments have been made that life begins at various points before birth—for example, fertilization, implantation, beginning of the third trimester in humans, or after birth, as can be seen in the effective age calculations for prematurely born babies. The point of birth that is culturally acknowledged adds further variation in the concept of birth.

Most definitions of death include cessation of breath and heartbeats, but arguments have been made for different kinds of deaths, as not all organs in a body cease to function at the same time—for example, brain death. As in the case of life, the point of death that is culturally acknowledged

can vary from biological point of death. However, the range of variation in the beginning and ending points is small compared to the total length of life span.

It is thought that maximum life span is biologically determined and not variable. The maximum life span can be empirically noted by observing the longest survival of an individual member of a species, which provides the minimum threshold of the maximum life span. This is a difficult challenge for studying long-lived organisms such as humans, since researchers do not outlive the subjects and cannot record births and deaths. Researchers have to rely on records and age estimations. Living to the age of 100 is unlikely for humans, but not rare: About 7 in 1,000 people are estimated to reach the centenarian milestone. Beyond 100, surviving each additional year is subject to a 50% probability. The maximum human life span is estimated to be between 115 and 150 years, with the longest-lived human on record having lived 122 years (died in 1997). The majority of centenarians are women, and most of the oldest old are women. Reasons for sex differences in longevity are not clear, although many have attributed it to greater testosterone-driven mortality in males.

As a group, primates show a strong tendency for increased longevity as a result of long gestation, long maturation, and long adulthood. Cross-species comparisons of life spans that are explained by biological variables such as brain size, body size, metabolic rate, and body temperature have yielded statistically significant relationships (Cutler, 1975; Sacher, 1978), which suggest that life span is an evolutionary variable that contributes to the fitness of a species. The maximum life spans of most mammalian species form a straight line when

they are plotted against various biological variables. Human life span is not noteworthy, given that there are many other mammals, such as whales and elephants, with life spans as long as or longer than those of humans. While human life span falls within the expected range based on brain size, it is extraordinarily long for body size (Hill, 1993). However, the statistical nature of such studies should be kept in mind. Human life span easily exceeds 90 when looking at the species as a whole, after sampling millions of people; however, a random sample of a village population would more likely yield 60 or 70 years of average life span. In contrast, life span data for nonhumans are based on a very small sample. It is unknown how much of the life span differences are attributable to the extreme discrepancy in sample sizes.

The maximum potential life span of humans is longer than that of other great apes. Among hunter-gatherers, life spans in the 70s and 80s are well-known, while chimpanzees in the wild rarely reach 45 years of age, and orangutans in the wild, 50 years. Even in captivity, maximum life span on record is about 60 years for apes, in contrast to the markedly longer life span of the oldest human on record.

Making a uniformitarian assumption that the relationships between body size, brain size, and maximum life span that are observed in the present are as valid for species in the past, maximum life span can be estimated for various fossil human ancestors (hominids; Weiss, 1981). The maximum life span for hominids that existed before the genus *Homo* came into being (*Australopithecus africanus*, *A. robustus*, and *A. boisei*) is around 50. The value increases with *Homo habilis* at 61, *Homo erectus* at 69 and 78, archaic *Homo* at 89, and more than 90 years of life span is predicted for Neanderthals as well as modern humans (Weiss, 1981). There is an increase in the estimated maximum life span through the years. This acceleration of the increase in maximum life span plateaus with the modern humans. However, it should be remembered that the estimation of maximum life span of fossil hominids was based on estimated brain size and body size. Therefore, the observed increase pattern in maximum life span is actually the increase pattern in brain size and body size over time.

While maximum life span implies a biological limit to how long an individual lives, average life span is estimated from the mortality data. Although maximum life span for humans is more than 100 years, the average life span is over 70 years. This is a substantial increase from less than 30 years, which was the average life span for humans from the time of ancient Greece until the 18th century. The life expectancy at birth in North America and northwestern Europe is thought to have been 35 to 40 years until the end of the 18th century. Despite the increase in average life span, there is no evidence of increase in the maximum life span. There is no evidence that mortality of centenarians decreased: The increase in the number of centenarians is a result of the decrease in mortality for people under 100 years of age. It seems to be the case that the trend is for more people to reach the maximum life span rather than for the maximum life span to increase. Few studies show that maximum life span has changed much over time (Wilmoth & Robine, 2003).

In contrast, if human longevity is defined as average life expectancy, it has increased over time. Life span is related to, but different from, life expectancy, which is a hypothetical number derived from mortality tables. Life expectancy is the number of years that a cohort is expected to live. Life expectancy at a specific age is the average number of years the cohort (those born into a population at the same time) will live to be.

Estimated life expectancy through human evolution has increased. Since it is impossible to get an accurate measurement of life expectancy, it is estimated by using demographic models. Assuming a stationary population (zero growth), life expectancy at birth is the inverse of the crude birth rate. Based on the life tables collected for anthropological societies, the crude birth rate for hunter-gatherers is around 0.045, which yields life expectancy at birth to be 22 years (Weiss, 1973). In contrast, life expectancy at birth in some developed countries is more than 75. When life expectancies at different points in life (birth, puberty, old age) are compared, it can be seen that life expectancy at birth is the one that changes the most, followed by life expectancy at puberty; life expectancy at old age has not changed much over time.

Humans have a distinctively long average adult life span. While great ape females in the wild who survive to age 15 can be expected to live 15 to 20 more years (Hill et al., 2001; Wich et al., 2004), humans of forager populations who survive to age 15 can be expected to live at least 30 more years (Blurton Jones, Hawkes, & O'Connell, 2002; Hill & Hurtado, 1996; Howell, 1979). The average adult life span beyond maturity for Ache hunter-gatherers is about 42 years (Goodall, 1986; Hill & Hurtado, 1996).

Fossil data show that adult survivorship increased quite recently in human evolution. Adult survivorship has been very low for much of human evolution, increasing dramatically with the modern humans of the Upper Paleolithic age (Caspari & Lee, 2004). Further work has shown that this increase in adult survivorship is not a direct consequence of the emergence of modern humans as a taxon (Caspari & Lee, 2006).

Although the adoption of agriculture is believed to have led to population growth, it is not clear that it was accompanied by an increase in longevity: In other words, although more people were born, they were not living longer. A substantial increase in longevity took place only after the Industrial Revolution, probably due to better nutrition and public hygiene measures that reduced infectious diseases, which decreased adult mortality. Advances in biomedicine started to play a big role in longevity only in the 20th century.

Considering the plasticity of longevity, it can be concluded that the differences in life expectancy between different populations are due to external mortality differences originating from physical and cultural environments. Across populations, mortality causes are the same, but in different order of importance. Extensive study of populations shows that there is a strong relationship between different causes of death and life expectancy (Preston, Keyfitz, & Schoen, 1972): Extrinsic causes of mortality, such as infectious diseases, are correlated with a higher crude death rate (the number of deaths each year in a population), while chronic degenerative diseases, such as

cancer and cardiovascular diseases, are correlated with a lower crude death rate. Considering that infectious diseases affect a younger demography, while chronic degenerative diseases are more likely to affect an older demography, a higher incidence of chronic degenerative diseases in a population implies that more people have survived longer to be subject to chronic degenerative diseases. In other words, the increase in life expectancy that has been seen since the Industrial Revolution is likely due to a decrease in the number of deaths due to infectious diseases.

Aging and Longevity in Humans

Humans are distinctive in having a long life span, a slow aging process, and a long postreproductive life span. Chimpanzees in the wild start a visible aging process characterized by external appearance of frailty and senescence in their 30s (Goodall, 1986), and once they reach this age, they seem to age rapidly, dying by age 40. In comparison, humans show a slow aging process, with muscular strength declining over several decades. However, a lot more research on the aging process of nonhuman primates would be necessary to arrive at a sound conclusion with comparative data on performance.

Longer adult life spans can be explained by lower adult mortality rates. Typically, mortality rate is highest for infants, decreases during childhood to reach a minimum at puberty, and increases after adulthood. Case studies of supercentenarians suggest that mortality plateaus after a certain point. Humans have low adult mortality rates compared to nonhuman primates and other mammals of similar body size. The adult mortality rate for humans doubles every 8 years, while for mice it doubles every 120 days (Hill, 1993). The decrease in adult mortality rates can be explained by a lower extrinsic mortality rate, which is determined by predation and environmental hazards (Harvey & Nee, 1991). With a lower extrinsic mortality rate, adults will live long enough to die from age-specific frailty (Robson, van Schaik, & Hawkes, 2006); therefore, senescence rates are directly related to the extrinsic mortality rate. A slower rate of aging among humans would lead to greater differences in maximum life spans between humans and great apes (Hawkes, 2003).

One unique aspect of human longevity is the long postreproductive phase, especially for women. In mammals, females are born with a store of oocytes that then go through the final stage of oogenesis and ovulation (release of egg) during the reproductive phase of life. Once the number of remaining oocytes nears zero, reproductive senescence begins, and reproduction ceases. Cessation of the menstrual cycle is called menopause. A mammalian female will experience menopause, if she lives long enough. Likewise in human females, ovulatory cycling stops when there are not enough oocytes to stimulate ovulation. However, in nonhuman species, there is more or less a correspondence of reproductive and somatic senescence; humans, in particular women, are unique in that reproductive senescence occurs far before somatic senescence. In fact, women can be expected to live 25 years or more after menopause; a woman

undergoing menopause does not experience a corresponding aging process in other parts of her body.

Although not enough research has been done to document age-specific changes in fertility and fecundity in older female nonhuman primates, the few studies of captive female primates show that the age at which fertility declines for these females, about 45, is similar to that of human females. This suggests that the timing of menopause is consistent through different taxa; women undergo menopause in accordance with other primate species. What is unusual in humans is the slow rate of aging beyond menopause resulting in a long postreproductive period.

The long postreproductive phase for humans, specifically human females, is a rare phenomenon in biology and therefore warrants attention. Menopause is unique in the sense that women cease to be reproductive while survival probability is still quite high and will remain so for many years. This phenomenon is found only in humans; it is not observed in nonhuman primate females, who do not live for an extended period beyond the cessation of ovulation (Pavelka & Fedigan, 1991). The grandmother hypothesis proposes to explain the extended postreproductive period by positing that human females maximized reproductive fitness by helping their daughters take care of their own offspring (Hawkes, O'Connell, Blurton Jones, Alvarez, & Charnov, 1998). The hypothesis received much attention, but it still needs strong empirical support (Hill & Hurtado, 1991).

Theories on the Evolution of Longevity and Aging

The idea of an innate biological limit of life span is supported by the observation that maximum life span does not seem to change over time. In addition, there seems to be a limited number of cell divisions *in vitro* even when the medium is kept fresh. It is not clear that the same limit applies to cells *in vivo*. However, some consider it evidential for programmed death.

Although some have argued for a nonevolutionary explanation of life span and aging, an emerging consensus is that life span and aging are processes that are possibly subject to natural selection. In this view, life span is extended or shortened as a result of selection. One explanation for aging lies in pleiotropy or antagonistic pleiotropy: That is, the same gene responsible for benefits early in life is also responsible for aging and deterioration late in life (Williams, 1957). Since increasingly fewer individuals survive to older age, there will be fewer in the age cohort, and consequently deleterious effects will not be under strong selection; likewise, a gene that confers a slight advantage early in life, when there is stronger selection due to larger population size, would be selected for even if it causes a major deleterious effect later in life. A version of the antagonistic pleiotropy theory is the disposable soma theory, which explains senescence (Kirkwood & Rose, 1991). The proponents of the disposable soma theory argue that energy needs to be used for somatic maintenance and repair. Reproductive efforts divert the

energy away from such somatic repair and maintenance, resulting in a tradeoff between survival and reproduction. Natural selection will favor energy allocation to reproduction at the expense of somatic maintenance, and therefore infinite survival is not achieved.

The decrease of mortality results in the increase in average life expectancy, as more people survive to later age. There are two components of death (mortality): external mortality, due to environment, and internal mortality, referring to the presumably innate biological limit of life span. In theory at least, there is a distinct difference between extrinsic and intrinsic mortality: Extrinsic mortality refers to mortality sources that are not results of reproductive and other life history decisions; intrinsic mortality refers to mortality that is not influenced by extrinsic sources and is, therefore, implicitly innate. Accordingly, aging can be defined as an increase in the intrinsic mortality with age. It is often assumed that internal mortality is specific to a species, while external mortality can be variable due to environmental factors including food supply, diseases, and accidents. In modern days, external factors also include medicine and public health measures. However, it is not easy to distinguish between intrinsic and extrinsic effects using empirical data. Once an individual survives all external mortality factors, senescence starts the process in which the individual's likelihood of survival declines. The aging process is not well studied among organisms in the natural habitat, because few survive to be old.

A useful theory to explain life span comes from the evolutionary perspective, which views life span as a balance between external and internal forces (Stearns, 1992). External forces lengthen life span by changing the relative value of adults versus offspring. If adult mortality is low and not variable compared to juvenile mortality, allotting resources for repair and maintenance of adult soma retains value; hence, there is selective advantage on extending adult life span. However, if adult mortality is high and variable compared to juvenile mortality, selection for adult life span becomes weak; as a result, aging effects accumulate and life span shortens.

The contribution of genetics to life span is not clear, nor is the effect of environment. Although genetics have been shown to influence life span in organisms such as nematodes and fruit flies, even nematode longevity seems to be plastic, with great variation in aging and life span. Although it is often said that long life runs in families, this does not directly point to a high heritability of longevity as a trait. This is because human families share more than genetics; they share lifestyle, wealth, education, socioeconomic status, and so forth. Therefore, even if a strong familial connection is shown, it does not lead to a clear conclusion about the genetics of human longevity. Studies on monozygotic twins also support plasticity of longevity.

The idea that aging is programmed for the fitness of the species (Weismann, 1889) has not received much support, because most organisms in the wild do not live long enough for the aging trait to be effective, and because group selection in general is not supported. The programmed aging hypothesis has not been supported by empirical evidence, either. Although several genes have been discovered to extend

longevity in their mutant form, no gene has been discovered that completely eliminates aging altogether in its mutant form.

Current evolutionary thinking on aging takes a combination of the mutation accumulation model and the antagonistic pleiotropy model. The mutation accumulation model posits that late-acting mutations will remain in the genome, even if they are detrimental to survival and reproduction, if not many individuals live long for these mutations to be exhibited due to high extrinsic mortality. Because of weak selective force, such mutations accumulate over generations, and the accumulative effect will result in aging for those individuals who survive long enough (Medawar, 1952). The antagonistic pleiotropy model provides a case for why late-acting mutations would be selected: If a pleiotropic gene provides a selective advantage during an individual's life when selection is strong, while providing a selective disadvantage during the time when selection is weak, such a gene would be selected for (Williams, 1957). Genes associated with the aging process would be such an example. Antagonistic pleiotropy and mutation accumulation are not mutually exclusive; both mechanisms are a result of weakening selective forces later in life. Physiological and biochemical expressions of aging are thought to be a result of reduced investment in repair and maintenance from the two mechanisms. However, research efforts to find antagonistic pleiotropic genes involved in aging have so far yielded unconvincing results, except life-extending genes that have been shown to have detrimental effects during early life.

There is some evidential support in physiology research that shows a trade-off. The disposable soma model argues that a lifetime of trade-offs (decision to allocate resources to some and not to others among growth and development, somatic maintenance and repair, and reproduction) evolved to maximize fitness (Kirkwood, 1977). Resources are used for somatic maintenance only if there is a good chance of survival in terms of extrinsic mortality: Under high extrinsic mortality, resources are diverted toward reproduction, away from somatic maintenance. The cost of accumulation of wear and tear (somatic damage) that is not repaired is the aging process. Indirect support for this model can be found in the match between intrinsic longevity (maximum life potential) and extrinsic mortality (Ricklefs, 1998). If these two are associated, a decrease in extrinsic mortality should result in the increase of longevity. This connection has been used to explain human longevity.

The aging process is intimately associated with the accumulation of damage on the molecular or the cellular level. Organisms with longevity invest more on repair and maintenance than those with short lives do, resulting in slower accumulation of damage over life. Thus, slow aging and longevity are connected.

Although a substantial proportion of research concentrates on discovering a specific single gene that is directly responsible for aging, there is increasing awareness that aging is a phenomenon contributed to by multiple factors and genes. This is predicted by evolutionary theory, given the variation and plasticity of the aging process. However, it is also true that mutation in a single gene can have a major effect on life span in

some organisms, such as *C. elegans*. There seems to be a central regulator of aging that regulates the multiple genes involved in aging (Cutler, 1975) by responding to environmental signals: When environment is hostile and nutritional access becomes difficult, organisms will change allocation of resources, diverting energy away from reproduction and into somatic maintenance. Findings that calorie restriction leads to life span extension can be explained by this hypothesis.

An evolutionary analysis of human longevity often applies life history theory. Life history theory aims to explain the variation in timing of fertility, growth, developmental rates, and death of living organisms according to trade-off mechanisms between mortality, fertility, and reproductive success. Life history variables include age-specific mortality and fertility as well as traits that are associated with age-specific mortality and fertility, such as life span, age at which an individual first gives birth (for females), and growth and development. First developed in the 1950s, life history research saw an increase in attention in the 1990s (Charnov, 1993; Roff, 1992; Stearns, 1992). The basic principle of life history theory relies on trade-offs; that is, due to limited resources, decisions have to be made in terms of resource allocation in such a way that allocation to one purpose deprives allocation to another, competing purpose. Assuming an optimal allocation strategy, one could posit a pattern of life history of organisms. Natural selection shapes life histories that lead to fitness advantage while also leading to evolution of the ability to change life history variables in different environments.

The human life history pattern differs from that observed in the great apes in its slow maturation, slower growth, higher fertility, and increased longevity, which is associated with menopause in women (Hawkes et al., 1998; Kaplan, Hill, Lancaster, & Hurtado, 2000; Robson et al., 2006). Within the framework of life history study, human longevity becomes a part of a configuration of life history variables that can be summarized as *slow life*: slow growth, late onset of reproduction, and slow mortality (Charnov & Berrigan, 1993). Primates in general are slow, and humans are particularly slow, although there are some parts of human life that are fast, such as increased fertility (Charnov, 1993; Harvey & Clutton-Brock, 1985; Harvey & Nee, 1991; Prothero & Jurgens, 1987).

Although it is often argued that humans have only recently started to live long lives, some argue that increased longevity and decreased mortality may have a long history in human evolution (Paine & Boldsen, 2006). According to Charnov, it is the slow growth that is driving the evolution of slow life history (Charnov & Berrigan, 1993). As such, longevity is an associated, correlated phenomenon (or an epiphenomenon) resulting from slow growth, and it is slow growth that needs to be explained. On the contrary, longevity itself may be selected for, and this needs to be explained. Examining the changes in longevity through time may shed light on this issue.

Longevity in the Human Fossil Record

Changes in longevity itself have not been empirically assessed. This lack of focus on longevity is at least partially

due to constraints inherent in paleodemography that impede the reconstruction of life tables for fossil populations. Longevity is difficult to assess for prehistoric populations because of a number of well-known problems that affect paleodemography. First, fossils are almost always available only in small sample sizes, which limits application of conventional statistical methods. There is always a question of whether specimens adequately represent the populations to which they belonged.

Second, different age groups are differentially preserved. This is particularly problematic for juveniles, since their fragile skeletons are less likely to be preserved than those of older individuals. This has far-reaching implications, because most of the parameters of interest in demography, those that are present in life tables, are dependent on information about juveniles. Understanding of longevity is likewise affected by juvenile data, because life span is strongly influenced by juvenile mortality rates.

Finally, there is the problem of assessing age at death. Even for modern humans, adult ages at death can be difficult to estimate with precision, especially for older individuals. Virtually all aging methods become less accurate with increasing age, and are most effective with multifactorial approaches, which utilize many different criteria for aging a single skeleton. Because most fossils are fragmentary, multifactorial approaches are usually impossible, and because so much is unknown about maturation rates and other life history factors, estimation of age at death is daunting. In addition, uncertainties about maturation rates, which may have varied over the course of human evolution, make numerical assessments of age at death problematic.

These three problems—sample size and associated statistical limitations, the absence of representative juvenile data that impede the construction of demographic profiles, and the lack of resolution possible when determining ages at death for fossilized remains—have caused impediments to the empirical study of human longevity in the fossil record.

Because it is so hard to study directly, prehistoric longevity has been discussed through its correlation with other variables, such as body size, brain size, and growth and development patterns. The actual pattern of change in adult survivorship critical to testing the relevance of correlations between brain size and longevity for human evolution, and any of the other questions surrounding the evolution of human longevity, have yet to be empirically established.

Population Growth and World Population

Humans live everywhere in the world, in both northern and southern hemispheres. However, this was not always the case. At the beginning of the ancestral human lineage, after the divergence between humans and their closest related species, ancestral fossil humans (hominids) lived only in Africa, in small numbers. It is with the appearance of the genus *Homo* in the terminal Pliocene and Pleistocene epochs that ancestral humans spread out of Africa into the world. Presuming that population density was maintained

during the worldwide spread of humans, the overall population size would have increased accordingly. As of January 1, 2009, world population was estimated at 6.75 billion.

While ancestral humans subsisted on foraged foods, population size increase was kept at a relatively modest rate. With food production through agriculture and animal domestication, population size and density increased substantially. With the Industrial Revolution, world population saw an increase in the increase rate, leading to an exponential increase in population that led to many alarmist concerns about a population explosion. World population has seen acceleration in its growth rate since the mid-18th century.

Population growth is a result of an accumulated surplus over time, a surplus generated from an imbalance between members coming in (births) and members going out (deaths). Regional population sizes are determined by migrations (emigrations and immigrations) in addition to births and deaths, but the effects cancel out when viewed from a world perspective.

For population to grow, fertility has to be higher than mortality. When the number of people reaching adulthood and reproducing equals the number of people dying, the population size is at equilibrium, and there is no growth. Such a population is said to be stationary. For most of human history, it is assumed that there has been a balance between fertility and mortality, that both fertility and mortality have been kept high. With recent advances in medical care and nutrition, mortality has decreased, while fertility has not changed much. The resulting increase in population size has subsequently met with another change, a decrease in fertility. Eventually, population size will reach a plateau with both fertility and mortality kept low. The demographic transitions model argues that human populations undergo a series of changes, first a decrease in mortality, then a decrease in fertility.

The actual birth rate, or the fertility rate, is lower than the maximum possible birth rate; biological events such as miscarriages, abortions, and stillbirths as well as sociocultural conditions such as contraception, delayed reproduction, late marriage, and celibacy contribute to the difference between possible birth rate and actual birth rate. Human populations differ in fertility rates, from more than 10 children per woman to 2 children per woman.

In the 1970s, there was quite an interest in the total number of humans that have lived throughout history, and some scholars gave estimates based on an exponential growth model for human populations. Based on the distribution pattern and density of archaeological sites, it seems that human species lived in small populations with low population density during most of human evolutionary history. Weiss used hunter-gatherer population density of 0.28 per square kilometer to estimate population size from areas of habitation during the Pleistocene: His calculations indicate that there were 0.5 million people between half a million and a million years ago, and that this number increased to 1.3 million in the Middle Paleolithic (Weiss, 1984), although such estimates are far from accurate and associated with large error.

With the appearance of the genus *Homo* in the early Pleistocene, hominid populations expanded throughout the

world, continuing to grow in size. The world population now is well over 6 billion. For most of human history, humans lived in small, mobile groups. Consequently, population size was small. It is only in the last 10,000 years, with the adoption of food production through agriculture, that world population has seen an explosion in its growth rate. Considering that only 6 million people may have inhabited the world around the beginning of the Holocene (and agriculture), there is a 1,000-fold increase in world population in the last 12,000 years (Weiss, 1984). Such exponential population growth has continued since the start of agriculture in the early Holocene (Pennington, 1996) and possibly started before that during the late Pleistocene (Hawks, Hunley, Lee, & Wolpoff, 2000).

The proportions of people at different ages are often represented by a population pyramid, which shows the percentage of population by age and sex. The shape of a population pyramid reflects the mortality and growth rate of that population. A population pyramid with a wide base and narrow top (approximating a triangle) represents a high mortality or high fertility rate. If fertility rate increases, the base will expand, as there will be a higher proportion of younger people in the population. If fertility rate decreases, the base will narrow, and the population becomes older. The recent global trend of fertility decrease is producing a top-heavy population pyramid with a higher proportion of older people in many countries. Such countries have met this prospect with much concern about the economic support of the elderly, their healthcare, and their quality of life. It should be noted that the demographic shift has occurred with changes in fertility and few changes in mortality or adult life expectancy. In a forager population, only about 10% in a cohort will survive beyond age 60, and they will make up 3% of the population; in contrast, modern industrialized countries can easily see 75% to 85% in a cohort surviving to age 65 (Weiss, 1981).

Conclusion

There are several aspects of longevity. Maximum life span is thought to be biologically determined, while average life span or life expectancy is subject to extrinsic mortality rates. Several models have been proposed to explain the biology of longevity and aging. The hypothesis of programmed death does not have a strong support. Current research supports the combination of the mutation accumulation model and the antagonistic pleiotropy model.

Using the correlation between longevity and brain size or body size, life span of ancestral humans can be estimated. Increased longevity over time is one of the distinguishing features of the human species. Documenting the pattern of changes in longevity through time is critical in understanding the evolutionary origin of human longevity and its relationship with other human life history variables. However, empirical examination of past human longevity faces methodological difficulties due to the nature of fossil data. While there is a trend of increase in longevity over the course of human evolution, the increase is most dramatic in

the modern age since the Industrial Revolution. Increased longevity is a result of decreased adult mortality and is one of the factors contributing to increase in population size. As in the case of longevity, human population size increased over time, with the most dramatic increase coming after the Industrial Revolution.

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ENVIRONMENTAL ISSUES

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Environmental issues can be discussed within a number of different contexts. For anthropology and sociology, culture and society become important factors in understanding environmental issues. By incorporating a perspective that includes environmental history, aspects of environmental change, dialogue and culture, and future concerns, a more complete understanding of the relationship between sociocultural actions and the natural environment can be developed. In an effort to understand the nature of environmental problems, one must develop an understanding of the cultural paradigms that guide human behavior and interaction with the natural environment. Many perspectives seek to explain this relationship. Social scientists look toward dialogue and cultural perspectives to trace the history of environmental concern.

Historically, humans have understood their role to be one of dominion over nature. This is explained in numerous classic works and referenced in many religious and spiritual texts as well (Bell, 2008; Dunlap & Mertig, 1992). Cultural paradigms exist that serve to guide our interactions with the environment. Most stem from the anthropocentric belief that the world is centered around people and that human society has the right to maintain dominion over nature. Structural beliefs provide the foundation of these understandings.

Cultural Beliefs and the Environment

The belief that a free market system provides the greatest good for the greatest number of people leads us to

place economic decision-making processes in private hands. Frequently, private decisions have public consequences, but these public consequences are not accounted for in production costs or covered by market costs. Instead, the costs are passed on to consumers in the form of taxes and higher base prices for goods and services. Esteemed environmentalists Al Gore Jr. and Robert Kennedy Jr. have argued that if the external costs of production were assumed by manufacturers, then the ultimate benefit would be a system that accounted for waste created in the production process. This is evident in their research on global warming. Coal-fired power plants are promoted as one of the cheapest forms of creating energy. This is misleading, because the health effects of pollution caused by coal are not included in the costs of production. Others argue that those costs would have to be passed on to the consumer. However, they are passed on now in the way of pollution and medical expenses for illnesses associated with environmental contaminants. Coal is one of the biggest contributors to greenhouse gases, thus leading to the overall societal costs of global warming.

Another cultural belief is that the natural world is inexhaustible. Extraction of natural resources happens at an incredible rate without a consideration to limits. Society's constant dependence on nonrenewable energy forces mining and the refining of coal and oil to keep up with these demands. Consumer goods are deliberately planned to become obsolete within a relatively short time, and consumers are pressured to buy replacements. This process

has been conceptualized in research focused on the treadmill of production. Production and utility processes, using natural resources, dominate the modes of production. The reliance on the treadmill model provides perpetual extraction and production, increasing the fragility of the natural environment.

Another cultural value resides in a lasting faith in technology. Culturally, we believe that technology can meet any challenge. Humans are seen as ingenious creatures able to devise solutions for any problem. However, technology itself is not sufficiently controlled and can create more problems that contribute to environmental degradation. This can lead to a situation known as *culture lag*, used here to describe a situation in which technology has outpaced the cultural ability to respond to the consequences of using a given technology.

The philosophy of the growth ethic argues that growth equals progress. Successful cultures are often defined by their levels of progress. Urban sprawl exemplifies the connection between progress and environmental destruction. Urban ecologists argue urban sprawl follows the concentric circle urban planning mode of the early 20th century. Residents were encouraged to develop space for residential purposes further away from city centers. This was culturally promoted as prime real estate, and individuals continued to purchase land as a showing of class standing. Urban sprawl results in the loss of green and open space, increased use of natural resources, and more vehicle miles traveled as commuting distance continues to increase.

Materialism is a cultural value that also contributes to how environmental problems emerge. Americans tend to measure success in terms of the consumption of material things. Globally, the most valued nation is one that can command and use the largest fraction of the world's resources. Currently, the United States supports 5% of the world's population and uses 25% of the world's natural resources. This is evidence that the cultural emphasis on the consumption of material goods is in direct correlation with natural resource use.

Two final cultural values that impact environmental practices are individualism and an anthropocentric worldview. Cultures that emphasize individual rights and personal achievements tend to have a greater environmental impact. We place benefits to the self over what is best for the collective. Subsequently, the anthropocentric worldview is centered around human beings, thus inferring that human beings are superior to other beings and have natural rights to use the environment to ensure the progress of human beings as a species.

Subsequently, these cultural beliefs form the principles that overwhelmingly guide cultural interactions with nature. Theoretically, they serve as paradigms that explain the emergence of environmental issues. The following section provides specific theoretical underpinnings of environmental issues.

Theory and the Environment

Theory addressing environmental issues has been situated in the social constructionist and political economy approaches. Within these approaches, attention has been paid to developments of subfields in social science research, such as social movements and the environment, environmental health, and environmental justice.

Social Construction and the Environment

Social constructionists focus on the construction of social problems and how this allows individuals to assign meaning and give importance to the social world. Sarbin and Kitsuse argued that "things are not given in the world, but constructed and negotiated by humans to make sense of the world" (1994, p. 3). When interests are at stake, claims are made around an activity in order to define the interests as problems. The process of claims making is more important than the task of assessing whether the claims are true (Hannigan, 1995).

Hannigan provides a three-step process for the construction of environmental problems: assembling, presenting, and contesting. He argues that each step develops the claims-making activities of environmental activists and antagonists. Environmental problems are different from other social problems, because claims are often based on physical, chemical, or biological scientific evidence (Hannigan, 1995). In nearly all cases of environmental problems, even though such problems are based on scientific evidence, the burden of proof falls on the claims-makers, the environmental actors.

When a claim about an environmental problem is presented, state and corporate actors emerge most often to challenge the validity of these problems. Although these actors are willing to construct the issue as a "problem," support to alleviate the problem is often lacking. If it supports the alleviation of the problem, most probably through funding remedial efforts or research, the state or corporation is seen as taking responsibility for the problem. If the state is seen as responsible, its perceived legitimacy decreases, which may lead to decreased trust. On the other hand, if a problem is not acknowledged, then trust in government may also decrease, because the perception arises that the interests of the state are not the best for the people.

The power of individuals in roles and positions to define these claims is ultimately what allows problems to be defined as problems. Claims may be made by others not in a position of power, but they are often not seen as valid because of the lack of power associated with the role. Different claims of environmental problems then lead to different definitions of the problems.

Definitions of problems are framed to illustrate specific viewpoints of what the problem is. Goffman used

the term *frame* in order to explain interpretations of occurrences. Frames can serve as explanations or guideposts to individual or collective action (Snow & Benford, 1988). Snow and Benford describe framing as an activity performed by social movements to express their viewpoints and “to assign meaning to and interpret relevant events and conditions in ways that are intended to mobilize potential adherents and constituents—to garner bystander support and demobilize antagonists” (p. 198).

By framing events in certain ways that assign meaning to them, actors can attempt to mobilize support and delegitimize opposing viewpoints. Because different frames may emerge surrounding the same problem, individuals may choose to adopt one or the other on the basis of the reliability of the frames. One factor in determining reliability is trust in the actors who present the frame. Constituents may mobilize around one frame because trust in that explanation and the organization that presents it is high (Robinson, 2009). This impacts how individuals interpret the seriousness of environmental problems and subsequently whether issues will be acted on and in what manner.

Social Construction and Social Movements

The framing process can serve to mobilize constituents for or against a particular cause. Mobilization against frames that are presented by actors emerges when the audience of the frame has low trust in the source of the frame. Social movement literature has acknowledged the emergence of mobilization over environmental issues where lack of trust is present. Examples include institutional recreancy, lack of trust in government agencies and officials, and the combination of the two (Brown & Mikkelsen, 1990; Cable & Cable, 1997; Freudenburg, 1993; Gaventa, 1980; Gibbs, 1982).

Charles Tilly provides a model for mobilization that bridges some of the ideological views of frame analysis with collective action and resource mobilization theory. Tilly’s (1978) definition of mobilization is “a process by which a group goes from a passive collection of individuals to an active participant in public life” (p. 69). A further extreme of this model is resource mobilization theory, which gives even less importance to ideological factors and, instead, emphasizes the need for available resources. The combination of ideologies, resources, and the power of frame presentation contribute to mobilization. Using this analytical framework, the emergence of environmental problems and mobilization around these problems can be better understood.

Environmental problems in communities provide a setting to further explore this connection. Community organizing around local problems has a long history in the United States. Many forms of community organizing exist. These have included writing and literacy circle

newsletters in the late 19th and early 20th centuries, Saul Alinsky’s model of radical politics to create mass organizations to seize power and give it to the people (1971), and neighborhood block clubs. The goals to spread awareness, ensure social justice, and understand that city hall can be fought vary in scope and magnitude but have often proved to be effective models for organizing.

Citizen action in response to toxic waste at Love Canal has emerged as the premier example of community organizing over environmental issues. The story of neighborhood organizing and the quest for a clean, healthy environment is acknowledged in most major studies on environmental issues. The specifics of this case follow in a later section where the application of environmental issues is discussed.

Political Economy and the Environment

Theories of political economy of environmental issues focus on the development of political and economic practices and policies that contribute to environmental problems. Primarily, the focus has been on the creation of the capitalist mode of production that leads to overwhelming environmental destruction. Furthermore, the development of capitalism promotes a political environment that is friendly to more profitable, but less environmentally friendly, practices.

In addition to physical environmental realities that production processes cause, issues of health and economic injustice exist. Bryant and Mohai (1992) asked whether a safe environment is a civil right. They argue that people of color see environmental degradation interrelated with economic and political justice. This is the fundamental idea behind environmental justice in both action and theory. Another issue in environmental justice arises because people of color and lower income are less likely to have access to health insurance; thus, they become more ill if exposed to environmental hazards without means of treatment. Therefore, these populations share more of the negative environmental burden and have fewer resources to resolve the given problems.

The connection between health and economic justice is not a new relationship. Since World War II, there has been an increase in the development of the petrochemical industry. Coinciding with an increased demand for synthetic chemicals was an increased demand for disposal sites for waste byproducts of these chemicals. Many disposal sites were created in vacant plots of land, without the regulated disposal standards in place today. Expensive land used for the disposal sites of the 1940s and 1950s became the residential suburban developments of the 1960s, 1970s, and 1980s. With the post-World War II increase in population, many families were moving into suburban neighborhoods. Families felt safe from the problems of the cities, but they were not aware that many

residential properties were built near the abandoned chemical waste sites of prior decades.

The problems of environmental contamination were first addressed publicly in Rachel Carson's *Silent Spring* (1962). Her warning of chemical contaminants silencing biological life was not heeded at the time her book was published. These issues were not addressed until the 1970s with the first Earth Day in 1970, followed by the passing of numerous pieces of environmental protection legislation and the creation of the Environmental Protection Agency (EPA). Through this period of uncertainty, unclear scientific findings overwhelmed policymakers and the public, leading to confusion about how to develop environmental policies and actions.

Environmental Issues: Method and Application

Environmental problems have manifested most directly in the form of pollution. Evidence of environmental destruction is seen in the form of air, water, and land pollution that has a direct impact on the health of the human population. One of the most direct links between pollution and negative health effects has been identified since the creation of the petrochemical industry in the 1940s. Since this time, we have seen more cases of cancer and respiratory illness in the human population. The rate remains high even when controlling for mitigating factors, such as the effects of advanced medical technology in treating these illnesses, and lifestyle factors, such as diet and smoking. This case was made with the infamous discovery of toxic waste at Love Canal, New York, in 1978.

Literature in this area addresses the possible effects of exposure to toxins on one's health. However, few studies have provided irrefutable evidence supporting the research hypothesis (association exists) or the null hypothesis (no association exists). Scientists know that chemicals can have adverse effects on the human condition when ingested, but they argue that some indirect exposures through air, soil, water, or residential habitation in proximity to such toxins have not provided similar consequences. The basic disagreement emerges in how one views risk, either through the precautionary principle or through risk assessment and evaluation. Proponents of the precautionary principle argue that if the chance of danger is present, then precaution should be used to avoid exposure. Risk assessment would argue the opposite—that the risk must be known before action is taken to avoid exposure. The difficulty is that science has not provided irrefutable evidence on the dangers of many chemical substances; therefore action for their removal from products and the environment has been slow. Recently, Devra Davis took on this phenomenon in *The Secret History of the War on Cancer* (2008). She outlined the lack of scientific responsibility in reporting findings connecting cancer and chemical exposure.

Most reports have not described exposures accurately, or they have failed to completely identify a causal factor (National Research Council, 1991). The Committee on Environmental Epidemiology was formed to assess the progress on hazardous waste assessment since the creation of Superfund and the Agency for Toxic Substance and Disease Registry. The committee concluded that no conclusive reports could be used to base policy on, because there are no measures in place to accurately depict exposure assessments. Their conclusions continue: There exists no comprehensive inventory of waste sites, no site discovery program, no minimum data set on human exposures, and no policy for immediate action if exposure exists (National Research Council, 1991). The report indicates that “the nation is not adequately identifying, assessing, or ranking hazardous-waste site exposures and their potential effects on human health” (p. 21).

Environmental toxins have long been thought to be causally related to the incidence of disease. Air pollution, specifically with carbon dioxide and sulfur dioxide, has been studied in association with asthma and pulmonary disorders (Carnow, Lepper, Shekelle, & Stamler, 1969). Water pollution, particularly with trichloroethylene and tetrachloroethylene, sparked a concern about childhood and adult leukemia in Woburn, Massachusetts (Brown & Mikkelsen, 1990). Similarly, numerous studies have been conducted that investigate the exposure-ailment connection (Landrigan, 1990; Neutra, Lipscomb, Satin, & Shusterman, 1991; Paigen, Goldman, Mougant, Highland, & Steegman, 1987). These studies use descriptive and case-control methods and field investigations consisting of surveys and physical examinations, resulting in quantitative analyses in order to test hypotheses.

Descriptive studies portray disease patterns in populations according to person, place, and time, and they include time-series analyses (National Research Council, 1991). For example, a study performed by the National Cancer Institute used maps of cancer incidences and toxic waste sites, concluding that the high incidence of bladder cancer in northwestern Illinois counties was significant and leading to the implementation of an incidence study using survey methods (National Research Council, 1991).

A cohort study was employed with North Carolina residents who consumed raw polluted river water contaminated by an industrial site from 1947 to 1976. Residents' rates of all forms of cancer were more than twice those expected in the general population (National Research Council, 1991). Once exposure ceased, rates returned to the expected level, adjusting for latency.

The epidemiologic case-control study carried out in Woburn, Massachusetts, yielded an association between leukemia and drinking from contaminated wells. The EPA could not pinpoint the source of contamination; therefore, it could not infer conclusively that the cases of leukemia were due to the proximity of a hazardous waste site (Lagakos, Wessen, & Lelen, 1986).

Griffith, Duncan, Riggan, and Pellom (1989) analyzed EPA and cancer mortality data from 13 U.S. sites where there were major incidences of cancer between 1970 and 1979. They found evidence that contaminated ground water was used for human consumption at 593 waste sites in 339 U.S. counties in 49 states. Significant associations were found between several cancers and exposure to contaminated water in white males; these included cancers of the lung, bladder, esophagus, stomach, large intestine, and rectum (Griffith et al., 1989). Higher incidences of cancers of the lung, bladder, breast, stomach, large intestine, and rectum were found in white females in these counties (Griffith et al., 1989), when compared with females in counties that did not have hazardous waste sites. However, this study has been criticized based on its use of population-based incidences of cancer rather than individual-level estimates. Researchers inferred that proximity to hazardous waste sites caused cancer.

Wong, Morgan, Whorton, Gordon, and Kheifets (1989) performed an ecologic and case-control analysis to evaluate whether there was an association between groundwater contamination with dibromochloropropane (DBCP) and mortality from gastric cancer and leukemia. The only positive association that was found was in farm workers. No relationship was found for gastric cancer or leukemia with DBCP contamination of drinking water.

Neutra et al. (1991) found that individuals living near toxic waste sites had one or more bothersome symptoms that those living in control areas did not have. However, rates of cancer and birth defects were not found to be statistically significantly different for these individuals than for those in the control neighborhoods. Symptoms such as worrying, depression, and nervousness were more likely to be the result of knowledge of the site and its contaminants than the result of chemical exposure. Although some practitioners argue that residents near these sites do show higher incidences of asthma and psychological disturbances than individuals in control groups, the findings remain highly controversial (Neutra et al., 1991).

For the most part, these studies consist of survey and field investigation methodologies, relying on self-report methods. One problem with explaining associations that rely on self-report methods is that if residents want to be relocated or have other agendas, then the degree to which symptoms are reported may increase. Many residents felt that this was what some homeowners were hoping for at Love Canal. This remains one of the most critical problems with state and federal agency studies that seek to provide evidence of community risk.

With the increase in studies in this area, the public has been partially reassured by having the knowledge that at least concerns are being recognized. Specifically, cancer rates are still high, but the fear of human-made chemicals has largely been dispelled. Most recently, the organic food movement has been gaining legitimacy. Yet, many still doubt the health benefits behind this movement. Studies

concerning environmental racism have been more prevalent, focusing on the incidence of lower-income, nonwhite families living near toxic waste sites. This focus has taken attention away from specific health problems. Instead, the focus has been on issues of political economy and equity. This is not a criticism of environmental justice but rather a call for the convergence of natural science and sociology in order to address both issues. Other variables to be considered in these studies may include racial composition of counties, social class of counties, concentration of low-income occupations in counties, new housing starts in counties, and the percentage of welfare recipients per county.

Risk Perception and Environmental Health

The uncertainty of science had created cross-discipline dialogue. Social scientists have addressed environmental issues in studies of risk assessment, disaster relief (both natural and technological), toxic exposure, and other data-driven areas. Because of the risk of chemical exposure due to toxic waste, landfills emerged as one of the most imminent public health threats with the discovery of Love Canal. However, even in cases where studies to show an association between illness and exposure to toxic chemicals have been inconclusive, the message has been that these chemicals cause cancer and needed to be eradicated.

An important role of science is to inform the public of findings, usually through the media. Epidemiologic studies deal with human populations and are often questioned based on the legitimacy of the data and the willingness of the agency or corporation funding the research to share findings with the public. These studies are also usually based on relatively small populations and a small number of events; this results in a lack of significant findings, because sample sizes are too small to generate statistically reliable conclusions. Researchers are asked to report conclusions to various interest groups that may have a stake in the research problem. The pressure of the public arena and media, with emerging concerns and consequences for public health and the environment, has led to a decrease in the willingness to share data and be criticized if the data do not fit the public agenda. Politics and public perception surpass what science is able to provide. Science's inability to prove negatives has led to public policy that tries to control what cannot be established. This uncertainty shapes policy to err on the side of protection; yet in many communities the risks are endured regardless.

Findings often snowball into hard line conclusions and the perception of a problem when one may not exist, or vice versa. Risk perception and the realization of risks are two different things. Risk perception may encompass what one believes might occur or an understanding based on secondary information. Risk realization occurs when one is physically affected by the agent or situation and a decision to act is based on that encounter. The problem arises

in this discrepancy. Perception is what people perceive to be happening. With different information from different scientific experts, the public is left to decide on their own who or what is right, based on the health and well-being of themselves and their families.

Freudentburg (1993) discussed the concept of risk and recreancy in public decision making. He argues that an increase in institutional responsibility for risk management has created a system where responsibilities are often overlooked. This concept proposes increased frequency in institutional decision making in risk analysis. Freudentburg (1993) coined the term *recreancy* to identify the institutional failure to follow through on a duty or responsibility or broadly expected obligations to the collective. Questions are now raised by individuals deciphering scientific studies for themselves, but they now question the role of institutional actors. Without correlational data from an alternative institutional source that they trust, citizens do not know where to turn for clear answers about data regarding environmental toxins.

Community-based studies by community organizers have emerged in an attempt to address the failure of institutions to provide real, understandable answers regarding human health and exposure rates. Specifically, recent literature calls for more involvement of the scientific community in the decision-making process. A resurgence of popular epidemiology, since Lois Gibbs's attempt in 1978–1979, has found individuals using lay methods to determine association. Even if they don't result in strong, scientific evidence, community-based studies at least provide the groundwork and show a need for more in-depth studies. Brown and Mikkelsen's 1990 study is a strong example of this method. The question of whether there was a connection between childhood leukemia and known contaminated well water divided the community, but it forced epidemiologic studies.

Coinciding with these revelations, other studies were being conducted that attempted to link other contaminated sites with adverse health effects. As Gots (1993) stated, most were laboratory studies in simulated environments. Examples of human studies existed only in the sociological and epidemiological literature (Brown & Mikkelsen, 1990; Gibbs, 1982; Landrigan, 1990; Neutra et al., 1991). Incidences of chemical scares were also prevalent. Headlines concerning the dioxin scare at Times Beach, Missouri; contamination of apple crops with the synthetic growth regulator Alar; and use of Agent Orange created the fear that human-made chemicals cause disease. Evidence existed that these specific chemicals may cause health problems in humans, but data on the incidence of illness relative to exposure and on synergistic effects of these chemicals were missing. Furthermore, there was even less information available about other potential threats to health, such as airborne and waterborne contaminants, environmental sensitivity disorders, and living in proximity to hazardous waste sites. To establish a causal relationship

between exposure and chemicals, obtaining valid measures and estimates for exposure is essential.

Environmental Movements

Contaminated Communities; The Challenge of Social Control; Environmental Problems as Conflicts of Interests; Disasters, Collective Behavior, and Social Organization; Love Canal: Science, Politics, People, and Power; and Powerlessness are just a few of the book titles that describe the scope and emergence of the mobilization surrounding environmental problems. Since the publication of *Silent Spring*, the struggle to define, understand, and resolve environmental problems has inundated environmental literature as well as the agendas of environmental organizations at both the national and local levels.

The environmental movement in the United States can be traced back to the early conservationists at the turn of the 20th century, whose focus was on control of natural resources for technological and societal use. Accompanying this was a movement toward the preservation of the natural environment simply for nature's sake and separate from any use and/or value that human society had placed upon it.

The contemporary environmental movement embraced both of these traditions while focusing on building a political alliance to ensure the passage of legislation that would protect both nature and human health. As evidenced by the multitude of legislative victories the environmental movement claimed during the 1970s, the environmental movement was gaining prominence as one of the most successful efforts of social movement organizers.

Politically, momentum began to shift back toward the wise-use movement throughout the 1980s. Environmental problems were framed in opposition to capitalist goals. Politicians took an either/or stance: jobs or the environment. With one's economic livelihood seemingly at stake, it is no wonder that concern for the environment was diminished in the public agenda. The environmental health movement is arguably one area that continued to keep environmental issues in the public's consciousness. One of the classic and influential cases in environmental organizing, Love Canal, illustrates the interconnectedness of politics, science, and the environment.

Mobilization Around Toxic Waste Sites: Love Canal

To understand the factors contributing to the emergence, awareness, and mobilization around environmental problems, the scope and focus of the problem must be considered. This analysis focuses on the emergence of and mobilization around toxic waste sites found in residential communities. Literature addressing toxic waste sites in communities place Love Canal, New York, as the first community to encounter such a problem that received

national media attention. Although community protests were occurring around the toxics issue as early as 1970, no other site received the same degree of national media attention (Szasz, 1994).

In 1978, Love Canal was declared a federal disaster area, but the final homeowner evacuation was voluntary, not mandatory, even though the state had said a health emergency may exist. Given the possibility of ill-health effects, residents were given the choice about whether to stay or move. Because of the lack of strong correlational evidence, public health officials were not able to substantiate a link between exposure to chemicals and disease (Robinson, 2002).

The questionable contaminated area was evacuated and became known as the Emergency Declaration Area (EDA). It was divided into seven sampling areas. Two studies were performed to assess the habitability and safety of the area. The first study was completed in 1982 by the New York State Department of Health (DOH), the EPA, and the U.S. Department of Health and Human Services. Problems arose about the study's conclusion, which was that the EDA was as habitable as comparable control areas. The Congressional Office of Technology Assessment found that the study lacked information to determine whether unsafe levels of contamination existed and that it did not make clear what next steps should be taken. Thereafter, DOH and EPA conducted a second study on habitability; it was released in 1988. Habitability and safety have been studied in regard to numerous hazardous waste sites, but actual rates of illness have not been linked to exposure to toxic substances from nearby chemical waste sites.

The Superfund Act, passed in 1980, was written specifically in response to the known hazardous waste site at Love Canal. Policymakers recognized that industry used land-based disposal methods, that industrial sites were contaminated, and that an increase in clean air and water standards led to a decrease in land-based regulated disposal (Barnett, 1994). The problem was that there was neither an informed way of counting or tracking these sites, nor evidence of an adverse ecosystem and human effects (Barnett, 1994).

Since Love Canal, no other neighborhood has received the same degree of attention, although many have encountered toxic waste contaminants in their communities (Brown & Mikkelsen, 1990; Bryant & Mohai, 1992; Cable, Walsh, & Warland, 1988). No conclusive, significant correlation between chemicals and cancer has been found at Love Canal or at the other identified exposure sites. Nor has any truly verifiable evidence been found that exposure to, and living near, any other toxic waste site causes disease, though disorders have been loosely associated with chemical exposure, such as asthma, respiratory disease, nerve damage, miscarriages, and cancer.

People living near these sites must often decide on how much they want to expose themselves to risk. Once the presence of a waste site is known, they must decide, without data to guide their decisions, whether to stay in

their homes or leave. This has historically interfered with the availability and collection of valid data. When a study is conducted, residents request to be informed of the results and progress of the study. Because most epidemiological studies require longitudinal or cohort analysis in order to be reliable and valid, it is advantageous to have a stable, nonmobile population. This begs ethical questions, on behalf of the researchers, to disclose data relating to exposure before the study is completed. Researchers cannot both verify exposure findings and expect residents to remain so that they can carry out the remainder of the study. Thus, individuals, families, and communities are asked to base their decisions on claims that cannot be substantiated one way or the other.

Toxic waste sites continue to be discovered in communities. In many cases, the resulting community struggles are extended battles. The operative phrase in many cases is "once a site is discovered." The chemicals in Love Canal were buried 30 years before it was known to the community that their houses, school, and playground were built on top of and surrounding a chemical site containing 22,000 tons of waste. This is not to say that the problem didn't exist before its discovery by residents; it just wasn't defined as a problem. From the time the chemicals were buried to the discovery of the site by residents 30 years later, residents noticed dogs with burned noses, children with skin rashes, and increased rates of miscarriages, leukemia, and nerve and respiratory disorders. But they were not aware that these rates were out of the ordinary. The effects of the problem did not change, but the way the problem was represented did. The shift was in an awareness of the existence of the problem.

In addition to the chemical disaster at Love Canal, other environmental issues have been the subject of various social movement activities, as well as political legislation. In each instance, public perception influences how and whether the problem is acted on by those with the power to make a difference.

Conclusion

Culturally and socially, environmental problems represent problems of social organization, communication, and socialization. Social scientists can look toward the phenomenon, visible in the reaction to environmental problems, to begin making sense of culture and society at large. Our understanding of environmental issues as primarily social constructions offers insight into how these issues are created, maintained, and resolved.

For example, in many cases where chemical contamination is the focal issue of community groups, the level of risk is perceived by affected individuals rather than established by science. It is the social processes in a community that lead to risk determination, not the natural science interpretations of an issue. Individuals have been socialized

to trust science for valid information. When the determination of risk is uncertain, individuals are left to determine the level of risk for themselves by other means. In most cases, this determination is made through contact with state or federal government officials, through collaboration with other community members, or through other sources of information, such as the media. This framework helps to explain disagreements over the seriousness of most environmental issues, from global climate change to mountain-top coal removal.

The subjective reality of environmental problems becomes visible in terms of how the issue is circulated in cultural discourse. Each stakeholder constructs different means of projecting information for public consumption. When presented in the media, the perception is that information is true and accurate. Most often the determination of risk takes place in the form of a public meeting. In this situation, public officials are in control of the meeting, drawing on public anticipation surrounding the specific issue and information to be released. At Love Canal, for example, officials kept the information to be discussed at the meeting private until the meeting in order to build anticipation and increase their power over the dissemination of information.

At both the cultural and social level, power is maintained through these exercises. Often, the state controls the dissemination of information that individuals perceive to be true and accurate. However, different modes of collaboration among community members can create a different means of risk determination. The sharing of common experiences among community residents can lead to a broader sense of mobilization. Once commonalities are recognized, residents begin to determine their own level of risk. Risk perception is based on the potential danger of a problem. The sources that individuals base their information and understanding on are numerous. Each source has developed a frame of events and information on which they base their version of reality. Whether from the media, science, the state, or local knowledge, such frames serve as a means to display a problem in terms of a specific group. Social movement development, in relation to the environment, offers a powerful tool for individuals looking to construct the frame of a given environmental reality.

The ways in which environmental realities have been constructed influences how they will be acted on socially, culturally, and politically. Cultural discourse then circulates in the public sphere and becomes normative. Environmental issues become part of the public dialogue. This dialogue serves to help develop an understanding about the factors that coalesce to create, maintain, and resolve social processes that influence environmental problems.

Community-level interaction is an interesting social space from which to witness environmental understanding. Community-based, environmental problems affect individuals in many ways. Some communities mobilize and form environmental organizations to address a specific problem. Others, with existing community organizations, add

environmental problems to their agenda. Environmental problems can vary in scope, size, and duration.

Mobilization in these communities may occur due to individuals' fear that nothing is being done to ensure the safety of their children and families. It may also occur on the basis of frustration and an inability to understand what and why this is happening in their community. In addition, community groups often mobilize as a result of a lack of trust in government. The mobilization of individuals to resist the state's discourse challenges the power of the state. The level of trust in government is a key factor in determining the level of power the state can maintain during the presentation of its frame. For example, if trust in government is low, then a stronger frame needs to be developed to legitimize the government's position. Government often emerges as the key stakeholder, as the actor that will have the power to create change.

Previous research addresses the state's desire to maintain legitimacy at the same time that community groups seek to resist state discourse. Admitting that there is a problem shows that the state is capable of mistakes, and thus, the state's legitimacy can be questioned and it is vulnerable. The goal in the rhetoric of the state is not to raise questions, thereby maintaining legitimacy.

Most environmental problems are categorized by place: global, local, or national. These categories are not mutually exclusive. For example, ozone depletion is a global problem because of the total atmospheric effects the ozone layer has on the biosphere from ultraviolet rays. Yet the problem can be seen as being local in an area where heavy smog is causing ozone depletion and high surface area ozone levels, such as in a highly urban area like Los Angeles.

Similarly, the discovery of toxic waste sites across the United States can be seen as a national problem. But in the specific communities where these sites are discovered, it is a local problem affecting individuals directly. The problem is no longer seen as away from them; it is now part of their community. This developing framework of environmental issues has helped individuals become aware of the multitude of impacts that these problems have. Social scientists have been able to develop an understanding of the environment that moves away from the depiction of the earth as something separate from human society, but, instead, the earth is a system with interrelated consequences and realities. One of the most vivid paradigm shifts has been the movement away from an anthropocentric worldview and toward an environmental worldview. This shift can be represented in the movement from the human environmental paradigm (HEP) to the new environmental paradigm (NEP).

Social scientists focus on this shift as a way to explain a cultural movement that has embraced a way of understanding the impact that society has on the environment. Arguably, once the NEP is part of the natural discourse of environmental issues, they become more easily recognized as problems that have risen from a system out of balance. This approach focuses on sustainable development and other modes of

development that provide environmentally sensitive growth models. These efforts move toward a culture that is sensitive to a responsibility that ensures less devastating environmental impact in the future. As environmental sociologists and other environmental researchers seek answers for a sustainable society, we must consider the devastating impacts of our current modes of production. New modes of production that take into consideration innovative, green energy solutions will provide a stronger sustainable economy and environment for culture and society.

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HUMAN ECOLOGY

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While researching for this entry on human ecology, the author perused books and articles about ecology, biology, geography, and anthropology; human ecology uses all these disciplines, and more, toward its own end. Human ecology refuses to condense its focus into one approach; it investigates many approaches to a problem. This investigation method involves all the above mentioned disciplines. However, because its focus is so broad, no one agrees on a concrete definition of human ecology. In an attempt to reveal its definition, this article describes theories, research, and case studies in this field.

Theory

What happens when the two words composing *human ecology* are defined separately and then combined? A common definition for *human* is “a bipedal primate mammal (*Homo sapiens*): man” (Mish, 2004). Such a definition is easy to understand in nearly any context, but defining *ecology* may prove more difficult. Levine et al. collect various definitions in the introduction to their book, *Human Ecology* (1975). For example, German biologist Ernest Haeckel defines ecology as “the body of knowledge concerning the economy of nature—the investigation of the total relation of the animal both to its organic and inorganic environment” (Levine et al., 1975, p. 1). American ecologist Eugene Odum defines ecology as “the study of

the structure and function of nature” (p. 1). These definitions are great abstractions of the word *ecology*; but what is the simple dictionary definition? Ecology is “a branch of science concerned with the interrelationship of organisms and their environments” (Mish, 2004). If human ecology is interpreted as literally the ecology of humans, then, logically, it is the study of relationships between humans and their environments.

Is this definition too base for science? Sargent defines human ecology as “man’s relationship to all systems of life” (1983, p. 3). Strickland and Ulijaszek, authors of *Seasonality and Human Ecology* (1993), define human ecology simply as “the study of interrelations that exist between individuals, populations and the ecosystems of which they are a part” (p. 1). Sociologist Robert E. Park felt human ecology was the study of processes or systems that develop to upset or align the biotic balance of equilibrium (1961, p. 29). There is a common theme among these mentioned definitions: relationships. Relationships are a large aspect of human ecology, but they do not constitute its entire scope of study.

In his article, “Human Ecology and Interactional Ecology,” James Quinn (1940) examines four views of human ecology. The first is J. W. Bews’s vision of human ecology as an all inclusive science composed of sociology, psychology, geography, biology, and anthropology; the second is H. H. Barrows’s view of human ecology as synonymous with human geography; while the third sees

human ecology as solely sociological (Quinn, 1940, p. 714). Quinn rejects each of these proposals and declares his own theory as the fourth viewpoint: Human ecology borrows from sociology, biology, and geography to form separate branches of science beneath each discipline. These branches are under the name human ecology; the branch from sociology is called interactional ecology, the branch from biology is called general ecology applied to man (Quinn had not proposed a working definition for this branch), and the branch from geography is called human geography. Quinn's theory is represented by three circles (one each for sociology, biology, and geography) situated as a triangle with each being cut in half by a fourth circle (human ecology) in the middle. The author of this entry agrees with Quinn's diagram because it represents human ecology as its own science, borrowing some, but not all, of its principles from other sciences. However, the author feels human ecology is an opportunistic science that can borrow from all sciences (not just sociology, biology, or geography) to understand a given problem. With this additive, human ecology becomes the holistic view it is.

Indeed, human ecology uses all sciences as a working foundation to solve problems between humans and the environment; however, there is much disagreement about its origin. Hawley (1986) attributes human ecology's beginning to sociologists. These sociologists looked to contemporary ecologists' work on the role of floral communities within an ecosystem as being comparable to the role of groups and individual humans within a human ecosystem. Sociologists such as Park (1936, 1961) and McKenzie (1934) established the idea of "an association of species joined in a division of labor and thereby forming a distinguishable adaptive unit" (Hawley, 1934, p. 2). In Hawley's view, the most central idea to human ecology is the adaptation process. As different flower species share labor to create their similar spatial environment, so do different human groups interact when adapting to their shared spatial environment. A common theme in all studies under the name "human ecology" is a focus on what people have done, are doing, and will do within their environment and whether these actions affect their success or failure at preserving the environment. Basically, human ecology studies the relationships between environmental and human systems.

Even though human ecology borrows from sociologists' theory, human ecologists ask questions that span many disciplines. A human ecologist asks a series of questions any one scientist would not, such as how do people's interactions with each other affect land use practices? In researching this question, one could find that human interrelations are influenced by success or failure of crops. Researchers would then investigate why a harvest was sufficient or insufficient. If it was insufficient, did erosion cause a strain on crop yields? What caused the erosion? If it was sufficient, did land use practices cause success? And so on. A human ecologist does not stop after the first question is

answered. Casey and Schwartzberg provide an exemplary definition of human ecology as a holistic science when they describe its scope as covering relationships between human populations, the environment, technology, human organizations, and social psychology (1969, p. 3). Being holistic, human ecology absorbs sociological ideas, as well as ideas from many other disciplines, to answer questions.

In contrast to Hawley's (1986) placement of human ecology as a category of sociology, Sutton and Anderson argue that it falls under anthropology and adheres to the scientific method (2004, p. 7). In the 1940s, anthropologist Julian Steward proposed the theory of multilineal evolution and labeled it *cultural ecology*. This theory placed subsistence practices at the center of cultural development but allowed cultural evolution variations within each subsistence practice. Leslie White (1949), also an anthropologist, wrote that cultural evolution was directly related to how efficient a culture was at harnessing energy. His ideas of evolution spurred further study of relations between humans and their environments and how these interactions are played out (McGee & Warms, 2004). Although human ecology has sociological and anthropological roots, its development has transcended the bounds of either field.

Moran suggests human ecology is an enveloping discipline that includes at least "anthropology, geography and sociology" (2000, p. 4). Indeed, because it is holistic, human ecology utilizes these disciplines, among others, to solve its questions. When using a holistic view, it is important to remember that parts are not greater than the whole, nor the whole greater than its parts. Steiner echoes this with his own statement about holism: "The whole would not exist without the parts; the parts would not be without the whole" (2002, p. 36). Following this quote, human ecology acts as a connection between the parts of science but does not completely adhere to a single discipline. Just as connective tissues in the body are part of neither the bones nor the muscles they connect, so human ecology is not wholly a part of any science it chooses to incorporate.

Using this myriad of definitions, human ecology materializes as the study of relationships between human adaptive systems and the adaptive systems of the environments humans inhabit.

Adaptation

All organisms must choose their method of survival; their choice is based on getting as much energy from the environment as possible while expending the least amount of energy possible. The Canadian ecologist Pierre Dansereau explains how these choices are made using his law of inoptimum, which reads as follows: "No species will encounter a given habitat and find the optimal conditions for its functions" (as quoted in Sargent, 1983, p. 55). This principle explains why humans change environments to suit their needs, or even why certain trees alter chemicals in the soil

in their favor. However, to make these survival choices, an organism needs access to an environment. Without an environment, an organism could not exist.

Also imperative for an organism's survival is other organisms of its own kind (Hawley, 1986, p. 5). This principle is true mainly for reproductive and ecological reasons, but in humans, it is also true sociologically. Choices are made by individuals based upon relationships with other individuals and the environment. Environments also change along with organisms they sustain, because environments and organisms act upon one another and grow together (Sargent, 1983, p. 3). Now, more than ever, humans have the ability to inflict change upon all environments across the globe through their survival choices (Hawley, 1986, p. 6).

Human survival choices have been honed over thousands of years through culture. Culture is conveyed through a system of learned symbols—intentional abstractions of an idea or an action. Using culture, humans have shifted their place within ecological communities and attained dominance over available energy in any given community or ecosystem. They achieved this dominance through learned behaviors, which enabled humans to expand upon existing knowledge. This foundation of knowledge affords humans a great advantage in survival. Each human need not rediscover concepts such as the use of fire, stone tools, or the wheel; humans are simply instructed how to use these tools and survival techniques through culture (Watson & Watson, 1972; White, 1949). Culture is simultaneously an adapter of environments and an element of the environment.

Hawley names two kinds of environmental elements: biophysical elements, including “land features, climate, soil characteristics, plant and animal life, mineral and other naturally occurring materials”; and ecumenical elements, including “ecosystems or cultures possessed by peoples in adjacent areas and beyond, to which access is provided by the existing facilities for transportation and communication” (1986, p. 14). (Note: Hawley uses *ecumenic* to avoid the confusion that might be created by the connotations of the words *economic* and *social*. But the author feels that *ecumenic* actually creates more confusion due to its modern religious connotation. As Hawley's use of *ecumenic* is intended to combine *social* and *economic*, the term *socioeconomic* will replace Hawley's *ecumenic* in this entry.) For an example of biophysical and socioeconomic elements working together, Hawley (1986) cites Spencer's research with inland Alaskan Eskimo depopulation. Traditionally, inland Eskimos traded caribou hides with coastal Eskimos for whale blubber and other supplies that were unattainable inland. When Europeans arrived, coastal Eskimos ceased most trade with inland Eskimos, because Europeans had more attractive trade goods than inland Eskimos. This change in Eskimo life forced inland Eskimos to move toward coastal areas, because they could no longer support themselves without coastal trade. This

move is an example of how socioeconomic elements forced inland Eskimos to modify their adaptation systems to biophysical elements.

Both classes of environmental elements have constant and variable conditions. Constant conditions comprise the initial adaptive challenge such as mountains, rivers, flora, and fauna of an environment, but even these constant conditions can be changed by humans. Variable conditions occur after initial adaptation; they deal with time or duration. Unpredictable or irregular events, such as natural disasters, swarms of insects, appearances of new human groups, invasive warfare, and other cultural diffusions are examples of variable conditions existing over time.

To recapitulate, there can be constant biophysical conditions, such as a nearby mineral deposit, and there can be variable biophysical conditions, such as natural disasters. There can also be constant socioeconomic conditions, such as permanent settlements, and variable socioeconomic conditions, such as warfare. The combination of these two elements and their present conditions form a culture's environment and shape its adaptive strategies.

Case Study

Parts of North America's environment have been shaped by the people who lived there. Native Americans lived for thousands of years in North America before European contact. Black, Abrams, and Ruffner (2006) conducted a study in northern Pennsylvania, examining exactly which kinds of trees composed forests, a constant biophysical condition, in different areas. They found that forests in areas of low Native American activity were populated mostly with beech, hemlock, and maple, whereas forests in areas of high Native American activity mostly consisted of oak, beech, hemlock, chestnut, pine, and maple. Their study showed Native American activity paralleled the growth of stands of oak, hickory, and chestnut. Black walnut occurred only near village sites, and its presence had the highest correlation with Native American influence. As several Native American land practices could have transformed northern hardwood forests to oak-hickory-chestnut forests, the group believes Native Americans shaped tree composition within forests through their land practices.

By clearing forests near villages for agriculture, Native Americans encouraged early-succession edge species. Oak and hickory thrive in open fields and clearings, because they are less shade tolerant than other species. Also, Native Americans' collection of firewood and building material would have increased the chance that oak and hickory would survive, because the Native Americans thinned the forest near villages. They may have been girdling trees competing with the desired species of oak, hickory, and chestnut. These desired species are adapted to survive fire. These fire adaptations include “thick corky bark, a tenacious ability to resprout following top kills due to high root/shoot

ratio . . . and resistance to rot” (Black, Abrams, & Ruffner, 2006, p. 1272). Native American fire practices encouraged “primary forest efficiency” by reducing forest litter to allow easier mobility, increased acorn quality and quantity for winter and spring subsistence, and increased deer herd sizes in certain managed areas. Dendrochronology suggests tree disturbances sharply declined after European contact. During the Late Woodland period and the Historic period, Native Americans were an important source of disturbance for forests.

This case study is an example of constant socioeconomic elements shaping constant biophysical elements. Without Native American land practices, oak and hickory would not have been as populous in the forest as they were. Native Americans certainly influenced where these species grew using constant socioeconomic tactics.

The Earth in Space

Earth’s biophysical environment begins with its mass in space. The earth’s mass determines its gravitational attraction, while the tilt and revolution of earth determines how it receives radiation from the sun. The distance to the sun determines the intensity of radiation received from the sun. Radiation levels are controlled by the solar constant as well as the angle at which the radiation is received. Gravity limits the weight of organisms, because energy is used against the force of gravity; accordingly, gravity limits an organism’s size, because it must support its weight against gravity. Gravity also limits circulatory systems and, in effect, limits organism height. Earth’s gravity retains gases that compose its atmosphere, although lighter gases such as hydrogen and helium can escape (Levine et al., 1975).

Our present atmosphere was created from volcanic eruptions expelling gases from inside the earth’s mantle. These gases consisted mostly of water vapor and nitrogen with lesser amounts of other gases. Water vapors were trapped by gravity, condensed, and fell back to the earth, forming the oceans. The first plants were aquatic and grew near volcanoes in warm pools. Protected from the sun’s radiation by the oceans, aquatic plants received light filtered through water. As oxygen released by plants entered the atmosphere, it oxidized iron and other minerals. When there were no more minerals to use the newly released oxygen, it filled the atmosphere. Due to the sun’s radiation, the initial oxygen transformed into ozone, which absorbed the sun’s deadly rays. As the atmosphere continued to fill with oxygen, less of the ocean was pounded by radiation, and life could expand its borders. About this time, free oxygen respiration systems developed. Oxygen continued to fill the atmosphere, displacing more and more radiation from the surface of the earth, and allowed life to move onto land around 420 million years ago. Such movement onto land was not by animals, but by plants. Plants moved from the waters onto the shores and then further inland (Levine et al., 1975).

Earth has the temperature and climate it has because our atmosphere selectively absorbs radiation of specific wavelengths. Weather is created through air and water molecule movement powered by the sun’s radiation. Weather is a real-time experience, whereas climate is an abstraction that represents a region’s average weather over time. Topography and distribution of land and water can affect climate in various ways (Levine et al., 1975). By creating rain shadows, topography can form areas of lower precipitation. Rain shadows occur when water-laden clouds lose their moisture before rising over mountains. On the mountains’ leeward side, it is dry, because little moisture can travel over the mountains. Large water bodies heat and cool more slowly than land bodies, and this can affect where and how quickly moisture is absorbed into the atmosphere. Vegetation can also have an impact on weather, such as cooling the air, causing precipitation.

Without soil, there could be no vegetation. Soils are formed by water, chemicals, wind, and living organisms on bedrock (parent rock). Bedrock controls basic soil composition (Levine et al., 1975). For example, sandy soils usually occur over sandstone; chalky soils occur over chalk; clay soils over shale; and rich organic soils over peat. Soils of the same character can spread across different rock types, and so, when forming soils, climate and vegetation can be just as important as rock type. Soil is a mixture of organic and inorganic components (sand, silt, and clay). The mixtures of these inorganic materials control soil texture and its ability to retain moisture and nutrients. Organic matter changes the physiochemical properties of inorganic materials and is food for microorganisms as well as plants. Molecular space between solid soil particles is filled with either gas or liquid. Liquid is a complex solution and is the medium by which nutrients move to microorganisms and plants. Gas in soil is essentially air. Air is normally saturated with water vapor and can contain much larger amounts of carbon dioxide than air in the atmosphere. When soil is waterlogged, it can no longer exchange gases with the atmosphere or aerobic life forms (Levine et al., 1975).

All of these above factors govern the earth’s dimension and environment, and they form the land humans live on. Land is not all the same due to topography and climate. Humans prefer land with good soil, a water source, and an agreeable climate. Not all the land on earth is suitable for human habitation under these specifications. Estimates report almost 30% of the land surface is potentially arable; 20% is nonarable mountains; 20% is desert or steppe; 20% is under snow, ice, or permafrost; and 10% lies on soils or regions inadequate for cultivation (Ehrlich, Ehrlich, & Holden, 1973). From the favorable environments of Africa where the human species was born, humans spread to inhabit nearly all the arable lands (Liu, Prugnolle, Manica, & Balloux, 2006). Culture enables humans to adapt to these biophysical elements within the environment and ensures human survival.

Systems

Besides being able to bring change and adapt, humans create. Just as we have created the tangible idea of culture, we create other things we cannot see. Steiner (2002) quotes the Chinese American geographer Yi-Fu Tuan as follows:

Humans not only submit and adapt [to change]; they transform in accordance with a preconceived plan. That is, before transforming, they do something extraordinary, namely, “see” what is not there. Seeing what is not there lies at the foundation for all human culture. (p. 35)

The preconceived plan Tuan remarks about is a system. Botkin and Keller define a system “as any part of the universe that can be isolated for purposes of observation and study” (as quoted in Steiner, 2002, p. 21). Ecosystems, then, are systems of ecology. Humans are part of ecosystems, because they interact with and within ecology. Culture is a system, and it is the method humans use to transmit ideas and adapt to environments. Culture directs adaptation to any given environment. For example, this explains why, in the same type of environment, humans will utilize different housing styles.

Just as humans will use different housing types for the same environment, there are different ideas of adaptive systems. Unfortunately, some popular ideas of systems conceptualize them as linear, going from point A to point B. Environmentalist Paul Hawken suggests “[changing] linear systems into cyclic systems,” because this “is the way of the world around us” (as quoted in Steiner, 2002, p. 35). Certainly, most systems in nature are cyclic (e.g., water, carbon, and nitrogen cycles); however, not all human systems are cyclic. The sheer abundance of the American frontier shaped American culture toward consuming resources with the belief they were inexhaustible. Cities grew at unprecedented rates while resources were consumed wastefully, and soon foreign resources were sought to continue the trend (Chen, Coa, & Liu, 2007). The American frontier idea is a linear system that provides end results quickly but in an unsustainable way; that is, linear systems have a beginning and an end; they will end when they have used up all available resources. Energy is expended in linear systems. An easy example of a linear system is the path of most Western products.

Products are manufactured, used, then dumped into the ground and never used again; there is a beginning and an end. In cyclic systems, there is no beginning or end, and nearly the same amount of energy sustains the cycle, as long as conditions permit. When Western products are used in a cyclic system, they are recycled instead of being dumped. Now the product is manufactured, used, and then recycled into the beginnings of another product, which will be manufactured, used, and recycled into the beginnings of another product. In the linear system, energy spent burying discarded products could have been

channeled into converting discarded products into raw materials to make new products; instead, energy is used to bury old products, and more energy is needed to produce raw materials for new products. So, a linear system requires fresh input to start it each time; cyclic systems harness initial inputs to continue indefinitely. Cultures exhibit these same system characteristics.

There are many types of systems within a culture. These systems are manifested within a culture’s technology, sociology, and ideology. Technology is usually a physical system, meaning it is a tangible system. Forts, weapons, irrigators, shovels, and the wheel are all manifestations of a technological system. Sociological systems are also tangible and mainly affect social organization at individual and collective levels. Individual, family, and political organization are displays of sociological systems. Ideological systems are intangible systems that affect both technological and sociological systems. These ideologies are contained within myths, beliefs, and knowledge (White, 1949).

In other words, technological and sociological systems are physical representations of the ideological systems held by any particular culture. Each system has influence over the other two systems, and the interaction of these three systems allows cultures to evolve. These systems are very interesting, because they shape tangible representations of people. Kinship organization displays a system’s tangibility and intangibility best. Due to certain ideals held by particular cultures, kinships are arranged differently. Indeed, kinship relationships to mothers and fathers are arranged differently across the world, because people live and think differently. Therefore, intangible ideas shape tangible kinship ties (and vice versa for that matter). But before any system—human or not—can begin, it needs a push; a source of energy.

Energy

All energy originates from the sun; consequently, all organisms are governed by thermodynamics. Thermodynamics is the study of how energy converts from heat to mechanical motion. The first law of thermodynamics states energy is neither created nor destroyed; it only passes through different entities (Ehrlich et al., 1973). At the same time, earth’s forces are always moving toward equilibrium by way of depleting all energy, or radiation, from its matter (Watson & Watson, 1972). The second law of thermodynamics states that in each energy transfer there is a loss of usable energy. This law is true for our consumption of foods as well as plants’ conversion of sunlight into energy. During photosynthesis, only 1% or less of sunlight is transferred into usable energy by plants (Ehrlich et al., 1973). The *trophic pyramid* reflects this energy loss during transfers; its bottom is larger than its top. If energy was not lost during transfers, the trophic pyramid would instead be a trophic square; all initial

energy entered into the bottom would be passed to the upper trophic levels. Indeed, energy is always in motion and moving toward being released or dissipated. Humans are one of many organisms trying to capture energy.

Anthropologist Leslie White succinctly states, “All life is a struggle for free energy” (1949, p. 367). Indeed, life contradicts the rest of the cosmos, because it seeks to collect escaping energy. Life attempts to retain as much energy in each transfer as possible. As time passes, humans have become more adept at collecting free energy. White argues human culture evolves with its increasing efficiency to collect energy. He outlines a formula devising this rate of cultural evolution. This formula is based on the amount of harnessed energy per capita or the increase of efficiency in capturing this energy. Indeed, cultural achievements were greatest near periods of markedly increased energy yields, such as during the Agricultural and Industrial Revolutions (White, 1949). Cultures evolved by harvesting energy from their environments, but to do this, humans also derive energy from outside the trophic pyramid.

Energy for human technology comes from natural resources, but its extraction and use is related to time, economics, and scale of demand (Levine et al., 1975). For example, coal mining was scarce before the 19th century because there was little demand for coal. As the Industrial Revolution gained momentum, the demand for coal rose and became an influential part of the economy. During the initial period of increased demand, coal mining technology was crude, and so, extraction and transportation was slow. As the demand for coal grew, it became an even bigger driving force of the economy. As advances in technology increased over time, more coal was made available faster. As time continued and technology gave access to cheaper and more efficient fuels, coal became less and less in demand. Nowadays, some coal is extracted by mountaintop removal, which is more efficient than coal mining was: It employs fewer workers, requires less time, and gains access to smaller coal seams. This example exemplifies how time, economics, and demand influence the extraction of natural resources. However, this extraction technique comes at an environmental cost. Erosion, flooding, and loss of wildlife habitat occur from these extraction techniques. Pollution is another environmental cost.

Pollution is everywhere in the environment. Some of it occurs naturally, such as air pollution from lightning-caused forest fires and volcanic eruptions, while some of it is produced by humans, such as noise pollution from human activities and air pollution from automobiles. There are two types of pollutants: qualitative and quantitative. Qualitative pollutants are synthetic substances introduced by humans, such as DDT, PCBs, industrial chemicals, and herbicides. These substances are usually not biodegradable, and they remain in the environment for decades. Qualitative pollutants do not lose potency during energy transfers and grow more concentrated within organisms as

they travel up the trophic pyramid. For example, there are 10,000 aquatic plants supporting 1,000 salmon and 100 eagles in a trophic pyramid. If each aquatic plant has 1 part DDT and each salmon eats 10 aquatic plants, then each salmon has 10 parts of DDT in it. When eagles eat 10 salmon each, each eagle has 100 parts of DDT in it. So, 10,000 parts of DDT become concentrated in 100 eagles.

Quantitative pollutants occur naturally, but they become pollutants as their amounts within the environment are increased by humans. Nitrogen in fertilizers and carbon emitted from combustible engines are quantitative pollutants, because they add to natural levels of nitrogen and carbon already in the environment (Ehrlich et al., 1973). Heat is a quantitative pollutant that humans have drastically increased within the environment. It is the main pollutant from every extraction, conversion, and use of human energy sources (Ehrlich et al., 1973). However, the effect of some pollution is diluted throughout an ecosystem by species diversity.

Diversity

Ecosystems stay healthy through organism diversity. The more species in an ecosystem, the better, because these inhabitants help disperse energy throughout the ecosystem. If an ecosystem loses one species, another species will fill the resulting empty niche and continue the flow of energy (Ehrlich et al., 1973). This energy flow allows food webs to evolve, and food webs allow environmental change, because energy and nutrients can follow diverse courses before returning back to the environment; subsequently, the course of energy can be different each time (Sargent, 1983). A stable ecosystem grows through complex species diversity, which allows energy different avenues through which to flow. When energy cannot follow different paths, it has the possibility to be cut off. Humans drastically change ecosystems' species composition, replacing complex stable ecosystems with simple unstable ecosystems through modern agriculture (Ehrlich et al., 1973). However, Meso-American maize agriculture is seen as a stable ecological system, because farmers plant a wide range of maize, such as modern hybrid maize and traditional strains; their focus on maintaining a healthy environment is evident in their culture.

Case Study

Brush and Perales (2007) conducted a study about what maize type certain ethnic groups chose to plant, where they planted it, and why they planted it. Their research was collected within the state of Chiapas in southern Mexico across different environments and social groups. Brush and Perales found maize diversity was not randomly distributed but rather was a function of biophysical factors,

such as altitude and maize species, and socioeconomic factors, such as whether the farmers were mestizo or indigenous and what the economics of their community were. Because mestizo and indigenous people are different in language, ethnolinguistic communities shape the maize landscape, and altitude shapes where ethnolinguistic groups reside. Most indigenous people choose to live at altitudes higher than 1,400 meters above sea level, while mestizos favor lower altitudes, because they evolved from European and indigenous people. Europeans interested in better crop yields favored the lower, flatter areas for cultivation, leaving indigenous groups to higher and more mountainous fields.

But even with these cultural preferences, both ethnicities are found at all elevations. This dispersion affects where particular maize species are grown. Higher than 1,400 meters, maize is grown in a very natural way in small patches among other crops using little commercial input; this method yields less than 1,500 kilograms per hectare of maize. This high-altitude strategy is mostly for subsistence. Conversely, in altitudes below 1,400 meters, and increasingly below 900 meters, maize is grown commercially using large single-crop fields with commercial inputs; this method yields more than 2,000 kilograms per hectare.

At all altitudes, mestizo farmers are geared more toward commercial agriculture than indigenous farmers. At lower altitudes, there is more maize diversity, because farmers must grow nontraditional crops for commercial export while also growing traditional crops. White grain maize is favored by low-altitude farmers for its commercial value. Traditional maize strains are found at all altitudes, while modern strains are only at lower altitudes. Both mestizo and indigenous people plant a variety of maize throughout all altitude levels, although mestizo farmers will try to change their maize seeds and promote gene flow between traditional and modern maize strains.

Maize color is the utmost classifying factor for all farmers. White maize appears only in lower altitudes, while yellow maize is dominant for both mestizo and indigenous farmers. Indigenous farmers favor other maize colors rather than white and yellow, possibly because minor maize colors are associated with indigenous rituals throughout Mexico. Since most commercial growers are mestizo and farm at lower altitudes, they plant white maize, because their buyers prefer white maize. Farmers at lower elevations import modern seed from outside sources, while farmers at higher elevations restock seed banks from the community. Mestizo growers employ a more linear system of energy (it cannot support itself), whereas indigenous farmers obtain their seed directly from their last crop (a circular system).

Between the two farmer groups, Brush and Perales (2007) found three possible differences in maize management: environmental factors, socioeconomic factors, and cultural knowledge. They found mestizo and indigenous farmers live in different ecological niches across each

altitude range, and their management choices are inspired by the environment, but not determined by it. Because similar strains of maize are found across all elevations on both mestizo and indigenous farms, the environments in which the two types of farmers farm cannot be very different from one another. This argument suggests environmental differences are minor within a particular altitude range and not the main reason influencing different avenues of maize production within a particular elevation.

Socioeconomic factors such as education, farm size, and access to credit may restrict indigenous farmers from entering the commercial market in areas where both ethnic groups live in lower altitudes. But, this does not explain why farmers at higher altitudes grow maize only for subsistence. Cultural differences are not very significant either, but they provide the best explanation for the contrast in maize management: Indigenous people acquire seeds from within the community, which supports local knowledge and social networks, whereas mestizo farmers do not. Indigenous culture is geared toward crop diversity and a more stable ecosystem, while lower-elevation mestizos are geared toward homogenous commercial crops. These planting practices are mostly a result of cultural attitudes and choices simultaneously affecting and being affected by socioeconomic as well as environmental factors. Indeed, this study aims to clarify relationships between humans and their environment.

All these explanations influence one another. Environmental constraints influence socioeconomic, which, in turn, influence cultural attitudes. These cultural attitudes represent adaptive strategies toward the environment, which is in turn being shaped by cultural attitudes. Understanding these relationships is a key step in human ecology.

Overpopulation

Whether humans realize it or not, they affect the earth with nearly every action they perform. Human action can either be directed toward preserving earth's systems or destroying them. As much as humans want to believe it, "a long history of growth does not imply a long future" (Ehrlich et al., 1973, p. 10). There are several factors that will ultimately affect whether the earth collapses or continues as an appropriate environment for humans. A major factor is overpopulation.

Momentum is the gathering speed behind population growth. Momentum is propelled by the number of females in a population at child-bearing age combined with the number of females who have yet to reach child-bearing age, because both female groups have the potential to increase population growth for another generation. Momentum fosters economic growth and technological advancements, intensifying production of natural resources; this exerts more pressure upon resources.

The delay between cause and effect adds pressure to environments too. Time between an occurrence and its effects may mislead some into believing there was no injury or the problem was solved, postponing necessary action needed to correct problems (Ehrlich et al., 1973). When dealing with population growth, understanding momentum and time lag are crucial.

However, the world's overpopulation problem is not just one problem; therefore, it requires more than one solution. Humans need to reduce consumption, reduce and improve technological impacts on the environment, and slow or stop population growth (Ehrlich et al., 1973). Just as population can grow exponentially, so can population problems. The larger a population, the more quickly it will grow and develop more problems. Following this trend, humans' ability to address increasing problems diminishes, because there are more people to be governed by less responsive governors. The most feasible options are lost to humans the longer they wait. Time lag can delay notice of a problem, and the time it takes to fix a problem grows longer with increased population growth (Ehrlich et al., 1973).

Population growth is mostly controlled by birth and death rates. Birth rates are expressed as babies born per 1,000 people per year. To calculate birth rate, the total number of births for the year is divided by the estimated population at the midpoint of that year. For example, the birth rate for Argentina in 2007 was 19 births per 1,000 people. Death rates are calculated the same way as birth rates except without midpoint growth estimation. In 2007, Argentina's death rate was 8 deaths per 1,000 people (Population Reference Bureau, 2009). Natural population growth is calculated using the difference between birth and death rates divided by the total population and recorded as per hundred (Ehrlich et al., 1973). Therefore, Argentina's natural growth rate was 1.1% for 2007. The actual population growth rate accounts for immigration and emigration.

Before modern times, population growth was mainly controlled by death rates. Where population increases occurred throughout history, it is because of lower death rates, not increased birth rates. The first big drop in death rates was during the Agricultural Revolution, and this was also the first demographic transition. During this time, people turned their attention from food gathering toward food cultivation, and this made more food available to everyone year round. This change in food production freed people from gathering food, because enough food to feed an entire village could be grown by fewer people. The newly acquired leisure time was directed toward bettering every aspect of human life, which further lowered death rates (Ehrlich et al., 1973). As technology bettered life through industry, agriculture, medicine, sanitation, and transportation, the death rate dropped even further and allowed populations to grow. As long as the environment would allow it, most people on earth had high birth rates and low death rates; however, during the Industrial Revolution, birth and death rates in Western Europe began

to decline. This decline was caused by a production shift from agriculture to industry and caused another demographic transition.

In agrarian societies, families encouraged high birth rates, because more children meant more people to help with necessary chores. Hence, children in an agrarian culture are seen as an economic benefit and asset. As industry shifted focus away from agriculture, the need and want for larger families declined, because children in an industrial society are an economic liability. They must be fed, clothed, educated, and kept healthy; these necessities demand large incomes. Children are also consumers and decrease family mobility, which is valued in an industrial society. Children make it harder to gain capital, because they do not usually contribute to income but take away from it. Further hindering birth rates in industrial societies, women and men marry later in life; accordingly, women lose many of their prime reproductive years before marriage, and this further decreases birth rates (Ehrlich et al., 1973).

A third major demographic change occurred after World War II, when major decreases of death rates appeared in underdeveloped countries (UDCs). Death rate decrease in UDCs was caused primarily by better health measures; medicine, drugs, and education about sanitation moved from developed to underdeveloped countries. With better medical knowledge and supplies, UDCs' death rate decline is in large part due to control of infectious diseases such as malaria, yellow fever, smallpox, and cholera. The death rate decreased most for small children and young adults. Although these health benefits produced a major change in UDCs, this change did not occur within UDCs; it was a function of outside factors, and socioeconomics did not encourage lower birth rates at the same time the death rate dropped. Indeed, these UDCs were not industrialized, so they did not have the same cultural or economic pressures to drop their birth rates. Due to the last major demographic trend, UDCs have a larger base of dependents to support, and this fosters more growth, which further undermines their economic situation (Ehrlich et al., 1973). Zambia is an example of a UDC trying to modernize its socioeconomics using industrial tactics across a large population.

Case Study

In the late 1950s, the colonial government of Zambia, with the help of the World Bank, built the Kariba Dam on the Middle Zambezi River, and relocated entire Gwembe Tonga villages from their traditional areas. Cliggett, Colson, Hay, Scudder, and Unruh (2007) utilized ethnographic data collected over a span of 50 years with modern satellite imagery to formulate opinions about land cover and the Gwembe people's land use patterns. Over time, the Gwembe people utilized the environment in the most opportunistic way possible.

In southern Zambia, where the dam is located, farmers are no longer willing to invest in seed or fertilizers, because they know there is high risk of losing their crops. The dam produced this uncertainty. In the 1980s and early 1990s, drought reduced water levels in the reservoir behind the dam, and irrigation became unfeasible, leaving some farmers without water for crops. Conversely, when the lake shrank, fertile land was exposed along the shores for farming. Switching their focus to these newly exposed shore fields, farmers were able to let other fields lie fallow that had been worked constantly since the dam was built.

In the late 1990s and early 2000s, rainfall brought floods and quickly raised the water level of the reservoir. Farmers lost crops, cattle, and farm equipment. Below the dam, fields along the river banks were flooded when floodgates were opened on short notice or no notice at all. These shore fields provide a great resource, but uncertainty makes farming them a high risk operation. Because humans have cleared land for fields, firewood, and building materials, vegetation cover has decreased, allowing flash floods to cause erosion.

War has also brought misery to farmers indirectly. In the 1950s, new roads were built, and credit facilities set up soon after for “seeds, fertilizers and agricultural equipment” (Cliggett et al., 2007, p. 23). The roads allowed farmers to transport their crops to market and receive foreign inputs in the form of fertilizers and pesticides, which produced more crops. However, war in Rhodesia spilled into Zambia and created problems for rural communities. Landmines were strewn across the land, roads were destroyed, and a new structural adjustment curtailed rural economies. Buyers no longer found picking up crops from farms profitable due to deteriorated roads. The poor road conditions also meant inputs were delivered late, if at all. Prices of crops swelled or dropped because of competition with foreign relief grain, and government policies for credit vanished. Some farmers have switched to growing marijuana, because it is profitable, drought resistant, transportable, and requires few inputs. Otherwise, due to production and market uncertainties, farmers invest as minimally as possible in agriculture.

As birth rates are high in the Gwembe region, the arable land available per person is dwindling. People resort to other ventures to generate more income, such as mining, fishing, producing tourist knickknacks, or resettling their entire village where they can farm more profitably. Population pressures increase when prime arable land is given to Europeans or non-Zambians for plantations, crocodile farms, and game ranches for tourists. Whenever there is available land, people will try to make it work until the next opportunity comes along. Fundamentalist Christian churches could bring livelihood changes, because the old Gwembe cult of witchcraft is beginning to be seen as a source of misfortune. These spiritual shifts may alter how people “identify family, mobilize labor, and choose to make a living” (Cliggett et al., 2007, p. 26).

The latest subsistence trend has been to uproot completely, and move to where land is available. Most Gwembe people move to lands near the Kafue National Park because there are benefits of “higher rainfall, better fields, better crops, abundant wood and lots of wild game” (Cliggett et al., 2007, p. 26). These rewards offset the costs imposed by lack of infrastructure, isolation, inadequate water supplies, and threats from wild animals. Overall, mobility has been a primary Gwembe strategy to deal with “environment change, population growth and socio-political dynamics” (Cliggett et al., 2007, p. 27). The only certainty Gwembe people have is uncertainty.

Zambia’s Gwembe Tonga encountered changes in their environmental elements. As the Kariba Dam was not an initial adaptation challenge, the dam is a variable biophysical condition caused by a variable socioeconomic condition: Politics changed to allow the dam. Change in these two environmental conditions initiated changes in other conditions. The dam affected constant biophysical conditions, such as land availability and field access, while also affecting constant socioeconomic conditions of the Gwembe, such as their traditional method of subsistence and social integration.

Future Directions

As seen in Zambia’s example, humans must adapt new sustainable resource management strategies or face collapse. To achieve sustainability, there must be agreement with respect to major goals and how these goals are defined (Sargent, 1983). Developing new technology, easing population pressures, and changing antiquated ideas about humankind’s relationship to the earth are essential goals. However, the balance of sustainability mostly deals with population numbers; if the population gets too large, something must change to accommodate the increase.

Along with increasing their populations, humans have given increased mobility, through advanced technology, to nearly every other organism on the earth: plant, animal, insect, and disease. These organisms hitch a ride on human means of transportation (Park, 1961). As humans continue to impact ecological systems, the connection between these systems and their own well-being is apparent.

An easy step toward achieving sustainability is implementing global recycling. On average, recycling consumes less energy than processing raw materials and saves energy while emitting less pollution; yet, few countries have moved toward encouraging recycling in their economies. Earth’s natural systems sometimes mirror effects produced by humans. For example, the earth’s climate has periodic temperature shifts, making it hard to assess humans’ impact on global temperatures through greenhouse gases. Rapid climatic shifts experienced in modern times are not unlike shifts that occurred naturally between glacial periods, and such shifts make data on human impacts hard to

identify (Chen et al., 2007). Even with continued research, only time may reveal humans' impact with respect to warming the earth.

Human ecology is a science aimed toward the future. Not only does it aim to solve current problems, it seeks to implement new sustainable strategies to balance human systems within environmental systems. If human adaptive strategies continue to lack an emphasis on sustainability, humans may allow looming crises to swell into a global catastrophe. The most pressing of these crises for humans is overpopulation. Due to time lag and momentum, humans will not know they have exceeded the earth's carrying capacity until it is too late. Humans must address overpopulation immediately to quell growing numbers.

Ehrlich et al. (1973) ask some significant questions about humanity's future on earth: How long will it take the earth to return to equilibrium after humans exert their final pressure on the carrying capacity? And how many of these pressures on the earth can be alleviated through technology? Indeed, technology paved the way for human comforts and expansion. Will technology continue to alleviate population pressure, allowing the idea of business as usual to continue? Or will change occur within the human mind to stimulate action toward sustainability?

The answers lie in utilizing both approaches, not just one or the other; this tactic has worked splendidly when it has been employed by humans. With it, humans have expanded their environment so much there are no more environments on earth to conquer. Clearly, the human future depends on answering these pressing ecological questions. Human ecology will help ask and answer questions for the future and facilitate strategies to solve ecological problems between humans and their environment, and it will do so through its holistic nature. Human ecology, along with other sciences, can solve life-threatening problems by providing sustainable solutions; only then will humans be an enduring presence on the earth.

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FEMINIST ANTHROPOLOGY

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This chapter critically reviews and discusses the emergence and maturation of feminist anthropological thought over the past three decades. The chapter also examines the ways in which feminist anthropology has critiqued, rebuked, and theorized the metadiscipline of anthropology. Feminist anthropology has, from its academic beginnings, sought to subvert a number of difficulties that came to define the metadiscipline in the 20th century.

Even while coming from multiple ideological viewpoints, feminist anthropologists have had several common themes through which to discuss and theorize the metadiscipline. These themes include, but are not restricted to, (1) correcting academic male bias in the ethnographic record, (2) developing an anthropology of women, (3) seriously discussing the oppression of women, (4) rediscovering women anthropologists of the 20th century, and (5) theorizing about gender relationships and their social meanings. In order to discuss the broad swath of feminist anthropology, it is necessary to move freely through the literature from the 1970s to the early 2000s; however, it is not the intention of the author to create a teleological survey of the literature. Instead, here is an overview of an ever-changing, ever-growing division of anthropology.

Subverting Dominant Paradigms

To accomplish the five above-stated goals, feminist anthropologists are influential in turning long-held notions

of women's lives and daily lived experience on their heads. Sociocultural dichotomies are among the many restrictive models used by the metadiscipline over the last 100 plus years. These dichotomies are those pairs that have been identified by anthropologists in the course of conducting fieldwork and reviewing and studying ethnology, and/or these pairs may have been conceived and applied as a result of personal experience. Under this category, I would include such pairs as female: male, nature: culture, domestic: public, raw: cooked, self: other, and so forth. In most cases, these pairs began their academic tenure as so-called intrinsic, universally constant, essential elements of all human beings.

Upon "discovering" and defining these dichotomies, anthropologists began the process of commenting on the possible meanings. Of particular importance to feminist anthropology are the central, idealized subjects, "woman" and "man." After reading and pondering over a wide variety of theoretical and ethnographic materials, this writer comes up with the same conclusion over and over again. That is, the only universally, biologically essential characteristic that is applied over and over again to human beings everywhere is that of woman: nature, or childbearing and the functions of women's bodies. What is important in multiple cultural contexts, and how that specific definition is manipulated through both theoretical statements and "concrete facts," is perhaps the major concern of feminist anthropological thought. Whether we are discussing foraging societies and household arrangements or the meaning

of family in postmodern societies such as the United States, this characteristic and its ensuing influences and problematics resurfaces over and over again.

The modern feminist movement, as a whole, was and is a reaction to Western society's attempt to pigeonhole women into a single role, that of child-bearer and servant to men, devoid of an autonomous personhood. This fact alone has been a primary factor in the still emerging thought of feminist anthropology. One of the ways that emergent thought is expressed is in the attempt to critique and subvert dominant Western stereotypes. Feminist anthropology is most concerned with the oppression of women and essentialized explanations of gender, social relationships, kinship systems, sexuality, and division of labor perpetuated by a male-dominated, European American, professional population since the 19th century (Moore, 1988).

Feminist anthropologists have been on the leading edge of subverting and redefining these stereotypes. In the beginning, feminist anthropological theory was an attempt to answer the seemingly obvious questions, "Are women universally oppressed?" and "Where did the oppression of women begin?" (Rosaldo & Lamphere, 1974). However, these questions were challenged even as they were being asked from within the feminist anthropological community and so began to subvert the very assumptions upon which they were based (Leacock, 1978; Moore, 1994; Rapp Reiter, 1975; Rosaldo & Lamphere, 1974). In this process, feminist anthropologists identified, and began grappling with, centuries-old assumptions about women and women's lives. Because of this, feminist anthropology is intertwined with some of the most recent developments in general anthropological theory, most notably postmodern and poststructural interpretative paradigms. To their credit, feminist anthropologists have managed to employ elements of postmodern and poststructural thought without, necessarily, continuing to a continually deconstructing—and ultimately unusable—theme. Feminist anthropology, unlike some poststructural critiques, provides the ability to create both new models and a "simultaneous move towards plurality and specificity" (Moore, 1994, p. 11).

Universalizing or Particular Knowledge

In the following discussion, we will explore what feminist anthropologists have theorized and subverted toward the ends of answering not only the initial questions of the universality and origins of the oppression of women, but more recently and more provocatively, "How does the oppression of women continue so effectively and in so many places?" and "How do specific groups of women and men work against gendered and other oppressions in their everyday lived experience?"

In the initial exploratory texts of feminist anthropology, *Woman, Culture, and Society* (Rosaldo & Lamphere, 1974) and *Toward an Anthropology of Women* (Rapp Reiter,

1975), there was an assumption by the majority of emerging feminist anthropologists that the universal oppression and subordination of women was and is a given. Rosaldo and Lamphere stated in the introduction to *Woman, Culture, and Society* that women have always, everywhere, been socially and politically inferior to men. Ruth Behar describes this tenet as an "effort to understand the [world-wide] social and political ramifications of women as the second sex" (Behar, 1995, p. 14). This in itself is a Western, deBeauvoirian tenet. This universalizing tenet led early feminist anthropologists to attempt to discover the "*origins* [italics added] of women's subjugation" (Nicholson, 1990). Rayna Rapp Reiter stated that the "subjugation of women is a fact of our daily existence . . . we find that sexual inequality appears widespread and that the institutions in which it is embedded have a long and complex history" (1975, p. 11). However, the major difference, and a division, between *Woman, Culture, and Society* and *Toward an Anthropology of Women* in the exploration of these questions was the historical specificity of the oppression of women in Rapp Reiter's volume.

From the outset, feminist anthropology tackled the internal theoretical debates by transforming the major dichotomies from an "or" to an "and" equation. This reformulation of the structuralist binary equation began the immediate subversion of the structuralist stance from which it came (Lévi-Strauss, 1973; Moore, 1994; Rapp Reiter, 1978; Rosaldo, 1980; Strathern, 1984). In this way, feminist anthropology subverted the tension between universalism and specific knowledge and forced a complimentary "freeplay" on them (Derrida, 1978). Jacques Derrida describes freeplay as

the disruption of presence. The presence of an element is always a signifying and substitutive reference inscribed in a system of differences and the movement of a chain. Freeplay is always an interplay of absence and presence, but if it is to be radically conceived, freeplay must be conceived of before the alternative of presence and absence; being must be conceived of as presence or absence beginning with the possibility of freeplay and not the other way around. (1978, p. 294)

This interplay between what is present or "universal" (woman as subordinate and man as dominant) and what is absent or "specificity of knowledge" (women and men in equity) is a long-standing anthropological view.

Michelle Rosaldo complicated this discussion by adding another dichotomy, domestic:private. In her *ovular*¹ article of 1974, "Women, Culture, and Society: A Theoretical Overview," Rosaldo established a "public domain:domestic domain" split as a universal characteristic of the oppression of women. By 1980, however, she had reassessed her position and noted that the very language of the criteria on which the public:domestic split was based was problematic. That is, the assumption of oppression was a purely generic Western, capitalist, middle-class definition that gives primacy to the domestic:public sphere split that

became prominent in the 19th-century Industrial Revolution (Landsman, 1995; Rosaldo, 1980).

The so-called public sphere is male and assumed to be of the greatest cultural value in all societies that have evolved in the West. This leaves women in the less valued so-called domestic sphere. For Western feminist anthropologists concerned with authorial power and the wielding of that power, the domestic sphere is an inferior and devalued sector. Thus, by framing arguments in a simplistic and dichotomous way, the opposite of the original intention is achieved. That was to discover and undermine the “original” cases of the oppression of women. Instead, by overlaying the domestic:public dichotomy as universal, European-American-patriarchal-monotheistic-unilineal-essentialist schemas of women’s and men’s roles became reinscribed in the literature over and over again (Leacock, 1978; Yanagisako & Collier, 1987). Rosaldo’s eloquent critique called for simultaneously retaining and rejecting this split.

However, far from suggesting that the domestic:public pair is an outmoded and unusable category, this structural apparatus is indeed still a useful theoretical tool in many situations. Before mapping both our Western categories and ideology onto the social relationships of another group, we must redefine what domestic:public may mean. Granted, wherever the juggernaut of industrialization and capitalism has changed the economic landscape, these categories are relevant (Leacock, 1978; Moore, 1994; Rosaldo, 1980). In many other cases, however, this domestic:public apparatus does NOT work, and there have been many advocates of making an attempt at revisualizing gendered social and societal relationships through a non-Western lens (Rapp Reiter, 1979; Yanagisako & Collier, 1987). Catherine Lutz clearly states that Western academics falsely universalize *our own* dichotomies everywhere in the world, regardless of the on-the-ground situation. This “constrains both our research on gender and our efforts to bring about social change” (quoted in di Leonardo, 1991, p. 19). The freeplay, and the reformulation of the structuralist binary equation from *or to and*, still allows for practical applications in critiquing and theorizing the subjugation of women.

To accomplish the task of revisualization, a return to the early work of Karen Brodtkin Sacks and Eleanor Leacock is in order. Both women, as Marxist feminist anthropologists, concentrated their analytical efforts toward the political economies of specific Native North American nations. Brodtkin Sacks, in the essay “Social Bases for Sexual Equality: A Comparative View” (1970), pointed to the Iroquois as an alternative to static Western notions of the public:domestic spheres. She stated, “In Iroquois society, women [had] an enormous amount of decision making power in the domestic, political, and religious spheres of life” (Brodtkin Sacks, 1970, p. 457). Leacock, too, after working with other matrilineal populations of Native North Americans—specifically the Montagnais-Naskapi—found evidence of a different way of conceptualizing the daily lived experience of the division of labor (Leacock, 1978).

Leacock (1972) also points out that what was significant for women’s status is that the household was communal. A gendered division of labor existed but was reciprocal, and the economy did not involve a dependence of the wife and the children on the husband. Household management was not construed as it has been for Western society. “In primitive communal society,² the distinction did not exist between a public world of men’s work and a private world of women’s household service. The large collective household *was* the community, and within it both sexes worked too produce the goods necessary for livelihood” (Leacock, 1972, p. 33). Therefore, the domestic:public dichotomy did not exist.

While there are certainly role sets and division of labor, in these ethnohistorical cases, the people did not perceive themselves in “power over”—or authorial power—relationships per se. Instead, Brodtkin Sacks, Leacock, and other researchers have found evidence of social relations based on a nonhierarchical web (Ackerman, 1995; Ashcraft & Mumby, 2003; Bacigalupo, 2007; Bilharz, 1995; Dossa, 2004; Duggan, 2005; Goodwin, 2006; Gunewardena & Kingsolver, 2007; Perdue, 1995; Regis, 2002; Shoemaker, 1995; Sparks, 1995; Watson-Franke, 1992), one that weights women’s work and men’s work equally in the social and societal workings of the community. Brodtkin Sacks admonished in 1970 that at the end of exploitation “looking at Iroquois and Mbuti societies suggest that we need a complete reorganization of ‘work,’ a radically different kind of division of labor. If they can do it, so can we” (p. 455). This statement implies that indigenous women “overthrew” an exploitative situation similar to our deBeauvoirian one. There is no evidence of that. Brodtkin Sacks’s research can be well utilized to see around our assumptions.

Even as we discuss, describe, and cite numerous instances in which feminist anthropologists of various ideologies have given ethnographic, empirical evidence to subvert the notion of the *universal* oppression of women, in most of the literature there are some of the same complaints that began in the 1970s. The term *ovular* was coined at that time as a woman-centered alternative to *seminal*. This was experimented with in order to bring up that important academic work was, all too often, “manly.” Whether implicitly stated by feminist anthropologists of color or reiterated by quoting ovular work within a new attempt at inclusion, there is a sense of frustration with the movement—or lack of it—away from a universalizing stance (Okely, 1975, as quoted in Lutz, 1995; Zavella, 1997). The metadiscipline of anthropology has yet to fully utilize and incorporate the knowledge that feminist anthropologists have gained and written in our efforts to refocus attention toward specificity and “situated knowledges” (Haraway, 1991).

Despite the rethinking and revision of numerous feminist anthropologists on subjects as diverse as Malinowski’s ethnographic snapshot of Trobrianders (Weiner, 1988) to power and prestige among American Indian women (Klein & Ackerman, 1995), the metadiscipline reiterates and

reinforces an older definition of universal oppression. In the 1997 text by Burton Pasternak and Carol and Melvin Ember, *Sex, Gender, and Kinship: A Cross-Cultural Perspective*, the authors state that “comparative research tells us that women have very low status in a considerable number of societies, and we know of none in which women clearly have more status than men” (1997, p. 65). One can only assume that many academic departments adopted this text—written by respected and established anthropologists—as a teaching tool when it was first published, and it is still being used over a decade later. This leaves yet another generation of young anthropology students out of the feminist anthropology loop.³

Even though it is still dealing with some vestiges of the “universal oppression of women,” feminist anthropology has thrown off the shackles of continually asking why as an attempt to find the “origins” of women’s subordination in favor of asking much more sophisticated and complex questions about women’s relationships to each other and to the worlds of their daily lived experience (di Leonardo, 1991). Some of these include the following: (1) How do women act as agents in their daily lived experience (Lamphere, Ragoné, & Zavella, 1997)? (2) How do women subvert local social rules to gain agency in their lives (Lopez, 1997)? (3) What does a woman’s position as producer and controller of goods lend to her overall position—status—in her community (Babb, 1989)? (4) How does the continued encroachment of a global capitalist system affect women and their choices at a local level (Harrison, 1997)? So, while the definition and face of universalism may have been radically altered by and within feminist anthropology, we still must address the question within the metadiscipline.

Biological Essentialism or Social Construction

In the same way that the universalizing tenet was subverted through the use of specific knowledge and the reformulation of the structuralist equation, so too does social construction subvert biological essentialism. Feminist anthropologists, by necessity, recognize sex (as represented by the XX and XY pairs of chromosomes) in order to be able to talk about the categories “women” and “men.” In Henrietta Moore’s words, “Bodies. It all has something to do with bodies” (Moore, 1994, p. 17). In practice, the words *woman*, *femme*, *mujer*, *bean*, *a ge yv* represent not only a valid concept, but also a distant one. She—*elle*, *ella*, *si*—is, in fact, globally embodied in daily lived experience. It is not *being* “woman” that causes problems for those who are—or embody—it. It is, instead, the constructed role sets within which “woman” is cast that continue to subject *her* to oppression (Lamphere et al., 1997). In her 1990 article, “Can There Be a Feminist Anthropology,” Abu-Lughod commented that the great “importance of the fact that the women we encounter in the field often recognize us as women, however different, has not received much attention” (1990, p. 26).

Biological essentialism, sociobiology, and bioculturalism have a tendency to set the women’s movement and women’s status back into a Victorian/post-World War II “Angel in the House” or “Donna Reed” realm (Moore, 1994; Ortner, 1984; Stocking, 1987). In the same way that the metadiscipline has persisted in retaining ideas about the universalism of women’s oppression in its primary form, so too has this kind of essentialism held on. Relegated a century ago to the role of mother and dependent partner of “man the hunter,” “woman” was, and is, essentialized and universalized in the Victorian European American ideal (Dahlberg, 1981; Lee & DeVore, 1968). Stocking found proof that the early metadiscipline largely ignored women and women’s lives, noting that Herbert Spencer

later justified the limitation of women’s political rights on evolutionary grounds: because the vital needs of reproduction arrested their individual mental evolution at an earlier age, and their [feeble] characteristic mental traits . . . were those adapted to “dealing with infantine life” and relating to the stronger male, their present hereditary makeup would incline them to support authoritarian government and incautious (i.e. maternal) social policy. (Stocking, 1987, p. 205)

Frances Dahlberg’s work, in fact, predated Stocking’s findings; she summed up the metadiscipline’s read on that oft-told story, “Man the Hunter”:

Hunters [read: men] must be intelligent—to remember where they have gone and successfully return with meat to their *waiting* [italics added] wives and children, to find food and water for themselves on the hunt, to anticipate their prey’s actions, to make weapons, and to plan with other men for a successful hunt. (1981, pp. 1–2)

Clearly, this form of biological essentialism plays into the universalizing tendencies that feminist anthropology has always striven to subvert, that is, that “woman” is essentially tied to her role as child bearer in near exclusion of any other. Rosi Braidotti expresses it best when she says that women’s bodies are “not an essence nor indeed a form of anatomical destiny, but rather it is ‘one’s primary location in the world, one’s primary situation in reality’” (as quoted in Moore, 1994, pp. 18–19). Here I turn to the free play between essentialism and social construction in the feminist anthropology literature.

In the same way that feminist anthropology utilized specific knowledge to analyze the universal oppression of women, so too did these researchers utilize the idea of social construction to analyze the ways in which the essential nature, for example, the reproductive capabilities, of human bodies are socially manipulated (Ginsburg & Rapp, 1991). Feminist anthropologists generally agree that gender, gender relationships, sexuality, kinship systems, and divisions of labor are not a given based on these essential physical, biological attributes. Instead these social organizations are constructed from era to era, place to place, and society to society

(Lamphere et al., 1997; Moore, 1994; Rapp Reiter, 1975; Rosaldo & Lamphere, 1974). As di Leonardo (1991) states, “Social constructionism clearly implies a respect for historical difference and change, but it also entails an understanding of the human use of history—of *constructions* [italics added] of the past—to legitimize or to contest the status quo” (p. 29).

From *Woman, Culture, and Society* (Rosaldo & Lamphere, 1974) and *Toward an Anthropology of Women* (Rapp Reiter, 1975) to the mid-1990s volume *Situated Lives: Gender and Culture in Everyday Life* (Lamphere et al., 1997) to the most recent additions, *The Gender of Globalization: Women Navigating Cultural and Economic Marginalities* (Gunewardena & Kingsolver, 2007) and *Making Miss India Miss World: Constructing Gender, Power, and the Nation in Postliberalization India* (Dewey, 2008), study after study points to the fact that the construction of gender, gender relationships, sexuality, kinship systems, and divisions of labor not only differs from country to country and region to region but also is enacted heterogeneously within populations. Because the evidence for this is clearly obtainable in the ethnographic record, feminist anthropologists once again subvert a universalizing tenet that would essentialize all women into a single role set and all men into another.

Sherry Ortner’s ovular work of 1974, “Is Female to Male as Nature Is to Culture?” reconceptualized and attempted to problematize a dichotomous pair in much the same way Rosaldo did the public:domestic pair. In a 1996 essay designed “partly in the spirit of defining [her]self, but largely . . . in the spirit of learning something from all this” (Ortner, 1996, p. 177), Ortner deconstructs her own structural pairs—female:male as nature:culture—by calling on some of the critiques of the original essay (Collier & Rosaldo, 1981; Leacock, 1981; MacCormack & Strathern, 1980; Yanagisako & Collier, 1987). While some scholars critiqued Ortner’s universalizing (MacCormack, 1980; Yanagisako & Collier, 1987), others discriminated between universalism and essentialism and leveled their criticisms at Ortner’s implementation of the dichotomies cross-culturally, as an essentializing position (Collier & Rosaldo, 1981).⁴ Judith Okely’s rereading of Simone de Beauvoir’s *The Second Sex* suggests that Ortner’s early reliance on that work (Ortner, 1974, 1996) places essentialized biologism “squarely on woman,” since “de Beauvoir systematically outlines a dominant European tradition which, since the 18th century Enlightenment, sees nature as inferior to culture. . . . She [Ortner] is implying it is ‘natural’ to look at ‘nature’ in a specific way” (Okely, 1996, pp. 179–180).

Ortner, like Rosaldo before her, reassessed her original argument to reconfigure what both female:male and nature:culture may mean as socially constructed terms. Her reassessment also includes a turn toward practice theory (Ortner 1983, 1996).⁵ With this turn, she places herself in a position to critique her early work by employing notions of social construction to subvert her earlier essentialized, universalizing position. About her own paper “Is Female to Male as Nature Is to Culture?” Ortner writes,

I also think that the *linkage* between such structures and any set of social categories—like female:male—is a culturally and politically constructed phenomenon. . . . My interests lay much more in understanding the politics of the construction of such linkages, than in the static parallelism of the categories. (Ortner, 1996, p. 180)

Ortner’s *linkage* corresponds to what I have defined as a reformulation of the structuralist binary equation, a clearly common theoretical tool of feminist anthropology.

I would go so far as to suggest that in some field situations—those similar to what is described as appropriate through the domestic:public lens—female:male as nature:culture is a valid frame. However, we must constantly be mindful of the tendency toward oversimplification, universalizing, and essentializing in the metadiscipline. There is still room for feminist anthropologists to rewrite the equation and allow for “universal particularity” (MacKinnon, 1993, as quoted in Moore, 1994, p. 17).

Interpretive or Cultural Materialism

Interpretive anthropology was heavily affected by Geertz’s 1973 work on symbolic anthropology, *The Interpretation of Cultures*. He defined culture as a “historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which [people] communicate, perpetuate, and develop their knowledge about and attitudes toward life” (Geertz, 1973, p. 89). Lamphere et al. (1997) invoke this general definition of culture for use in their anthology, *Situated Lives*, over the Boasian “culture history” definition of “complex patterns of elements, traits, and configurations that constituted the lifeways in separate but equal ‘cultures’” (p. 2). To complete their definition of “culture” in an interpretive context, it is necessary to include the work of linguistic anthropology. Di Leonardo (1991) states, “Envisioning language and political economy as mutually constitutive exemplifies the larger ‘culture and political economy’ tendency within the metadiscipline” (p. 27).

The cultural materialism school in the metadiscipline, by contrast, emphasized the “impact of external forces, and . . . the ways in which societies change or evolve largely in adaptation to such impact” (Ortner, 1984, p. 135). Ortner goes on to say that most anthropologists “ignore[d] the fact that peasants are part of states, and that even ‘primitive’ societies and communities are invariably involved in wider systems of exchanges” (Ortner, 1984, p. 141). Because of the polarity of this pair within the metadiscipline (hence the specializations), this has been a difficult subversion to attempt.

In the 1990s, as a result of a decade of ground-breaking work in the 1980s, the subversion of this dichotomy became more commonplace (Babb, 1989; Gal, 1989; Strathern, 1987). Feminist anthropologists revisualized the universalizing and essentializing stance taken by many cultural

materialist anthropologists, and the sometimes extreme cultural relativistic stance of symbolic anthropologists, to transform them through the aforementioned use of the conjunction *and* instead of *or*. In 1991, di Leonardo borrowed the term “culture and political economy” (Schneider & Schneider, 1976, as quoted in di Leonardo, 1991, p. 27)⁶ to describe the tone of many of the articles in her edited volume, *Gender at the Crossroads of Knowledge* (di Leonardo, 1991).

So, too, do Lamphere et al. (1997) invoke this stance for the articles included in their volume. Even more calculated use of dichotomous pairs as an *and* equation instead of an *or* equation exemplifies how feminist anthropology can move the metadiscipline in positive and exciting ways (Harp, 1991; Weedon, 1987). By utilizing both culture and political economy—while also acknowledging that even this stance will produce a partial knowledge—feminist anthropologists again strike a blow at structurally dichotomous pairings as theoretical tools.

The basic frame for culture and political economic feminist anthropology has been succinctly summarized by di Leonardo (1991, pp. 28–31) in five key points. These are as follows:

1. Social evolution is radically rejected. The critiques of Shostak's work *Nisa: The Life and Words of a !Kung Woman* (1981) are used as an example.
2. Those patterns of behavior conceived as “innately human or at least as well-established are neither.” Terms that label a myriad of socially constructed forms, for example, *homo-* and *heterosexual*, *race*, and *ethnicity*, do not have the same meanings across space and time.
3. As a “material and social institution and as a set of ideologies,” gender has an embedded nature in human society.” Recognizing this embedded nature of gender also means that women “must be seen not only in relation to men but to one another as well.”
4. “All forms of patterned inequality merit analysis. . . . Thus the hoary anthropological shorthand, ‘the X say’ must be replaced with genuine attention to what varying populations among the X say.”
5. Feminist anthropologists, and all anthropologists, must “attend to and investigate actively the multiple layers of . . . social location . . . through which we perceive particular cultural realities.” First and foremost, di Leonardo includes here the relationship of “researcher and researched,” a reflexive turn for the metadiscipline.

Di Leonardo continued her critique in her 2000 volume, *Exotics at Home: Anthropologies, Others, and American Modernity*, by bringing “the X” to the American doorstep to be recognized as ourselves (di Leonardo, 2000).

Culture and Political Economy or Experimental Ethnography

Di Leonardo's final point allows me to move to a final subversion in this discussion, culture and political economy

(as discussed above) or literary (experimental) ethnography (as discussed below). Di Leonardo's plea for attention to social location and perceptions of social reality are a direct response to the *Writing Culture: The Poetics and Politics of Ethnography* (Clifford & Marcus, 1986), which summarily passed over some 15 years of feminist anthropology with hardly a “by your leave” (Behar, 1995; di Leonardo, 1991). However, di Leonardo's answering text, *Gender at the Crossroads of Knowledge: Feminist Anthropology in the Postmodern Era* (1991), strikes a decidedly different tone from that of another feminist anthropological text that also purports to be an answer to *Writing Culture*, that is, *Women Writing Culture* (Behar & Gordon, 1995). The advent of both culture and political economy and literary (experimental) ethnography were deeply affected by the feminist and postmodern turn in anthropology of the 1980s and into the 2000s. These paradigms called into question the ways in which anthropologists approached the slippery term *culture* and the representations of societies and their cultural systems. As was the case with feminism and poststructuralism, in critiquing and subverting structural dichotomies, feminism and postmodernism made some of the same demands on the metadiscipline of anthropology and its traditional views of “culture” and its representations of the “other” (Boddy, 1991; di Leonardo, 1991, 2000; Moore, 1994; Wolf, 1992). Postmodern analysts critiqued traditional ethnography for claiming a homogenizing approach that placed “the X,” or the other, in a static, racist, and untenable “ethnographic present” (Clifford, 1986; Cole, 1995; Silverstein & Urban, 1996). These critics claimed—and rightly so—that knowledge, even within a relatively isolated and genetically homogenous group, is an always partial, ever-shifting set of circumstances (Clifford, 1986).

Of course, feminist anthropology had pointed out the inherent partiality within the metadiscipline of anthropology by pointing to the absence therein of both representations of women in society and of women anthropologists (Leacock, 1978; Rapp Reiter, 1975; Rosaldo & Lamphere, 1974). That was more than a decade prior to *Writing Culture*. The static, ethnographic present of “the X,” feminist anthropologists concluded, was also a static androcentric viewpoint. If and when women were included, it was to shore up the very dichotomies that I have previously discussed—essentialized and universalized notions of the public:domestic spheres and the question of whether female:male was equivalent to nature:culture (Ardener, 1975; Behar, 1995; Buckley, 1989; di Leonardo, 1991, 2000; Mascia-Lees, Sharpe, & Cohen, 1988; Moore, 1988; Rosaldo & Lamphere, 1974).

The more complex and sophisticated feminist anthropological theory becomes, the more our different ideological stances crash into one another without specifically relating. To wrap up the previous section, culture and political economy can be characterized as grounded in empirical evidence. Not, as in Geertz's words, as “empiricism, magpie amassment of cultural detail, produc[ing] an ethnographical

telephone book” (Geertz, 1995, p. 23), but as best exemplified in this statement by di Leonardo (1991):

In the end, the careful attempt to discern the meanings of gender in other cultural worlds and the bringing together of ethnographic, historical and political-economic knowledge of particular populations can be seen as the most fruitful modes of feminist anthropological practice. (p. 17)

Literary (experimental) ethnography, the supposed opposite of culture and political economy, is a complex mix of “textual experimentation” that can include “autobiography, ethnography, and memoir to reflect on Western feminist desire, location, and knowledge” (Gordon, 1995, p. 432). It is important to note that this work is grounded in empirical evidence used in the same spirit as di Leonardo’s above definition. Yet, there are some striking differences as well. To further clarify literary (experimental) ethnography, the modifiers *self-reflexive* and *personal* are added.

Self-reflexivity—in and of itself—is, in the 21st century, a fairly common occurrence in anthropological literature. I daresay that most graduate students have come to expect a certain level of self-reflexivity to add contextualization—that is, social location—to the anthropological text. Further, it is practically impossible to include that self-reflexivity without some personal information becoming evident. Again, this is expected, as it lends an air of reality to both the writing and the writer, and perhaps more importantly, to the ethnographic material. However, the degree of personal self-reflexivity⁷ in works that are identified by the authors as being in the field of culture and political economy is less than is evident in a great deal of the literary (experimental) ethnography (Abu-Lughod, 1993; Behar, 1993; Gottlieb & Graham, 1993; Visweswaran, 1994).

In the 1990s, feminist culture and political economy and feminist experimental literature have been an answer to postmodernist critiques, each going its own way toward complex and holistic anthropological work. Whether the literature is based in the more familiar ethnographic form and concentrates on using its empirical base to describe and theorize “the play between speech and economy, power and agency” for a group of aboriginal women (Povinelli, 1991, p. 249) or whether it takes a more experimental form that incorporates women’s poetry (and its effect on men) and representation of women’s oral narratives (Abu-Lughod, 1993), the feminist anthropological project ends up critiquing and theorizing the metadiscipline (Ferrari, 2008).

Upon reading much of this literature, it becomes apparent that many of the same scholars are writing very different kinds of articles for volumes that fall within the purview of each of these genres. An unfortunate phenomenon is that despite that fact, there is very little cross-citation. It is as if they stand in near complete isolation relative to one another (Behar & Gordon, 1995; di Leonardo, 1991; Lamphere et al., 1997). To begin to subvert this most recent dichotomy that has arisen within feminist anthropology itself, the conclusion

will identify an inclusive stance that, while it is no means new (Brodin Sacks, 1989; Rothfield, 1991; Yanagisako & Collier, 1987), has yet to be fully embraced.

Conclusion

Feminist anthropology has long advocated a methodological stance that Rosaldo and Lamphere called for in *Woman, Culture, and Society* in 1974, that is, to be proactive and inclusive. Gordon (1995) also called for this proactive stance in 1995 when she said,

We need feminist fieldwork in the U.S. that participates in political activist and advocacy-oriented research. Interdisciplinary dialogue with oral historians who work within a disciplinary tradition of public advocacy might pull feminist anthropology at home toward grittier intellectual alliances such as with community educators and activists and with each other. (p. 375)

Faye Harrison’s work cuts across these boundaries. In her latest volume, *Outsider Within: Reworking Anthropology in the Global Age*, Harrison invokes the concept of “weaving” to achieve the goals of being both proactive and inclusive (Harrison, 2008).

This is especially important in U.S. society, where cultural interpretations crash into each other at an astounding rate. For example, feminist anthropologists need to theorize and offer solutions where the new world order reorganizes so-called debtor countries’ economic systems to match our own, with military buildups paid for by social program extinction; or where multinational corporations in search of cheap labor strip adults and children from subsistence activities and thereby create situations in which people who were relatively self-sufficient become exclusively dependent upon a cash economy (Davison, 1989; Harrison, 1997, 2008; Lamphere et al., 1997).

Humans have the cognitive ability to see beyond their milieus of familiarity. As proof, as feminist anthropologists, we must take ourselves. Our experiences, writing, fieldwork, and teaching pedagogies have extracted a great many of us from our consanguine relationships and make it difficult, if not impossible, to “go home again” (Abu-Lughod, 1991; Behar, 1993; Visweswaran, 1994). Feminist anthropologists are collectively writing toward a theoretical stance with a breadth, width, and flexibility to articulate concerns of multiple groups of women—for example, feminist anthropologists with various ideological backgrounds, and those myriad groups of women with whom we work—that continues to *weave* itself and be woven by its thinkers (Harrison, 2008). Feminist anthropology also continues to move toward a theoretical stance that is not a reaction to some earlier adaptation but is inclusive, an inclusion that is not only rhetorical but practical as well. This means that *all* of the work we undertake as feminist anthropologists is validated: (1) historiography—both theoretical and auto- and biographical, (2) ethnography—from empirical data

collection to experimental text, (3) social relations—from culture and political economy to linguistics, and (4) women's lives—to include oral narrative and individual story (Behar & Gordon, 1995; di Leonardo, 1991; Gunewardena & Kingsolver, 2007; Lamphere et al., 1997; Silverblatt, 1991).

There is also a need to develop a way to critique an argument without resorting to the accusatory polemic that ends up rejecting many women and most men from the conversation. A web, not a hierarchical frame or yet another binary dichotomy, must be more widely acknowledged to elucidate the complex and continually shifting set of relationships that all individually effect the whole (Ackerman, 1995; Bilharz, 1995; Harrison, 2008; Medicine, 2001; Perdue, 1995; Shoemaker, 1995; Sparks, 1995; Watson-Franke, 1992).

Structural dichotomies serve to constrict the scholarly work of feminist anthropologists to a continual recapitulation of and with Western academic norms. Feminist anthropological theory generally insists upon “greys”—polarizing to nether black nor white—and, as we have seen in the discussion of the subversion of the structuralist equation, can rarely give a sole good/bad definition to its tenets. Dichotomous thinking serves racist, colonialist, and imperialist ends by continuing to exclude the very voices of those caught in the midst of them. A. Lynn Bolles admonished feminist anthropologists in 1995 at the American Anthropological Association meetings by asking, “Where are the African American women anthropologists?” Seldom cited (except for the rare exceptions of Brackette Williams, Patricia Hill Collins, Faye V. Harrison, and now, after decades of invisibility, Zora Neale Hurston), the thoughts and voices of these women—and of Latina, Native American, Asian and Asian American, African, and other women anthropologists—are still largely lost between the polar reaches within the metadiscipline. In the continuing debate and lack of mutual citation and inclusion of each other's work over the best way to theorize and discuss the ever-widening rage of gendered relationships and women's roles in societies globally, we, feminist anthropologists, are denying ourselves the solidarity that could become a factor in effecting positive change in the actual lived experiences of women.

The continued marginalization of women's cultural knowledge and experience, feminist anthropological writing, and feminist anthropologists themselves in the coursework of anthropology graduate students keeps producing—or reproducing—the knee-jerk reaction of astounded discovery that initiated the 1970s explosion in feminist anthropological literature. This is the reason that feminists, women and men, continually need to “discover” that literature over and over again. Until some primacy is given to a feminist anthropological viewpoint, and until and unless there is an effort made on the part of the metadiscipline of anthropology to be more inclusive within the discipline, graduate and undergraduate students will be “discovering” Ruth Bunzel, Elsie Clews

Parson, Ella Deloria, and Zora Neale Hurston all over again decade after decade.

Notes

1. Collier and Yanagisako (1987).
2. It should be noted here that Leacock did indeed fall into the universalizing trap that probably caused much of her work to be overlooked in recent feminist anthropological literature. However, looking past that tenet, her point is well taken and can be used as a tool for rethinking the public:domestic dichotomy.
3. A look at the bibliography of this book corroborates the critique. Few works of feminist anthropologists are cited, and those that are are from the 1970s, when the question of universal oppression was first addressed (Pasternak, Ember, & Ember, 1997).
4. These feminist anthropologists also critiqued Rosaldo's domestic:public dichotomy as essentializing (Collier & Yanagisako, 1987; MacCormack, 1980).
5. Practice theory is defined as “anything people do . . . the study of all forms of human action” (Ortner, 1984, p. 149).
6. While Schneider and Schneider (1976) are not generally described as “feminist,” per se, the corpus of Jane Schneider's work (in collaboration with self-described feminists, e.g., Rayna Rapp Reiter and Annette Weiner) may be loosely seen as such. Thus, this very specific reformulation of the structuralist equation was developed in conjunction with an anthropology by and of women. Also note that in 1984, Ortner did not use the reformulation but instead criticized the work as “studying the effects of capitalist penetration upon . . . communities” (Ortner, 1984, p. 141).
7. That may seem redundant, but the aim here is to separate positionality (self-reflexivity) from consciousness-raising-style “gut spilling” (personal). While there is still a place for consciousness raising, it has not been included in much academic literature.

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TERRORISM

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The September 11, 2001, terrorist attacks on the World Trade Center in New York City and the Pentagon were the first in a series of dramatic and destructive terrorist attacks in which Islamist extremists sought to coerce Western and pro-Western governments into changing at least some of their policies. Subsequently, there were major attacks in the United Kingdom, Spain, Algeria, Egypt, and Jordan by Islamist radicals. Thousands of people perished in the September 11 attacks alone, and hundreds died after trains were bombed in London and Madrid.

These attacks made terrorism a front-and-center issue in the United States and Western Europe, but terrorism has been a major concern for many decades in many different parts of the world. Israel, Sri Lanka, India, Pakistan, Indonesia, the Philippines, and Japan, for example, have also experienced serious terrorist incidents since the mid-1990s. Indeed, terrorism in various forms has existed for centuries. Perhaps the earliest organized terrorist movement was by the Zealots in the first century. The Zealots used public assassinations as a tactic for frightening Jewish residents into refusing to cooperate with the Roman occupiers of the Holy Lands.

Terrorism was particularly widespread in 19th-century Europe. Anarchist and nationalist groups all resorted to violence against government officials and/or average citizens suspected of collaborating with the authorities. Anarchists sought to topple governments by killing key

leaders—hoping that this would usher in an era of self-governance by the people themselves. Nationalists as far apart as Armenia (in the Ottoman Empire), Bosnia (in Austria-Hungary), and Ireland (in the British Empire) used violence against nonmilitary targets, including civilian infrastructure like the London subway, to do what the Zealots had attempted to do centuries earlier: compel an imperial power to withdraw and grant their territories independence.

Definition of Terrorism

It is ironic that despite the international concern over terrorism, the states of the world have been unable to agree on a single definition of the term. The primary reason is political. Some states believe that certain forms of violence should not be categorized as terrorism, merely because it suits their foreign policy interests, or because they believe that “Western” definitions of terrorism are hypocritical. This is particularly the case with the violence perpetrated by Palestinian groups against targets in Israel. Often these attacks consist of suicide bombings on Israeli streets or the firing of small rockets into Israeli villages from the Gaza strip. Arab states believe that these actions should be considered a legitimate form of resistance against an occupying power. (Israel occupied Gaza until recently and still occupies much of the West Bank.) Often this view is associated with the perception that Israel is not a legitimate

state in the first place—despite the fact that it was recognized by the United Nations 60 years ago and that some Arab states and the Palestinian Authority have acknowledged Israel's legitimacy.

Arab and Muslim states, in general, also believe that the United States and other Western powers should recognize that the actions taken by the Palestinians are not so different from the violent acts performed by American and European revolutionaries in the 18th and 19th centuries or by the anti-Nazi resistance in World War II. They maintain that it is hypocritical to label Palestinian violence as terrorism but attacks on nonmilitary targets during the American or French Revolutions as acts of heroism. Of course, it is equally hypocritical for these same Arab states to deny—as they do in statements by the League of Arab States—that antiregime violence directed at them by domestic revolutionaries is terrorism, not a legitimate form of resistance.

The differences about whether Palestinian violence should or should not be classified as terrorism will persist for the foreseeable future—so there may not ever be a common, international definition. There has, nevertheless, been a consensus among scholars and statesmen in most of the world that terrorism is

violence against nonmilitary or civilian targets that is designed to create fear outside the immediate circle of victims, in order to promote a political objective.

This definition provides important criteria for distinguishing among “ordinary” crime, psychotic behavior, and terrorism. The definition also allows us to distinguish between terrorism and insurgency or guerrilla warfare, although in practice there is overlap, as insurgents often use terror tactics. For our purposes, though, an insurgency is an organized attempt by a group of people to confront the military forces of a state and to secure control over a specified territory. Insurgents usually are also organized in an overt and military-like manner. Terrorists typically avoid direct confrontation with military forces and are organized more like criminal gangs—secretive and smaller in number—and rarely chose to directly confront military forces. Terrorists also ordinarily do not seek to directly control and administer territory.

The purpose of most violent crime is, obviously, financial gain for the perpetrator. Other violent crime may be intended to satisfy some personal agenda or emotional need—for example, revenge against someone for a real or perceived slight. Clearly, such forms of criminal violence can instill fear in the victims, their families, and perhaps entire neighborhoods, but unlike the case with terrorism, this fear is not created in order to serve a political purpose. Violence by a mentally unbalanced individual ordinarily can also create fear, but it is not designed to achieve a rational political goal.

Another form of politically motivated violence against civilian targets is terror practiced by the state against its

own population or the population of an occupied territory. One of the most infamous examples is the violence of Nazi Germany against German Jews and others as well as against civilian populations in much of Europe during World War II. An equally infamous example was the Great Terror in the Soviet Union, notably under Joseph Stalin, where millions of average citizens were killed or sent to labor camps and even government and military functionaries were jailed or executed, even though they were innocent of any crimes against the state. In both cases, the purpose of the violence was political: to eliminate opposition to the regime and its policies. Thus, the practice of state terror differs from terrorism in important respects. It is conducted by the state itself and is designed to prevent policy or regime changes, whereas terrorism is conducted by non-state actors (individuals or groups that are not employed by a state and are thus free to act independently of any state) who are seeking change.

Because of their nonstate status and the fact that their violence is illegal, terrorists ordinarily organize into conspiratorial groups with internal discipline necessary to evade the authorities in the states where they commit their acts of violence. As noted below, there are exceptions, as some groups have become so large and so entrenched that they have essentially two wings: a political or social services wing that operates in public and another wing that undertakes terrorist operations.

Some important distinctions need to be made when discussing state terror and terrorism. One is that states occasionally use violence to further their national interests. When the violence is conducted by the military against the armed forces of another state, it is war—not state terror or terrorism. When the violence is covert (as in the assassination of a foreign leader), it is technically an act of war—not state terror or terrorism. When states in effect use terrorist groups (nonstate actors) to engage in acts of violence against civilian targets in another country, that is state-sponsored terrorism.

State-Sponsored Terrorism

Sponsorship can take various forms, but usually it consists of a state providing financial support, equipment, or technical assistance to a client terrorist group or groups. The support can be passive, as would be the case when a state allows a terrorist group or groups to operate headquarters and perhaps even run its own training camps inside the state's borders. Or, the support can be active, as would be the case when a state actually trains the terrorists and/or provides them with weapons, money, and travel documents. In some cases, a state may even pay the terrorists to conduct specific operations in another country.

Some states sponsor terrorist groups because it enables them to commit acts of violence against a rival state without having to go to war. Typically, a state would do this in

order to weaken the other state or create political discord inside it. States may also sponsor terrorist groups because they are in ideological agreement with the group's objectives. For example, during the Cold War, communist East Germany supported leftist terrorists in West Germany to help further the spread of communism and weaken West Germany's attachment to NATO. Domestic political pressures may also be factor. For example, after losing the 1948 war against Israel, Egypt supported the *fedayeen* (Arabic for self-sacrificers or freedom fighters), who infiltrated and attacked Israel. Egypt was too weak to directly attack Israel, but its support of the fedayeen allowed it to demonstrate to the Egyptian people that it was still standing up to Israel. Syria is another example. The Syrian government in Damascus allows Islamist terrorist groups to maintain headquarters in the country, in part so that the regime can tout its Islamic credentials (the regime of President Assad is dominated by Alawites, a sect that many Muslims regard as heretical) and claim that it too is standing up to Israel despite having been defeated on the battlefield.

The bottom line is that states sponsor terrorism because they are unwilling or too weak to confront another state militarily. In effect, the states use the terrorist groups for the purposes of the state—a fact that is amply demonstrated by Syria's efforts to divide the Palestinian movement by playing one group off against another and by its use of violence against Palestinian groups that did not adhere to Syrian foreign policy in the 1980s. In 1988, Syria helped the Amal militia in Lebanon attack the strongholds of the Palestine Liberation Organization (PLO) because the PLO had become too powerful and too independent. Thus, accepting state sponsorship can be something of a Faustian bargain for a terrorist group, as the sponsor can restrain the group from pursuing its own goals or can even take action against a group it once sponsored.

The U.S. government has formally designated four states as state sponsors of terrorism: Syria, Iran, Sudan, and Cuba. Until 2006 and 2008, Libya and North Korea, respectively, were also on the list. A state that has been designated is subject to a variety of economic sanctions by the United States, the most important of which are restrictions on foreign assistance, a ban on defense-related sales, and controls over exports of "dual use" items (systems that can be used in both commercial and military applications, such as advanced computers). There is some controversy about the efficacy of these sanctions—some of the designated states have been on the list for more than 20 years; the duration obviously suggests that the sanctions have not caused those states to change their policies. This certainly seems to have been the case with respect to Iran, which continues to provide training and financial support to Hezbollah, a terrorist group that has effectively taken over southern Lebanon. A primary reason for the apparent ineffectiveness of the sanctions is that they are not universal. For a variety of reasons, few other states apply economic pressure on the states that the United States has designated as state sponsors.

During the 1970s and 1980s, Libya adopted the unusual policy of openly supporting a wide variety of terrorist groups. (Most state sponsors officially deny that they support terrorist groups or claim that the groups they support do not engage in terrorism.) Libya supported groups as disparate in their ideology as the politically conservative Irish Republican Army, the leftist Japanese Red Army, and assorted Palestinian factions by them providing with training camps, technical assistance, and financing. The Libyan leader, Muammar Qaddafi's apparent intention was to destabilize the status quo, which favored the United States and Europe, and in so doing increase Libya's influence at least in North Africa. Ultimately, Qaddafi's support for terrorism and his erratic foreign policy alienated neighboring states and made Libya a pariah even in the region.

Libya's role in a terrorist attack on a Berlin night club frequented by American servicemen led to a retaliatory attack by the United States in 1986. This attack consisted of bombing runs by U.S. warplanes over some Libyan government facilities and terrorist camps. The attacks did not cause Libya to reduce its support to terrorists (there actually was an increase in Libya-supported terrorism immediately after the attacks), but it did help convince European states that they should cooperate with the United States in tightening economic sanctions against Libya's only important industry, energy.

By the late 1980s and 1990s, oil prices had fallen sharply and the sanctions prevented Libya from getting the drilling and refining equipment it needed to expand production and offset its loss of revenue from lower oil prices. The result was the gradual erosion of the Libyan economy and an increase in dissatisfaction with the status quo among the Libyan people. Eventually, these developments caused Libya to take the steps it needed to convince the West that it no longer supported terrorism. North Korea was also driven by a combination of economic distress and diplomatic pressure to abandon its sponsorship of terrorism and, more important, its nuclear weapons programs in 2008.

The oil markets in the 21st century are quite different than they were in the 1990s. Prices are high and supplies tight. Thus, it seems unlikely that economic sanctions can have similar effects on Iran, which has both the world's third-largest oil reserves and an ideological commitment to the Islamist groups it has been supporting. Indeed, Iran has officially stated that it shares the objectives of these groups, that is, the destruction of Israel and the return of the territory occupied by the Jewish state to Islam in general and to the Palestinians in particular. As long as Iran shares these objectives and is able to support its economy through oil exports, it will likely continue to sponsor Hezbollah and Hamas, two groups that have been designated by the United States and most European states as terrorist organizations. Iran rejects that designation, claiming instead that both groups are engaged in legitimate resistance against an occupying power.

There is, as well, controversy about the “stickiness” of the “state-sponsored” designations. What this means is that it is sometimes politically difficult to remove a state from the list of designated states. Cuba, for example, has remained on the list, even though the U.S. government concedes that in recent years its biggest offenses have been that it failed to take a strong stand on counterterrorism and that it has maintained relations with Iran and North Korea. The reason that Cuba has remained on the list is concern about the political symbolism of taking it off the list as long as the Castro regime (Fidel Castro’s brother assumed the presidency in 2006) is still in power in Havana.

Nonstate Actors: Their History, Goals, and Strategies

The major terrorist threat in the early 21st century is not from the states that sponsor terrorism, but rather from nonstate terrorist groups—organizations operating as independent actors even though they may occasionally accept support from states. Al Qaeda is the most notorious example of a nonstate terrorist group, but there are many others, and nonstate terrorist groups have been a serious law enforcement and foreign policy issue for at least the past two centuries.

Al Qaeda (Arabic for “the base”) is the perpetrator of perhaps the most infamous terrorist attack of all times: the September 11, 2001, destruction of the World Trade Center in New York City and the extensive damage at the Pentagon, the headquarters building of the U.S. Department of Defense. The September 11 attacks were remarkable for the number of casualties they caused, the high profile of the targets, and the sophistication of the terrorists’ methods. They hijacked four airliners roughly simultaneously and crashed them into the two World Trade Center towers and the Pentagon. The fourth hijacked plane did not reach its target, apparently because the passengers realized what was happening and fought with the hijackers. This plane crashed in a rural area of Pennsylvania, killing all aboard. Overall, more than 3,000 people were killed in these incidents, excluding the hijackers themselves who, of course, also perished. By way of comparison, 2,400 people were killed in the Japanese attacks on Pearl Harbor that propelled the United States into World War II.

Headed by Osama Bin Laden, Al Qaeda was established at the end of the Soviet-Afghan war in 1988. This war was fought by so-called *mujahedin* (Arabic for strugglers or warriors)—groups of Afghan refugees infiltrated back into the country from Pakistan, tribal groups inside Afghanistan, and foreign fighters from other Muslim countries—who were supplied with weapons and equipment by the United States and Saudi Arabia. The weapons were distributed through the Pakistanis, thus the myth that the *mujahedin* defeated the Soviets without help from the West was allowed to grow.

After the Soviets withdrew from Afghanistan, most of the foreign fighters (also known locally as Afghan Arabs) returned to their homelands, but some chose to continue fighting those whom they perceived to be the enemies of Islam. Bin Laden and his closest allies were prominent among this group, and they built Al Qaeda both as a terrorist organization and as supporter of other terrorist organizations.

Among Bin Laden’s inner circle were a number of Egyptian radicals who wanted to return to Egypt to fight against the secular regime in Cairo; others chose to follow Bin Laden’s strategy of fighting the “far enemy”—the United States, the nation that was supporting many of the regimes in the Middle East that Al Qaeda and other Islamic radicals regarded as the “near enemy” for their failure to adhere closely enough to fundamental Islam, corruption, and the repression of domestic opposition.

Bin Laden and his group left Afghanistan and settled in Sudan, where they operated training camps for Al Qaeda recruits and planned various terrorist operations. Pressure on the Sudanese government by the United States and others caused Sudan to expel Al Qaeda, so Bin Laden and company relocated back to Afghanistan, where they helped the Taliban win the civil war that had broken out after the Soviet withdrawal. Once the Taliban was in power, they allowed Al Qaeda to set up bases and operate extensive training camps in the country. It was from the Al Qaeda bases in Afghanistan that the September 11 attacks were orchestrated, and thousands of young men were trained in terrorist tactics and weapons handling.

The Taliban and Al Qaeda are often referred to as Islamist or Salafist, and they are not the only groups to which these labels have been applied. Hamas, Hezbollah, and the Palestinian Islamic Jihad have also been labeled this way. *Islamist* refers to the ideology (Islamism) that the tenets of Islam should control all aspects of human behavior. *Salafist* is a reference to the early followers of the prophet Muhammed, who are collectively known as the “Salafi,” and they represent a supposed golden era of adherence to the tenets of Islam. Salafists want to get modern society to similarly adhere to the religion—thus their objectives are basically the same as those of Islamists.

What this means in practice is that Islamists and Salafists agree that there should be no division of church and state, and that Islamic holy law or *sharia* should become the law of the land. They also agree that governments that do not adhere to sharia, or are corrupt, must be replaced, although only a minority believes that they should be replaced by force. Many Islamists and Salafists also believe that all Muslim states should be consolidated into a single community of believers known as the Caliphate, essentially a resurrection of the Ottoman Empire or one of its predecessor empires in the Middle East and North Africa. Bin Laden has said that the Caliphate should include not only Israel, but also Spain and Portugal, because those lands were once controlled by Muslims.

Al Qaeda and other Islamist terror groups justify their use of violence in a couple of ways. One is denying that their victims are truly innocent, because the victims are somehow complicit in the supposed mistreatment of Muslims. Indeed, these groups tend to see Western policy in the Middle East as part of a grand conspiracy to undermine Islam that started with the Crusades 1,000 years ago. They also see the state of Israel as the embodiment of the conspiracy, because it occupies land in the heart of the Muslim world and because it was able to defeat Arab armies only because of assistance given to it by the United States, which now is the leading state in the West.

Islamist terror groups also attempt to justify their use of violence through the concept of *jihad*. Jihad is also used to justify other forms of violence, such as insurgency and interstate war—for example, the Ottoman Empire declared jihad when it entered World War I.

There are five pillars of Islam: profession of faith in one god, Allah; daily prayers; alms giving; ritual fasting during Ramadan, a month in the Muslim calendar; and pilgrimage to Mecca, Islam's holiest city. Jihad is considered a sixth pillar by some Sunnis, and it is one of the ten required practices by many Shi'ites. (Sunnis and Shi'ites are the two main sects in Islam—more than 80% of all Muslims are Sunni.) All Muslims recognize jihad as a requirement, but there are different interpretations of jihad among Muslims.

Technically, the word *jihad* means struggle. The term is interpreted to mean both the struggle to live a good life consistent with the faith (the so-called greater jihad) and a struggle against the enemies of Islam (the lesser jihad), in effect a holy war. Holy war can be offensive, for the purposes of spreading the faith or expanding a Muslim state. It can also be defensive—defending the believers and their state against invaders, as during the Crusades. The most common usage is defensive holy war, but terrorists have creatively interpreted the concept in ways that attempt to justify violence against nonmilitary, civilian targets.

The traditional consensus has been that jihad can only be declared with the approval of religious authorities, but Islam does not have a unified hierarchy like the Roman Catholic Church, which can issue rulings that are generally recognized as authoritative by all Catholics. Islam has instead a variety of religious scholars and leaders, some of whom are recognized as the most important scholar in a particular country; others can be self-proclaimed experts in religious law. As a result, jihad has been authorized by a wide variety of religious leaders and for a wide variety of causes. For example, Osama Bin Laden declared jihad on the West using the status he cultivated as a religious scholar, even though most Muslims do not regard him as having the necessary credentials. Indeed, many other Muslim scholars have specifically rejected Bin Laden and his declaration of jihad.

Islamic law articulates rules of war that should be followed whenever holy war is declared. Among those

rules is the proscription against killing or hurting women and children—a rule to which Muslim terrorists obviously do not adhere. Again, extremists sometimes try to justify these violations of the holy law by claiming that when women, children, and the elderly are victimized, it is either inadvertent—even though that is obviously not the case when a terrorist explodes a bomb on a crowded bus or in a restaurant—or unavoidable collateral damage. Extremists sometimes also assert that holy law does not apply when the women and children are part of a militarized society. This last argument has often been used in reference to attacks in Israel, where there is universal conscription and many people work for the Israeli government or a defense-related industry.

Hamas is a Sunni group based in the Gaza Strip and Hezbollah is a Shi'ite group based in southern Lebanon. Each combines nationalist and religious ideologies. That is to say, both believe that the state of Israel should be eliminated and that the lands occupied by Israel must be returned to the Palestinian people. They also believe that the Palestinian state that would replace Israel should be governed by Islamic law. Both of these two groups are more entrenched in their communities than the typical terrorist organization. Indeed, both operate nonviolent branches that provide social services (schooling and medical care) to their constituents, and both also function as political parties. In branching off into legitimate social and political pursuits, these two groups are following in the footsteps of the Muslim Brotherhood in Egypt (indeed, Hamas is an offshoot of the Brotherhood). The Muslim Brotherhood also offers social services and stands candidates for parliamentary elections. Unlike Hamas and Hezbollah, the Brotherhood in Egypt recently renounced violence.

In the 2005 election, Hezbollah won 14 seats in the 128-seat Lebanese parliament; Hamas actually won a majority of the seats in the Palestinian Authority's parliament in the 2006 elections. Since the 2006 elections, Hamas fought a mini-civil war with the other leading party, Fatah, with the result that Hamas took over Gaza entirely and administers it separately from the West Bank. Hamas and Hezbollah even operate their own satellite television stations through which anti-Israeli propaganda is routinely broadcast.

Of the two, Hezbollah has been the greater international threat. Its operatives are suspected of bombing Israeli and Jewish facilities in Europe and as far away as Argentina. Hamas, on the other hand, has concentrated its violence on Israel and other Palestinian factions. One of Hamas's preferred methods is firing rockets into Israel—the rockets are handmade, small, and lack guidance mechanisms. Another is the employment of suicide bombers. Other Palestinian groups use the same tactics—for example, the Palestinian Islamic Jihad group also has an arsenal of improvised rockets that it fires into Israel. Literally hundreds of such rockets are fired into the Jewish state every year.

In a sense, the rockets and suicide bombers are the quintessential terrorist weapons. The rockets are plainly designed to do little more than create fear among Israeli civilians. They are too small and too unreliable (many land without exploding, or explode in unpopulated desert) to have any material effect on Israel's ability to defend itself, but they obviously frighten residents in Israel's southern municipalities. Similarly, suicide bombings on a bus or train or of a restaurant have no effect on the Israel military. Instead, such attacks are intended by the terrorist leaders to frighten the Israeli people and to convince them that the Palestinians are so implacable that reconciliation is impossible. The theory is that this will cause the Israeli people to leave Israel or compel their government to make major concessions—concessions that many Israelis argue would never really satisfy Hamas or Hezbollah, whose stated objectives are to destroy Israel.

Not all terrorism in the Middle East or in Muslim lands has been related to Islamism. Indeed, until the mid-1990s, most of the terrorism in the Middle East was conducted by nonstate groups that espoused secular, nonreligious ideologies. During the Cold War, many Palestinian groups espoused Marxist ideologies. The Popular Front for the Liberation of Palestine and the Democratic Front for the Liberation of Palestine, for example, espoused socialist revolution and the liberation of Palestinian lands from Israel but not the imposition of Islamic Holy Law. Yassir Arafat's Fatah movement, which became the centerpiece of the umbrella Palestine Liberation Organization, also demanded the liberation of Palestinian lands without the imposition of sharia.

During the 1960s, 1970s, and 1980s, most of the terrorist groups outside the Middle East were similarly motivated by nationalism or Marxism. Typical of the nationalist groups are the Irish Republican Army (IRA) and the Euskadi Ta Askatasuna (ETA). The IRA was committed to the end of British rule in Northern Ireland and of the systematic discrimination against Irish Catholics by the Protestant power structure there. The ETA sought independence for the Basque region of Spain. Leftist groups included the Red Army Faction in West Germany, the Red Brigades in Italy, the Japanese Red Army, the Tupamaros in Uruguay, and in Colombia the Ejército de Liberación Nacional (ELN) and the Fuerzas Armadas Revolucionarias de Colombia (FARC). Each of these groups resorted to bombings, kidnappings, and murders in order to disrupt capitalist enterprises, frighten the citizenry, and lead their respective countries down the path to socialism.

The FARC and ELN are still in existence, although they seem to be much less ideologically motivated than in their early years. Indeed, FARC is generally thought to be a prime example of the phenomenon of convergence, wherein terrorist groups and criminal organizations collaborate and eventually become more and more like each other. That is to say, the FARC started out earning money by taxing cocaine producers and protecting them from the Colombian government, other producers, and private

militias. Over time, FARC became less interested in socialist revolution and more interested in maximizing profits from drug operations. Roughly the same can be said for Abu Sayyaf and the Abu Nidal Organization (ANO). Abu Sayyaf is a Philippine-based terrorist group that nominally espouses an Islamist ideology but in fact spends most of its energies in criminal activities that are designed only to increase the funds available to the group and its members. The ANO originally conducted assassinations in order to help eradicate the state of Israel, but over time it devolved into a murder-for-hire criminal gang. Other terrorist groups work with criminal organizations to obtain weapons, bomb-making materials, and forged travel documents and identification cards without losing their ideological fervor.

The Liberation Tigers of Tamil Eelam are another important terrorist group. Based in Sri Lanka, the Tamil Tigers are similar to nationalist groups, such as the ETA and IRA, in that they want an independent homeland for a minority population (the Tamils). But in some respects, the Tamil Tigers have been more ruthless and innovative. They were the first to adopt the technique of suicide bombing, and they developed an all-woman elite unit of dedicated fighters. The Tamil Tigers also pioneered terrorist operations at sea—using small boats laden with explosives to crash into commercial or military ships. They have also been adept at fund-raising from overseas Tamils, particularly in Canada and the United Kingdom.

Other terrorist groups worthy of note for the severity of their violence include the following:

- Aum Shinrikyo, a millenarian group in Japan, attempted several chemical attacks on U.S. military and civilian targets. Only the last attempt, a 1995 chemical release during rush hour in the Tokyo subway system, was successful. Although only a small number died, thousands sought medical treatment, and there was widespread panic in the city.
- Chechen nationalists have undertaken a number of high-profile terrorist operations in Russia. In 2004, they took more than 1,000 school children hostage in the town of Beslan. Almost 200 of the children died when security forces took the school buildings from the terrorists. Two years earlier, Chechen terrorists had taken over a Moscow theater, holding 850 people hostage. All of the terrorists and 130 of the hostages were killed when security forces retook the theater.
- In 2002, Jemaah Islamiya bombed a resort in Bali, Indonesia, killing more than 200 people. In 2005, it set off bombs in a town square and a shopping mall in Bali, killing 20. It is also suspected of bombing a Western hotel in Jakarta in 2003, killing 12.

One of the points of this discussion of nonstate terrorist actors is that this phenomenon is neither new nor confined to a particular part of the globe. Another important point to note is that nonstate actors have created mass casualty incidents on every continent. Given the trends in technology and the economy, it seems likely that terrorist groups will not only increase their capacity for causing damage but

also continue to be able to conduct operations at great distance from their home bases.

Technology and Globalization

Terrorist groups have long been suspected of attempting to acquire weapons of mass destruction (WMD). However, only Aum Shinrikyo has actually employed such a weapon—in its poison gas attack in Tokyo. The technological information and some of the materials needed to build a nuclear, chemical, or biological weapon have been available for a price through illegal sales by governments (e.g., in Pakistan) and criminal smuggling. Aum Shinrikyo actually hired scientists to work on developing chemical weapons, and there are fears that Al Qaeda and some other groups are also actively seeking to develop their own WMD capabilities. That is one of the reasons why the United States and many other governments are working to improve controls over nuclear and other sensitive materials and to crack down on the smuggling of sensitive materials and equipment.

However, as most of the incidents described here demonstrate, substantial numbers of casualties and property damage can be caused by conventional, even simple, weapons. For example, there was nothing sophisticated about the bombs that blew up the Oklahoma City federal building in 1995 or that destroyed a Madrid commuter train in 2004. Even suicide bombers employ what is essentially rudimentary technology, and the September 11 hijackers used no technology of their own—they commandeered commercial airliners and crashed them into buildings. The point is that restrictions on WMD proliferation, as important as they are, will still leave terrorists with most of their preferred tools. Bombs, bomb-making materials, radios to trigger explosions, and a limitless variety of small arms are widely available in the global marketplace.

Further, globalization of the marketplace affects terrorism in a variety of other ways. First, it creates rich targets. Terrorists know that they can create both fear and serious economic disruption by attacking the seaports, airports, and rail terminals upon which international commerce depends. Second, international transportation of goods and people has become much easier and relatively inexpensive. This means that terrorists can readily travel from country to country or continent to continent to avoid capture, get training, or conduct a violent act. The thousands who traveled to remote, isolated Afghanistan for Al Qaeda training and then returned to Western Europe or North Africa are prime examples of the role of modern transportation in the spread of terrorism. Third, international migration for economic and other reasons has created pools of expatriates, particularly in Europe, that have been used by terrorists not only as sources of funding but also as communities into which they can blend and try to escape detection by law enforcement. Expatriate communities have also often been sources of recruitment by terrorist organizations. Finally, some analysts believe that globalization itself has increased terrorism

by creating a sense of grievance in traditionalist communities whose values and beliefs are challenged by the influx of Western media and Western values—such as secularism and gender equality. Certainly, Islamist terrorists view many Western values as deeply subversive and immoral.

Terrorist Financing and Counterterrorism

Terrorists raise the funds they need to maintain their organizations and conduct operations in a variety of ways. One source is donations from people sympathetic to their cause. For example, extremely wealthy individuals in the Persian Gulf have contributed to Islamist groups because they shared their religious ideology, or to Palestinian groups because they believed that the Palestinian people were being oppressed by Israel and deserved a homeland. Another example is donations by Irish Americans to the IRA, or overseas Tamils to the Tamil Tigers. Sometimes, however, such donations are supplemented by extortion and threats of violence by terrorist operatives—this was the case, for example, in South America, where Hezbollah operatives have strong-armed Lebanese expatriate merchants into making donations. It also occurred in Toronto, Ontario, where Tamil Tiger organizers coerced Tamil expatriates to contribute in order to avoid violence or damage to their places of business. Donations can also be supplemented by what amounts to embezzlement from legitimate charities. This has been a particular problem in the Middle East, where charities have only recently come under state regulation and where large sums of money are donated to charities due to Islam's requirement that believers donate 2.5% of their income as alms for worthy causes.

In addition to donations, embezzlement from charities, and extortion in expatriate communities, some terrorists raise funds by accepting support from a state and/or by participating in criminal activities. As noted above, some terrorist groups are so immersed in criminal activity that they have essentially been transformed into criminal organizations that no longer seriously seek political change, even though they may still claim that their goals are socialist or Islamist revolution. Other groups, however, treat crimes such as drug and weapon smuggling, robberies, and kidnappings for ransom (even smuggling tobacco products from a low-tax state to a high-tax state in the United States) only as a means to the end of political change.

One of the major elements of counterterrorism is an international effort to restrict terrorist financing. There is, indeed, a United Nations convention that commits signatory states to develop the legal authorities and systems they need to prosecute individuals who help finance terrorist groups. The U.S. government has also been working quite closely with other governments on restricting *money laundering*—financial transactions whose purpose is to prevent the authorities from knowing where the funds came from (e.g., a criminal activity) or where they are ultimately being sent. The vehicle for this effort is the Financial Action Task Force (FATF).

FATF was initially established to deal with organized crime, but it has since evolved to include terrorist financing. There are 33 member states and several regional task force members, including the Middle East and North Africa FATF that was created in November, 2004, which includes all the states in this region except Iran.

Another major element in counterterrorism is government surveillance of citizens and residents. Analysis of surveillance data about how citizens spend their time and money is used to identify and interdict terror plots. Although increased surveillance has been politically controversial in the United States, where it has been seen by many as an infringement on traditional civil liberties, similar measures have been in place in other countries for many years. Related to this is citizen awareness and alertness—that is to say, much valuable intelligence about nascent terror plots has come from citizens who observe unusual behavior and report it to the local police. This is something that Israel, in particular, emphasizes in its counterterrorism program.

There has also been considerable international cooperation among intelligence and police agencies, although little of this can be described due to its sensitive nature. There have, as well, been international partnerships between the United States and many of its trading partners in order to improve the screening of cargo shipments so as to prevent terrorists from exploding conventional or mass destruction weapons in a port or en route on a cargo ship or aircraft.

Finally, there is an important military aspect to counterterrorism. Military force has been used by the United States, Israel, Pakistan, the Philippines, and many other countries to capture or kill suspected terrorists.

Future Directions

Terrorism is a phenomenon that will never be completely eradicated, but it can be minimized, not only by counterterrorism strategies, but also by economic and political reforms in societies where grievances create pools of discontent or where terrorist leaders and criminal organizations troll for recruits.

This is not to suggest that poverty or some other social ill actually causes people to become terrorists—the record is quite clear that many terrorists are from well-off families and that hardly any poor people are terrorists. Yet, discontent surely seems to be a contributory factor, and people are often more discontent with their economic situation than anything else. Thus, the indirect relationship between economic factors and terrorism is an area in which more research should be done.

Other important areas for future research involve the question of metrics. The specific questions are how progress should be measured in the “war on terrorism” and how much is enough in terms of spending on counterterrorism measures. These are not easy questions to answer,

and even though the answers are necessarily going to be strongly influenced by politics, objective criteria should inform the political debate. For example, it seems plain that the number of terrorists killed or captured is as telling a standard as the amount of drugs seized at the border—both measure the success of a tactic and neither measures the success of the strategy. The number of terrorists killed and captured says nothing about the number of terrorists still at large, just as drug seizures say nothing about the volume of drugs that were actually smuggled into the country. Similarly, a reduction in the number of terrorism incidents over time may indicate nothing more than that the terrorists are regrouping or that they are keeping their powder dry while planning an unusually violent attack.

Answering the second question about how much spending is enough is equally vexing. The question should not be answered without first evaluating the effectiveness of previous spending—yet, there are no standards for such an evaluation. Assessing national preparedness for future crises is something that the military has learned to approximate reasonably well through war games, readiness evaluations of units, and inspections of platforms and equipment, but there is no systemic evaluation of the many parts of government that have roles to play in counterterrorism and homeland security.

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HUMAN RIGHTS AND DIGNITY

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Human rights and dignity are central normative notions of contemporary politics as well as political and ethical theories. However, they have not had this role for a long period of time, as the main development of these concepts began only during the Age of Enlightenment. During the previous 60 years, their influence can be said to be of global importance. On December 10, 1948, the Universal Declaration of Human Rights was adopted and proclaimed by the General Assembly of the United Nations. Yet, there are traces of both notions in ancient and medieval thought, and this chapter will trace their roots and historical development and make inferences concerning potential future challenges concerning them.

Concepts of Rights

Article I of the United Nations Universal Declaration of Human Rights states, “All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.”

Human rights are subjective rights of individual human beings. Subjective rights are different from objective rights. Objective rights refer to the completeness of regulations within a legal system. Objective rights grant subjective ones. Subjective rights imply that individual human beings have the authority to do certain things within the

system. The concept of human rights implies that all human beings, because of their being human, have certain rights and freedoms that are universal, inalienable, and indivisible. According to a stricter sense of the concept of human rights, they can be contrasted with civil rights. Civil rights are held by all citizens of a state and include rights that are not human rights, like the right to vote. Human rights are held by all human beings. However, civil rights are included in the United Nations’ *Universal Declaration of Human Rights*.

According to the Czech jurist Karel Vasak (as he originally proposed in 1979), there are three generations of human rights. The first generation deals with liberty, and the rights in this generation are particularly civil in nature. Human rights in the second generation are related to equality, and their nature is primarily social, whereas the third generation rights go beyond the civil and the social and are mostly expressed in soft law declarations of international law. Libertarians are usually skeptical concerning human rights of the second and third generation, as they presume that these rights contain concealed paternalistic political goals.

The term *human rights* came into existence at the beginning of the 19th century. However, as mentioned above, it was not until 1948 that human rights were generally proclaimed, by what was then a newly formed United Nations. The declaration was primarily motivated by the cruelties of World War II. Article I of this declaration

states a close connection between the concept of dignity and that of rights. As a result of this declaration, both concepts, that of human rights and that of human dignity, became highly significant for many countries' constitutions and the post-1945 world.

Relationship Between Rights and Dignity

Both rights and dignity can be justified naturally or solely legally. Natural rights are valid at all times in all places. Solely legal rights are grounded in an actually existing legal system founded by decisions made by human beings. To enforce natural human rights, they also need to be integrated into a legal system, but they are regarded as valid even if they have not been acknowledged by anyone.

Analogously, one can talk about necessary and contingent human dignity. Necessary dignity is a quality that belongs to all human beings at all times and in all places, whereas contingent human dignity is dependent upon an institution that declares that human beings are bearers of dignity. The concepts of *right* and *dignity* imply a normative aspect. The concept of *dignity* often has also an ontological aspect, whereas the concept of *right* can, but does not have to have, an ontological aspect.

In the above case of the United Nations *Declaration*, both concepts have an ontological aspect, as Article I states that all human beings who are the bearers of dignity and rights "are endowed with reason and conscience." Hence, the normative aspect of both concepts is based upon an ontological one. However, the relationship between the two concepts in question can be different than that shown in the last example; for example, in the case of the German basic law, some experts claim that the concept of human dignity is the foundation for all human rights. In this case, it can be seen that only the concept of human dignity has an ontological and normative aspect, whereas that of a human right merely includes normative implications.

Concepts of Dignity

The concept of dignity must not be mixed up with the word *dignity*. The word implies several concepts that can be divided into a sense and a reference. Dignity is a quality that a bearer can have necessarily or contingently. To distinguish between these two types of dignity, it would be best always to clarify which type one is referring to. For pragmatic reasons, the author will use the expressions *necessary dignity* and *contingent dignity* from now on.

Necessary dignity can either be inherent or dependent. Given that human beings necessarily have free will, and free will is the foundation for dignity, it is the case that all human beings have necessary, inherent human dignity. If it were the case that God attributed dignity to all human beings necessarily, then all human beings would have

necessary, dependent dignity. However, both instances would be examples of necessary dignity.

Contingent dignity can also be connected to various qualities. Given that human beings reciprocally attribute dignity to one another, then we would have contingent, dependent dignity. If human beings, on the other hand, were bearers of dignity, because they have the quality to make logical inferences, and this capacity is a bodily capacity, then human beings would have contingent, inherent dignity, as the capacity here is not a necessary one. Both examples represent types of contingent dignity.

The terms *necessary dignity* and *contingent dignity* can be specified further. They can imply equality or inequality concerning the bearers of dignity. In our context, only the concept of dignity that implies equality among its bearers is relevant. This does not mean that the other concept is socially unimportant; for example, bishops and judges have dignity; however, their dignity is a hierarchical one that is irrelevant here.

The concept of dignity that is relevant here is a non-gradual one that implies equality among its bearers and is connected to six characteristic features:

1. Dignity cannot exist independently, but is always connected to a bearing entity.
2. A bearer has the quality *dignity* if he possesses a nongradual quality X, wherein dignity is founded.
3. The relationship between the bearers of dignity is that of equality; that is, all bearers of dignity have a nongradual quality X, because of which their relationship can be specified as descriptive equality.
4. The descriptive equality of the bearers implies a normative one, whereby the norm is related to an ideal of the good and not to that of an evil; for example, dignity is only given if all its bearers are supposed to be treated equally well and not if they are supposed to be treated equally badly.
5. Bearers of dignity have a special status within the world; that is, they are categorically different from all other beings in the world and have a quality that cannot be verified empirically.
6. The concept of dignity will be named "dignity" or named with an equivalent word in a foreign language. (If this trait was not included, then the concept of dignity would refer to too many concepts; for example, most concepts of rights would then also count as concepts of dignity, which would be a questionable position.)

Each entity to which the six features just stated apply is a bearer of the quality *dignity*. Hence, the reference of the concept *dignity* is dependent upon the meaning. However, thereby we have not yet clarified the concept of *human dignity*, but only that of *dignity*. The concept *human dignity* is the result of the intersection of the set of references of the concepts of dignity and of being human. A being belongs to the set of bearers of dignity if it is the case that he has all the features demanded of a bearer of dignity. A being belongs to the set of human entities if it belongs to

the human species, that is, if it potentially belongs to the human reproductive community. It is important to distinguish between human beings and human entities. Both human beings and human entities belong to the human species. However, it does not have to be the case that all human entities are human beings. It is clear that a fertilized egg belongs to the human species, but it is unclear whether a fertilized egg can be called a human being. However, it clearly is a human entity, as it belongs to the human species. There are five possibilities of how the set of bearers of dignity and that of human entities can intersect:

1. The set of human entities can be a subset of that of the bearers of dignity. In this case, someone who is a human entity necessarily is a bearer of dignity. However, it is not the case that all bearers of dignity are human entities. Here, it is the case that someone who belongs to the human species also has to bear dignity, as it would be according to Kant, if we read him as follows: The ability to have reason is actual within the human soul, which is unified with the human body from the moment egg and sperm get together. Dignity here is founded in a feature that can necessarily be found in all human entities. According to Kant, the actual ability for reason can be found in all human beings. However, not all human beings can express this ability, as the capacity to express it is connected to a bodily capacity that one needs to develop.

2. The sets of the bearers of dignity and that of human entities can be identical. If someone is a human entity, then he is a bearer of dignity. Each bearer of dignity necessarily is a human being. In this case, the quality on which dignity is founded is a quality that is being held only by human beings. As here the identity of the set human entities and that of bearers of dignity is a given, it is also the case that the quality on which dignity is founded is the same as the one on which it depends whether one belongs to the human species.

3. The sets of bearers of dignity and that of human entities can overlap. There are human entities that are bearers of dignity, and there are human entities that are not bearers of dignity in the same way as there are bearers of dignity that are human entities, and there are bearers of dignity that are not human entities. In this case, dignity is founded upon a quality that some but not all human entities have, and that some but not all nonhuman entities have. One can read Kant in such a way that his concept of dignity belongs to this group, but only if one assumes that actual reason is not a capacity of the soul but is only present when someone can speak. There are human entities that can talk and who therefore also have dignity. However, there are other human entities that are currently unable to talk and who henceforth do not have dignity. It cannot be excluded, and Kant definitely does not exclude the possibility that there are nonhuman beings that have reason together with this dignity.

4. The set of the bearers of dignity can be a subset of human entities. All bearers of dignity are necessarily human entities. However, there are human entities that are not bearers of dignity. A position which claims that, for a human entity to have dignity, the human needs to be born would be one that belongs to this group. It can be the case that, as in this case, the feature on which dignity is founded is also the feature that turns a human entity into a human being.

5. The set of bearers of human dignity and that of human entities do not overlap. The fifth and last option is not relevant for us, as with it we do not have bearers of human dignity.

Values of Rights and Dignity

Both human dignity and human rights are the foundation of many constitutions and can be found at a prominent place in the charter of the United Nations. There is no moral dilemma or moral challenge for which these concepts are irrelevant. As an example, for the relevance of human dignity, one is referred to a discussion in the field of medical ethics.

The notion of human dignity is a complex one that is not being used in a unified manner. In addition, it is often abused in order to stop an argument or to claim that the opposite opinion can only be held by a scoundrel or a protofascist. Hence, it is important always to reference facts and to clarify the concepts one deals with. In the field of medical ethics, arguments that deal with the beginning of human life are of particular importance. From which moment on can one claim that a human entity has human dignity or the right to live?

1. From the moment of fertilization
2. From the moment of fusion of the precells
3. From the moment at which the nidation in the uterus takes place
4. From 14 days after the fusion, as from that moment on, it is impossible that twins can come about (conjoined twins can still come into existence, however)
5. From the moment at which the embryo becomes a fetus (i.e., after 3 months, when the developmental process of all organs is finished)
6. From the moment of birth

It depends upon a governmental decision which of these various stages is regarded as decisive for a human being to have dignity or the right to live. Legal regulations concerning stem cell research, preimplantation genetic diagnosis (PGD), and abortion are based upon this decision. A particularly striking example can be given in the case of PGD. In contrast to the UK, PGD is forbidden in Germany. One reason for it being forbidden is that in the process of PGD, one or two totipotent cells are taken away from

the fertilized cells and genetically analyzed, and they are destroyed in this process. As it is possible for a totipotent cell to develop into an independent human being, some regard totipotent cells as bearers of dignity, which therefore must not be destroyed.

History of Rights

Even though human rights, as we understand them today, were established only fairly recently, one can trace aspects of the concept back to antiquity. In ancient Athens, in the 6th century BCE, many government posts were given away by drawing lots, and thereby, any citizen could acquire the office in question. However, women or slaves did not have the right of citizenship. An important step in the development of human rights was the upcoming of Stoic philosophy and its concept of the *humanitas*, which implied that all humans, because of their being human, ought to be considered ethically. Yet, this duty was a lower-rank duty.

The proper beginning of the concept of human rights goes along with the beginning of the Age of Enlightenment. In the following paragraphs, the focus will be on the concepts of the most influential philosophers of rights: Thomas Hobbes, John Locke, Jean Jacques Rousseau, and Immanuel Kant.

The first philosopher who was significant for the development of the concept of human rights was Hobbes. Fundamental to his understanding of rights is the fictional state of nature he presents, in which there is a war of all against all, and each person is the potential enemy of every other person—*Homo homini lupus* (“Man is a wolf to [his fellow] man”). Each person is fighting for his own survival and power. Then, each person is supposed to have the right to everything else in order to preserve himself. There is danger lurking in this state, as even the strongest can be killed during the night or by a group of weaker men who cooperate. No one is so much stronger than all the others to actually make sure that his safety can be guaranteed over a long period of time. Hence, there is a certain kind of equality among human beings, as we are all more or less equally strong, or to put it in a different manner: There is no one who is so much stronger than all the others over a long period of time that he could guarantee his own safety in a stable manner. Due to the given equality, this can come to a fictional contract between all human beings, in which all human beings agree to give their natural rights to the Leviathan, who from then on has the absolute power over his citizens. The individual citizens give away their sovereignty, and the political leader receives it.

A slightly less grim picture of human nature was presented by Locke. His ethics is closely connected with Christianity, as he makes clear that without afterworldly sanctions, there would be no reason for not living solely according to the pleasure principle. In the end, morality is based upon a God-given law. In a similar manner, he

approaches his political ethics. He limits the power of the sovereign by putting forward that there are natural rights that are God given and valid universally. According to Locke, the natural law and the natural rights exist also in the state of nature. According to Hobbes, in that state everyone has a right to everything. According to Locke, on the other hand, the rights of a human being are limited by the rights of the others. And the most basic rights can be described as the right to the inviolability of a person and his property, which can be specified further by making a distinction between the right to life, health, liberty, and possession. As there are people in the state of nature who do not accept the natural law, there is a need to move from the natural state to a political system.

In contrast to Locke and Hobbes, Rousseau presents a more optimistic understanding of human behavior in the hypothetical state of nature. According to him, there are enough goods available for all human beings, they live separate from one another, and they are peaceful. Then human beings exist in a state of healthy self-love, which includes sympathy, which stops them from acting egoistically. The positively evaluated state of nature ends when someone develops the category of private property due to egoistic desires. Such an action leads to inequality and promotes further egoistic desires, so that one ends up in a system with richer and poorer people. The richer people force the poorer ones to accept a social contract whereby the poorer ones do not realize that they were being forced into the contract. Even though they claim that the social contract serves the common interest, it is supposed to be solely in the interest of the rich. However, there is also the possibility of an ideal social contract, which would be one in which all citizens realize that they are the general will. In that case, the political and moral freedom consists in sticking to the law that one has given oneself. Here, the general will would correspond with the individual one.

Autonomy, in a different sense from Rousseau's, is central for Kant's understanding of rights. Rights, according to Kant, are supposed to help individuals to live together so that they do not get into conflict with one another. Anyone is supposed to live such that his arbitrary will can coexist with the wishes of others. Kant also holds that a social contract is the basis of a state. He agrees with Locke that there are inviolable natural rights, with Rousseau that the highest norm concerning law giving ought to be the general will, and with Hobbes that in the state of nature there is the war of all against all. By transforming the particular individual wills into a general will, the state of nature changes into a constitutional state.

History of Dignity

Early Greek philosophers did not hold a concept of dignity that can be compared to the one we have. In their case, dignity was always connected to a hierarchy. According to

Aristotle, there are natural slaves, who of course have less dignity than citizens. Dignity today, however, implies the equality of its bearers. As said before, the concept of equality of all human beings is developed and becomes particularly influential in Stoic thought. As an outgrowth of Stoic philosophy, the first important concept of human dignity is put forward by Cicero. His thinking is reflected particularly in Renaissance philosophy. Pico della Mirandola and Manetti are two Renaissance philosophers who put forward paradigmatic theories of dignity. Another reader of the philosophy of Cicero was Kant, whose concept of dignity became particularly influential. In this section, first the paradigmatically most important theories of human dignity in historical order (Cicero, Manetti, Pico della Mirandola, and Kant) are presented, and these are followed specifically by the vehement criticism of the concept by Nietzsche, who provides us with a useful basis for reflections concerning the future of human dignity.

Cicero was the first great philosopher who put forward a concept of human dignity. He holds that all human beings, which implies all beings with *ratio*, have dignity. Concerning Cicero, the sets “members of the species human beings” and “beings with ratio” are identical concerning the extension, which means that if someone is a member of the one set, he also has to be a member of the other set, and it is impossible for a being to be a member of the one set without being a member of the other one. However, dignity is not the central concept within his ethics, as it often is today. The focus of his ethics lies on the highest good, which again is connected with the honorable, the *honestum*. Anyone who possesses the four cardinal virtues—justice, wisdom, bravery, and moderation—is honorable. Hence, the highest good is solely identified with the virtues. External goods are irrelevant concerning the highest good, which implies, however, a hierarchy of duties. The highest duties are the duties against the gods, followed by the duties against one’s political community and then the duties against one’s parents. We also have duties against other human beings who are bearers of dignity like us. However, these duties are of lower rank. This does not mean that they are irrelevant. These duties are of direct importance concerning our interaction with slaves and foreigners, who are also supposed to be treated in a just and dignified manner. Due to the high relevance of the duties against the political community, Cicero holds that the *vita activa* is more important than the *vita contemplativa*, even though the latter corresponds to our human nature.

Another paradigmatically important concept of dignity was put forward by the Renaissance humanist Manetti, whose views were ultimately founded in his faith in the Christian God. Faith is supposed to lead to appropriate actions and right thinking and also to the knowledge of God, human dignity, and the highest good. As in Cicero’s ethics, the concept of dignity is not the central one, which is the concept of the highest good. The highest good lies in a state of afterworldly bliss. To be able to reach this state, one has to be virtuous according to Manetti. The virtues piety, justice, and

wisdom are of particular importance, according to him. Anyone who possesses these virtues reaches the highest good. Even though one reaches the correct understanding of these concepts only by means of contemplation, the main focus in life ought to be in the *vita activa*; with such a focus, one can fulfill one’s duties against God and the other human beings in an appropriate manner. Due to the duty of justice, one ought to love all human beings as one’s brother and consider that love in one’s deeds. However, the possession of human dignity is independent of one’s deeds, as it is connected to the *imago dei*, the image of god, which we possess within our immortal souls. To act in accord with our dignity, we ought to stick to the duties that God has given all men and that are connected with the highest good. One of the duties is the duty of charity. Herein the consideration of other human beings, bearers of dignity, becomes directly relevant.

Another paradigmatically central foundation of human dignity was put forward by Pico della Mirandola. His concept is cited in many contemporary debates, even though current thinkers tend to receive his concept in a biased manner. According to him, human dignity lies in our free will, which lets human beings become a likeness of God and represents the signature of the creator upon his special creations. Human beings, according to Pico, participate in all layers of being, but, in contrast to other creations, they are not connected to one specific layer of being exclusively. Because of our free will, we have the chance to become who we wish to become. Of course, this does not mean that we can turn into fish or pigeons. However, it implies that we can choose our lifestyle according to our own fantasies, desires, or thoughts. It is this aspect which modern interpreters usually focus upon.

Yet, there is another side that can also be found in Pico’s philosophy. Even though we can choose to become who we apparently wish to become, there is supposed to be a real wish within all of us. We all wish to return to our origin, our creator, God, even though not all of us are conscious of this wish. The only way by which human beings are supposed to reach the highest good, which is the center also of Pico’s ethics, is by means of the *unio mystica* with God. This goal cannot be reached by conscious decisions. We depend upon the mercy of God to reach this state. However, we must first be prepared in order to be eligible for mercy. We must possess the political virtues within our character, which means that we ought to make peace, be just, have the virtue of love, and act in accord with it. On that fundamental level, the dignity of other human beings is considered, as here our duty to consider other human beings, bearers of duty, comes in, and we have the obligation to consider it in an appropriate manner. Our main duty concerning the highest good, however, is to go beyond our connection with the sensual world, to purify ourselves, and in the end God might grant us the chance to return to him and become one with him. The *vita contemplativa*, according to Pico, is much more relevant than the *vita activa*. If a human being does not consider the duties just stated, he does not lose his

dignity, because his dignity is connected to his free will, which he cannot lose.

The most influential conception of human dignity was put forward by Kant. However, even according to him, the focal point of his ethics lies in the highest good. In contrast to the previous positions mentioned, the highest good, according to Kant in his *Grundlegung zur Metaphysik der Sitten* (“Groundwork of the Metaphysics of Morals”), does not enclose happiness, but it lies in the good will, which any being has who has will and reason and who acts out of respect for the moral law in accord with the moral law. Anyone who acts on maxims out of respect for the moral law, fulfils the moral law. This implies that his actions are based on maxims. To check whether a statement can be a maxim is to try to universalize the statement and check the reflections. If the reflections lead to contradictions, the statement cannot be a maxim. If the procedure does not lead to any challenges, the statement can serve as a maxim. The categorical imperative, which can be described in various ways, is a way of paraphrasing the moral law. One formulation of the categorical imperative includes the concept of human dignity, which is founded upon autonomy. The highest good and the moral law are valid for all beings with dignity, and dignity applies to autonomous beings only. One implication of the practical formulation of the categorical is that one must never treat humanity, neither in oneself nor in any other person, solely as a means. Any being with dignity must never be treated solely as a means. Hereby, it becomes clear that dignity is of some relevance in Kant’s philosophy; however, even according to him, the highest good is the central focus within his ethics. A further indication that human dignity does not have a foundational role within his ethics is that it turns up mainly within only one formulation of the categorical imperative.

The foundation of dignity, according to Kant, is the capacity of being autonomous, which is a necessary condition for acting in accord with the moral law. Autonomy must not be misunderstood as representing arbitrariness as freedom. Beings with dignity have the necessary duty to act in accord with duty. All acts that are in accord with the categorical imperative are in accord with duty.

In his *Kritik der praktischen Vernunft* (“Critique of Practical Reason”), Kant holds a similar position. Only his concept of the highest good changes slightly. It still encloses the moral law, but the person who acts out of duty in accord with duty not only deserves to become happy, according to Kant, but he can actually hope to receive happiness in proportional means to his acting morally. However, to act morally implies that one must not act in accord with the moral law while hoping to receive happiness in proportional means to his acting morally, even though one can hope that this will be the case. Only someone who acts morally out of respect for the moral law, without being motivated by his hope that he will be rewarded with happiness, acts morally. He can expect to be rewarded with happiness in an after-world but not with a happy this-worldly life.

The most vehement criticism of human dignity was put forward by Nietzsche. Explicitly, he attacks solely necessary concepts of dignity, and all the concepts mentioned above have been necessary ones. Implicitly, however, his philosophy also goes against contingent concepts of human dignity. His argument against necessary human dignity goes as follows: The concept of necessary human dignity is founded upon four mistakes. Hence, it ought to be abandoned. The four mistakes he refers to are the following:

1. Human beings have an incomplete understanding of themselves.
2. Human beings attribute to themselves invented qualities.
3. Human beings regard themselves to be in the wrong relationship concerning animals and nature.
4. Human beings invent hierarchies of good, which they falsely regard as eternal and unconditional.

Concerning human dignity, these mistakes can be explained further by merely selecting some specific examples in order to support his argument:

1. Human beings correctly understand that they have reason. However, they have an incomplete understanding of themselves, as they do not realize that reason is not eternal and that it does not provide us with knowledge concerning the world but was developed in order to help us survive. Reason, according to Cicero, is the foundation of human dignity, but his concept is based on the wrong understanding of reason. Hence, it is not valid.
2. Human beings invented the concept of free will, which cannot even be thought of in a non-self-contradictory manner. Free will is the foundation of human dignity according to Pico. However, as free will does not exist, his concept of human dignity is invalid.
3. Human beings think that they were created in God’s image and that they have a special status in relation to animals and nature. According to Nietzsche, neither of these claims is correct. Human beings do not have a special status in nature, and they differ merely in degree from other animals. As the concept of God was merely invented, human beings also cannot be created in God’s image. According to Manetti, human dignity is founded on humans being created in the image of God, which is not correct. Hence, his concept of human dignity is invalid.
4. According to Nietzsche, all systems of morals, as well as all values and norms, were invented by a certain group that has common interests. There are no eternal values and norms. According to Kant, human dignity represents an eternal norm. Hence, his concept of dignity is invalid.

Against the concept of contingent human dignity, Nietzsche implicitly puts forward at least three separate arguments:

1. Nietzsche holds that human beings do not have special status in the world. However, such a special status is demanded by all concepts of human dignity, both necessary and contingent ones.

2. Nietzsche holds that there are no universally valid norms. However, necessary and contingent concepts imply that human dignity is a universally valid norm.
3. Nietzsche holds that all human beings are not equal, and that there are two groups of people that have to be evaluated differently. However, necessary and contingent concepts imply that human dignity demands the equality of all human beings.

Given these three last points, it is clear that Nietzsche attacks not only necessary concepts of human dignity but also contingent ones.

Contemporary Concepts of Rights

All concepts of human rights that will be presented in the following paragraphs stem from the Anglo-American tradition: Nozick, Rawls, Nussbaum, Taylor. All four political philosophers defend human rights, but they represent four diverse basic positions within the spectrum of possible communitarian and liberal attitudes. Liberal positions can be characterized as positions in which the right has priority over the good, whereas in communitarian positions, the good comes first and provides the basis for deriving a concept of the right. Nozick is a libertarian thinker and therefore the most liberal of them all. His work is a reaction to the theory of justice that was put forward by his colleague in the department of philosophy at Harvard University, John Rawls. Rawls's position represents a classical liberal one. Taylor and Nussbaum represent two left-wing interpretations of communitarianism; Taylor puts forward a communist communitarianism and Nussbaum a social-democratic version of it.

Nozick's political philosophy builds on a version of Locke's natural rights position. The right to one's own body and one's property are fundamental, according to him. The best state is supposed to be a night watchman state, whereby the state secures the basic human rights but does not interfere with the free exchange among, and contracts between, consenting adults. Many philosophers criticized him for this system, as they regard the social consequences as not appealing.

According to Rawls, international human rights specify a limit to the internal autonomy of a regime, and any country that provides human rights to its citizens is entitled to tolerance. Hence, a desire to provide human rights entitles countries that see gravely unjust behavior in the internal practice of other countries to promote interventions in the countries in question. In contrast to the dominant lists of human rights, Rawls's suggestion is more limited; he particularly stresses the rights to life, liberty, property, and equality. His suggestion takes into consideration that promulgation of human rights does not imply the risk of getting rejected as being too liberal or too closely related to the Western tradition. However, Rawls

agrees with most human rights theorists by holding that the rights are universal, international, have a high priority, set minimal standards that should save people from the severest forms of unjust treatment, and are relevant primarily for governments.

In contrast to the liberal theories previously discussed, the political philosophies of the following two thinkers are based on a concept of the good that is supposed to be the basis for a concept of the right. Nussbaum's concept of the good includes two separate lists, based on her intuition, which are supposed to describe (1) the *conditio humana*, which is relevant for all human beings, and (2) goods and capacities, which are supposed to be important within all human lives. The first list includes mortality, the human body, perception, early childhood development, practical reason, community with other human beings, relationship to animals and nature, humor and play, and individuality. In the second list, she mentions that it is good to live through all stages of life, to be healthy, to fulfill one's sexual desires, to avoid pain, to have a concept of the good, and to live in a community in which solidarity exists. Hence, she puts forward a strong, but vague, concept of the good. It is strong, as it says something about all aspects of life, but it is vague, as it does not state in detail what ought to be done. Both lists serve as a basis for deriving rights.

Taylor's concept of the good from which he derives the right, on the other hand, can be described as weak but detailed. It is weak, as it does not put forward anything about all the various aspects of life. Hence, he favors a pluralist ethics. On the other hand, he holds a detailed position concerning religion, as he interprets the world from a Roman Catholic perspective.

Contemporary Concepts of Dignity

In contrast to the human rights tradition, the most prominent concepts of human dignity come from various traditions worldwide. This section will deal with those of Gewirth, Margalit, and Spaemann. The first two thinkers hold a contingent concept of dignity and the last one holds a necessary concept of dignity.

Gewirth holds that all human beings are "actual or prospective purposive agents." If all beings who are able to actually or potentially act on purpose are bearers of dignity, and all human beings are such beings, then all human beings are bearers of dignity. He connects the rights to freedom and well-being with the concept of dignity. Hence, all bearers of dignity hold the rights to freedom and well-being. According to Gewirth, it is necessary for any agent to have these rights, as these rights are supposed to be necessary for any action, and an agent would be self-contradictory if he denied having these rights. As morality is concerned with human action and being a human agent, Gewirth claims that human beings have dignity and the

two human rights mentioned. The line of thought which he proposes implies some tacit assumptions:

- Morality is concerned with action.
- Human beings are “actual or prospective purposive agents.”
- Person X is a human being.
- Person X wishes to do action A.
- In order for X to be an agent who seeks to fulfill his purpose A, it is necessary for X to assume having the right to act thus, and it would be self-contradictory not to do so, as he would reject what he needs as a purposive agent.
- All human beings, all actual or future purposive actors, need to assume that they have the right to action.
- Rights need to be granted by others.
- Hence, there is a contract between all actual or future purposive actors that need the rights necessary for action.
- All actual or future purposive actors grant the rights necessary for action, which are the rights to freedom and well-being, to all other actual or future purposive actors, so that the others grant oneself the same rights.
- The rights to freedom and well-being are connected with dignity.
- As all actual or future purposive actors grant one another the rights to freedom and well-being that are connected with dignity, and it is necessary for all actors to do so, it is also the case that all actual or future purposive actors grant one another dignity, and granting one another dignity is necessary.

With this line of thought, which, of course, is open to many criticisms, Gewirth argues for human dignity based on a theory of action combined with a contract theory.

Margalit's argument in favor of dignity is a negative justification of the concept, as he does not state what dignity is but rather what one must not do to others, so that their dignity is recognized. His method can be described as appellative rather than a logical inference that shows the necessity of dignity. His negative justification is supposed to show that human dignity is attacked whenever a person is humiliated. He puts forward examples and reasons that are supposed to show that humiliation is bad, and avoiding humiliation is all that is needed for a decent society. A society that is nonhumiliating is a society that respects human dignity. This position implies that human beings are hurt not only by physical attacks but also by means of symbolic actions.

In contrast to these two this-worldly concepts of dignity, Spaemann's position is metaphysical. According to him, the concept of human dignity refers to something sacred, the preciousness of human beings themselves, which, however, cannot be thought of without God. Dignity is a religious-metaphysical notion, and human beings have dignity just because they represent the Absolute. It is impossible, according to him, that any human being can be without a certain minimum of dignity. This does not imply that dignity is a gradual notion. The human dignity that is important for contemporary discussions and that does not

have any gradations refers to the minimum amount of dignity that all human beings have to have and that they can never lose, according to Spaemann. On the basis of some transcendental-pragmatic reflections, he links dignity to a nonempirical substance, which again is connected with a personal soul. When egg and sperm come together, this soul is united with the body, as the soul is not part of nature. In addition, the dignity connected to the personal soul is not identical with human rights but represents the foundation of human rights.

Future Directions

Given the most recent scientific innovations and artistic creations, it is not a daring prophecy to claim that transhumanism and posthumanism are and will continue to be significant movements. They share the basic attitude that the special status of human beings has dissolved, which means that human beings do not have a special factor that separates them categorically from other forms of life: Human beings are merely gradually different from other forms of life. This conception can already be found in the reflections of Darwin and Nietzsche.

However, transhumanism and posthumanism must not be identified with one another. Their values differ significantly. Whereas transhumanism upholds humanist values, posthumanism sticks to antihumanist values. Humanist values are such that the Renaissance type counts as an ideal that is to be aspired to. Antihumanist values, on the other hand, are such that there is no absolute set of values—values depend upon perspectival interpretations, and it is up to the interpreter in question which values he sticks to. As the concepts of human rights and dignity are connected with humanist concepts like the affirmation of the special status of human beings, which both transhumanism and posthumanism reject, the future development of these movements is directly connected to the evolution of the concepts of rights and dignity. Concerning rights, the next battle will be one between animal and human rights, whereas concerning dignity, human dignity might have to evolve into a trans- or posthuman dignity.

Future: Animal Rights Versus Human Rights

One of the current and future developments concerning rights is related to the dissolution of the special status of human beings. Human rights apply only to human beings, and only humans ought to be considered in the moral realm, because they have a special ontological and normative status in the world. Given the dissolution of the special status of human beings, this position no longer holds. The most prominent defender of animal rights is Tom Regan. He argues that the fact of being a “subject-of-a-life” is a necessary and contingent condition for having rights. As there are nonhuman animals that also possess this quality,

they also ought to possess rights, and one ought to alter the concept of human rights into one that includes humans and some nonhumans.

Another attack concerning our current attitude toward animals was put forward by Peter Singer. He compares the discrimination against animals just because they do not belong to the human species with sexism and racism. As an alternative, he proposes an ethics that considers an equal consideration of interests. Hence, two beings that have similar preferences ought to be morally considered equally, too. Both Regan and Singer take the dissolution of the special status of human beings seriously. Thereby, they show that the current concept of human rights ought to be revised, as it does not adequately represent the relationship between human beings and nonhuman beings.

Future: Human Dignity Versus Transhuman and Posthuman Dignity

The current and future developments concerning the concept of dignity are also related to the dissolution of the special status of human beings in the world. One of the qualities necessarily connected with human dignity is the special status of human beings in the world. Human beings are categorically different from nonhuman animals, according to this view. It can imply, as it does according to German law, that only a human being is a person and all other beings are things. To hurt an animal is to commit a damage to a property, a thing. Given the dissolution of the special status of human beings, this estimation becomes implausible, and as such, the categorical difference between human beings and animals vanishes. Hence, there is a need to revise the concept of human dignity to integrate the altered attitude concerning the status of human beings in the world. In that case, we might already be able to talk of a posthuman instead of a human dignity. Another option would be to completely get rid of the concept of human dignity, as the qualities related to it are no longer plausible, and given the origin of the concept, it has religious implications, which are also no longer held by a majority of people.

In addition, a further development has to be noted. Genetic engineering enables us to alter the genetic setup of humans significantly, and it can be expected that many further developments will take place in this respect. These developments are significant also for the concept of dignity. Two attitudes concerning human alteration have been developed within two movements. First, there is the transhumanist movement, and second, the posthumanist movement. Both accept the dissolution of the special status of human beings in the world and the integration of human beings in nature so that they are different only in degree from other animals. However, their views concerning the genetic alterations of human beings differ. In contrast to the transhumanists who uphold a humanist—a Renaissance—ideal of human beings, posthumanists uphold antihumanist values.

However, the transhumanist movement is not a unified one. Esfandiary distinguishes between the transhuman and the posthuman. A *transhuman* is a transitional human who represents the link to the posthumans but still belongs to the human species. A *posthuman* is a member of the posthuman species, which represents a further step in evolution. Bostrom, on the other hand, has a different notion of the posthuman. He regards a posthuman to be a member of the human species but with capacities that greatly exceed “the maximum attainable by any current human being without recourse to new technological means.” Both uphold a humanist ideal that implies that not all alterations count as enhancements. Only if the alterations stick to a certain ideal of the good, which is similar to the Renaissance ideal of human beings, do they count as enhancements.

The posthumanist movement, on the other hand, is more open concerning what counts as an enhancement. It does not uphold that there is only one moral ideal or that there is only one set of values and norms valid for everyone. There are various ideals that are valid for certain types of human beings. There is a group that upholds the Renaissance ideal, but there are other groups, too. There is also the group of the blind, which regards being blind as an ideal. Posthumanism, in contrast to transhumanism, does not claim that one group holds a mistaken ideal, as transhumanists would claim with respect to the group of the blind for example. Posthumanists have greater respect for the value of negative freedom, which this author regards as a cultural achievement that cannot be underestimated and that one must not sacrifice lightly. The genetically altered, from the perspective of posthumanism, can also be referred to as posthumans. However, there are also concepts of the posthuman within posthumanism that are not directly concerned with questions of genetic enhancement, like Hayles’s concept of the posthuman or Haraway’s concept of the cyborg, which put forward a new anthropology. Hence, posthumanism from their perspective is the attempt of putting forward a radically new picture of what the *anthropos* is.

There are various ways to understand and affirm genetically altered human beings. If one refers to members of the human species as bearers of human dignity, which one can continue to do, and if one revises the traditional concept by integrating the dissolution of the special status of human beings, then one should seriously consider what type of dignity applies to trans- and posthumans. Given the differences between them and current human beings, this ought to have an effect upon their moral status. Maybe they can be regarded as bearers of transhuman and posthuman dignity, respectively.

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