

Noam Chomsky



CARTESIAN LINGUISTICS
A Chapter in the
History of Rationalist Thought

Second Edition

Edited, with an Introduction, by James McGilvray

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A CHAPTER IN THE
HISTORY OF RATIONALIST THOUGHT

NOAM CHOMSKY

*Professor of Linguistics
Massachusetts Institute of Technology*

SECOND EDITION

edited with a new introduction

by

JAMES MCGILVRAY

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www.cybereditions.com
cybereditions@cybereditions.com

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Contents

Introduction for Cybereditions (by James McGilvray)	7
Preface	45
Acknowledgments	47
Introduction	49
Creative Aspect of Language Use	51
Deep and Surface Structure	72
Description and Explanation in Linguistics	88
Acquisition and Use of Language	94
Summary	104
Notes	105
Bibliography	143
Index of Persons	151
Index of Subjects	155

INTRODUCTION FOR CYBEREDITIONS

by James McGilvray

About this book

While often ignored (and when not, denounced!) Noam Chomsky's *Cartesian Linguistics* (*CL*) is one of the most original and profound studies of language and mind of the 20th century. Chomsky said of it in the original introduction that it is "a preliminary and fragmentary sketch of some of the leading ideas of Cartesian linguistics with no explicit analysis of its relation to current work that seeks to clarify and develop these ideas." This is understatement. It is preliminary only in that it was intended to invite other studies¹ and in that nothing of its scope and reach had been tried before. Nothing has equaled it since, including Chomsky's own later works. It is fragmentary only in the sense that it is a short work that deals with several centuries of the study of language and mind and is necessarily selective in the views and individuals it discusses. And while it is correct that there is little explicit analysis of relations to current (as of 1966) work, it is obvious to anyone reasonably familiar with work in linguistics and the study of mind then or since what Chomsky's views are. Those views – organized in terms of a distinction between rationalist and empiricist approaches to the mind that Chomsky suggests but does not pursue in *CL* – are the focus of the new introduction that appears below.

Chomsky would, I am sure, have liked to write a new introduction to *CL* – clearly one of his favorite works – and to play a more direct role in its production. Unfortunately, due to a backlog of commitments that will keep him busy for several years and to ever-increasing demands from people and groups around the world to speak to political issues in the ways he so effectively does, he does not have the time to write a new introduction, not to mention performing other editing tasks. But he has looked over this new introduction and made helpful comments on it.

This edition differs from the first in being entirely in English. In the original 1966 text, Chomsky left many of the quotations in French or German, using translations only if they were available. To make this edition more accessible to the wider audience it deserves, Susan-Judith Hoffmann translated the German and Robert Stoothoff almost all of the French,² using recent published translations whenever they were available and appropriate. Throughout, an effort has been made to suit the text to Chomsky's terminology; sometimes this has required modifications in available translations.

Note the following conventions. Editorial additions to Chomsky’s notes appear in square brackets. Chomsky’s references to texts and pages remain as they were in the original; additional references have the form “Author date of publication, page(s)” – for example, “Chomsky 1995b, 33.”

I am grateful to several individuals - to Cybereditions and Noam Chomsky for the opportunity to help bring out a new edition of *Cartesian Linguistics*, to Chomsky for trenchant comments on this introduction and on my additions to his endnotes, to Susan-Judith Hoffmann and Bob Stoothoff for excellent translations, to Steve McKay for preparing the indexes (there were none in the original edition), and to hundreds of undergraduates who over the years delighted me with their understanding and appreciation of a challenging text. I owe particular thanks to Chomsky for letting me edit one of his favorites, and to Bob Stoothoff of Cybereditions for editing my contributions, for comments, and for the difficult and underappreciated task of composition. I gratefully acknowledge partial support from SSHRCC and FCAR grants for this and other research projects.

Summary

Cartesian Linguistics began as a manuscript written while Noam Chomsky was a 35-year old fellow of the American Council of Learned Societies. Some of the material in it was presented as a part of the Princeton University Christian Gauss Lectures on Criticism early in 1964 and published in 1966. An intellectual tour de force, *CL* is not an easy text to read, but it is certainly a rewarding one. It begins by describing the sort of linguistic creativity that is found in virtually every sentence produced by any person, including young children. The focus soon shifts, however, to the kind of mind that is required to make this ‘ordinary’ sort of creativity possible. And to some extent – primarily through commentary on Wilhelm von Humboldt – Chomsky hints at what the implications of such a mind might be for politics and what he calls in his “Language and Freedom” (Chomsky, 1987) “the ideal form of social organization.”

The prominence of René Descartes’ name in the book’s title needs some explanation. As Chomsky points out (*CL*, 2), by no means all of the ‘Cartesian linguists’ he discusses would have considered themselves Cartesian (*CL*, note 3); some individuals he mentions in the discussion or notes, such as Huarte (n.9), precede Descartes; some of the ideas developed by post-Cartesian ‘Cartesian linguists’ had their origins in figures before Descartes (Sanctius, note 67, for example); and Descartes himself said little about language. The few things Descartes did say focus on linguistic creativity, however, and what he had to say plays a prominent role in his view of the mind and its study. In effect, Chomsky gives him prominence because Descartes – perhaps because he was a scientist

himself – seems to have been the first to recognize the importance of linguistic creativity to the scientific study of language and the human mind. He catalogued the characteristics of linguistic creativity and noted that this sort of creativity presented what seemed to be an insurmountable challenge to the explanatory tools of science as he understood it;⁴ it required – he thought – the postulation of what Chomsky calls a “creative principle” that does what nothing explainable by Descartes’ physics with its principles of a contact mechanics could do. He also recognized, in a way that others rarely did,⁵ that for all humans to be creative in this way, they must have available at a very early age, and without regard to native intelligence, education, and financial advantage, the conceptual tools that make this possible. In sum, Descartes recognized the fact of creativity and the connected need to assume the existence of ‘innate ideas’; he also understood and tried to meet the challenges that creativity and innateness pose for the scientific study of the human mind.

The ‘Cartesian linguists’ who appeared after Descartes might have had little direct interest in Descartes’ work, or might – like Chomsky himself – have disagreed strongly with some of the details of Descartes’ view of the mind. But they had similar insights about creativity and its connection with innateness, and they directed their study of language and the mind towards dealing with the issues these pose.

These points about creativity and innateness and their explanation are related to Chomsky’s distinction (in note 3) between two kinds of approaches to the study of the mind, rationalist and empiricist.⁶ Rationalists – as the term is used here, for good historical reasons – are those who can plausibly deal with the issues that ordinary creativity and innateness pose for the study of mind. Empiricists are those who – again, for good historical reasons – do not, or cannot. In this introduction I add “romantic” to Chomsky’s label “rationalist” to emphasize what is clearly a part of rationalism as Chomsky understands it: that the rationalists, like the romantics, recognize the centrality of free will. This addition might seem odd, for while the romantics Chomsky focuses on (Wilhelm von Humboldt, A. W. Schlegel, and Samuel Taylor Coleridge) share the rationalist’s assumptions about innateness, most other romantics did not. But it is justified, I think, because both the rationalists and the romantics Chomsky discusses recognize that there is a crucial link between innate ideas and human creativity.

The rationalist-romantics’ insight was that it is only because we have many thousands of readily available individual concepts (‘ideas’) and innate ‘powers’ (faculties) that can put them together in endless complexes (expressions, sentences, propositions) that humans can so readily, and so early, have the capacity to meet virtually any need that might arise, from baking bread or wondering about whether to put the dog out to producing and appreciating a work of

art. We can be creative at an early age and throughout life because the tools – thousands of individual and endless numbers of complex concepts – we need to be so are readily available. In emphasizing this ready availability, the rationalist-romantic is a *nativist*, holding that both concepts and the ways to put them together to make complexes such as sentences are innate. Not surprisingly, the rationalist-romantic is also an *internalist*, maintaining that the source of concepts and their combinatory principles is ‘in the head’. Experience is required to acquire a concept, but because the mind is set to respond to input in specific ways, often a single ‘triggering’ exposure is enough. Although our concepts depend on internal resources, they tend to be similar to the concepts other humans have because our native mental capacities are innate in the specific biology of human beings or – for earlier rationalists such as Descartes – as gifts from God specifically ‘designed’ for human use. That is why others can readily understand, and appreciate, a child’s or an adult’s innovative efforts.

The empiricists, however, hold that most of the mind’s concepts and its combinatory principles are learned by some kind of ‘shaping’ procedure. For the empiricists, such as the English linguist James Harris discussed in the text,⁷ while sensory concepts such as colors and bitter tastes might be innate (because they depend essentially on native resources or ‘instinct’) the environment, including society, makes and shapes all distinctively human concepts and principles such as those expressed in languages (*polite, resource, wink, good...*) through a “generalized learning procedure.” It is usually assumed that training by those who already have concepts plays a role. Because training is required in order to learn the thousands of concepts and the specific combinatory grammatical principles that every 6-year-old has available, the empiricists must assume that much of the child’s early life is devoted to training sessions that consist in getting the child to conform to the “speech habits” of the group that trains it. The empiricist is *anti-nativist* and *externalist* (maintaining that concepts and combinatory principles are ‘learned’ through experience of things ‘outside’ shaping concepts). But given the enormous number of conceptual tools the child must acquire and the relatively small amount of time available, it is difficult to see how ordinary creativity at an early age can, for the empiricists, be other than an anomaly.

In the rest of this introduction I expand upon and bring up to date this brief summary. There are three parts, with the second and third broken into sections. Paralleling the order of discussion in the text, in the first part I outline what ordinary linguistic creativity consists in. In the second, I take up in some detail how the rationalist-romantics, and Chomsky in particular, have tried to deal with the issues that early creativity poses. The first section of this part raises the issue of how a science of language or the mind can speak to creativity. The second explains why Chomsky and the other rationalist-romantics distinguish

between language and its use (in Descartes' terminology, between intellect and will); this section explains why an aspect of creativity that Chomsky calls "appropriateness to circumstance" poses an apparently intractable mystery for the science of mind. A third section on nativism explains how the rationalist-romantics deal with innate ideas and how they see the connection between nativism and creativity. Finally, in the third part, I break with the order of Chomsky's text and discuss empiricism and rationalism in the study of mind, particularly in their contemporary forms, and conclude by pointing to some connections between a rationalist-romantic view of mind and Chomsky's (and Humboldt's) views of politics and education. These connections are mentioned and hinted at in the text and the notes.

I strongly suggest that readers proceed now to Chomsky's text and extensive notes. No introduction can be adequate to the rich insights of this text; the rest of this introduction is, to some extent, an expansion of a few of Chomsky's notes (3, 8, 9, 29, and a few others). Readers can return later to the rest of this introduction for comment on creativity, innateness, the science of language, and rationalist-romantic and empiricist approaches to mind, and for an indication of how Chomsky has developed the ideas explored in *CL* in more recent work.

I. The creative aspect of language use

A considerable part of Noam Chomsky's life has been devoted to constructing a science of natural language – that is, of language as a "natural object." But, as he points out, the study of language also offers a way to study human nature, for not only does the science of language give access to some of the most fundamental operations of the human mind, but language is both unique to humans and involved in virtually everything we think and do, "entering in crucial ways into thought, action, and social relations" (Chomsky 1988, 2). Creativity is a readily observed feature of human thought and action, and the satisfaction that people get from creativity and the exercise of freedom is a key component of social relations. Chomsky assumes, then, that the science of language can illuminate human creativity, and that close observation of human creativity can tell us something about the nature of language and the structure of our minds.

The creativity that Chomsky is concerned with in *CL* is not that found in the sciences. Scientific creativity involves the invention of new theories and concepts. Chomsky's own scientific work is an example. He virtually created linguistics in its modern form when he abandoned the ill-motivated project of descriptive taxonomy that was characteristic of much of linguistics when he began his studies – a project where the 'scientist' is, as Claude Vaugelas claims (below, p. 90), "a simple observer" who cannot justify his or her descriptive tools. Chomsky initiated another project consisting of constructing what he

then called a “generative” science of universal grammar (now sometimes called a “computational” theory of human language), a formal science of the built-in biological ‘mechanisms’ by which all natural language sentences are generated or derived along with an account of how any natural language and any of its individual variants are acquired. (The emphasis on ‘natural language sentences’ and ‘natural language’ is intended to indicate that sentences as Chomsky conceived and conceives them are internal biological (‘mental’) entities – what he in recent years tends to call “expressions” (discussed below) where these are thought of as internal sound-meaning pairings – and natural languages are the biologically possible structured systems that humans can develop, given the relevant triggering experiences. He does not think of sentences as philosophers and logicians tend to think of them, as well-formed formulae.⁸)

Nor, for a different reason, is the creativity Chomsky focuses on the creativity of artists who use the medium of natural language – poets, novelists, or essayists.⁹ For while the creativity he focuses on is, like the poet’s, exhibited in the use of natural language, it requires neither special labor nor particular talent. It is the creativity that is readily found in the “ordinary use of language.” This ‘ordinary’ creativity, like the poet’s and essayist’s, uses the concepts provided to all humans by their biological heritage. It relies upon and presupposes concepts that are innate – that is, implicit at birth and, given normal development, readily activated. Virtually every utterance that people – including small children – produce displays this creative use of native concepts; it is the rule, not the exception. That is why it is so important that the science of language and the study of the human mind take it into account. A science of language or an account of mind that fails to provide for such an easily observed phenomenon cannot be correct.

It takes no special skills or invented and (for most of us) inaccessible scientific concepts to recognize that the ordinary use of language is creative. It is enough to use our observational powers, coupled with the concepts of common sense that we all have, and to look clearly and without prejudice at the ways people of all ages use language. In 1575 the Spanish thinker Juan Huarte (*CL*, note 9) used these commonsense concepts when he observed and described what he called “wit” (*ingenio*, a productive, engendering power for apt innovation). With humans, he thought, wit is found in its most advanced form in the use of language: mankind’s “Honour and Nobility ... consists in his being favour’d with, and having an Eloquent Tongue. ... In this alone he distinguishes himself from the Brutes, and approaches near to God.” Half a century after Huarte, the philosopher-scientist René Descartes clearly described human “wit” of the sort that is observed in the use of language. He had a special reason to take an interest in the phenomena of creativity in the use of language. Having as a scientist developed some of the principles of a contact mechanics, and having to his satisfaction

shown that these principles could fully explain the minds of animals and the operations of the human body and brain, Descartes had to recognize that easily observed features of intelligent human action, revealed in the creative use of language, escape mechanical principles. At the end of Part V of his *Discourse*, he describes the phenomena in lucid, but compressed, terms. Humans, he says, routinely produce “different arrangements of words” that give an “appropriately meaningful answer” to whatever questions are asked of them. Ask a person a question about some circumstance – which need not be present to questioner or questioned – and you will receive one of an indefinitely large number of answers, all expressed in different sentences but, typically, all appropriate. His mechanics could not explain these phenomena, he recognized. They must be due to a different principle, a creative one.

Following Chomsky, let us try to capture the basic characteristics of the phenomena of language use that Descartes took so seriously. The ordinary use of language seems to have three characteristics. First, a speaker’s current environment and brain state do not seem to compel a particular utterance: to use Chomsky’s terminology, sentences seem to be “stimulus free.” Second, there seems to be no way to limit, for any given circumstance, the number of sentences that might be used to deal with it: in Descartes’ case, speakers may respond to a question with any of a “boundless” (Chomsky’s term) number of answers, each with what Descartes called “different arrangements of words.” Third, such answers will likely be “appropriate to circumstances” and “coherent.” Apparently, sentences do not need to be caused by circumstances or limited in number (structure, etc.) to be appropriate. Chomsky’s descriptions of what he calls the “creative aspect of language use” adapt Descartes’ terminology as well as that of Géraud de Cordemoy (another 17th century philosopher who expanded on Descartes’ observations). Chomsky’s terminology may vary somewhat, but in *CL* and works after it, the three basic characteristics remain. He takes ordinary linguistic creativity to be “novel” and “innovative” (effectively, by access to a boundless number of sentences), “free from” external and internal stimulus control (stimulus freedom), and “coherent” and “appropriate.”

Descartes’ ‘creativity test’ for human intelligent behavior (the products of what he called “Reason” although he must have included volition in this as well) is still generally accepted. Alan Turing, in 1950, proposed a ‘test for mind’ for computers that focuses on appropriateness. He suggested that we should not attempt to decide whether to regard computers as capable – like human beings – of producing intelligent behavior until they can be programmed in such a way that their responses to arbitrary questions are no less *appropriate* than human responses. Despite several ingenious efforts on the part of programmers, no machine has yet passed the test. Passing it, as Turing pointed out, would *not* prove that the ma-

chine has a human-like mind, or a mind at all, but someone might propose it as a reason to change usage and say of the machine that it “thinks”. I do not pursue the topic here; Turing’s paper spawned literally hundreds of responses and discussions which, with few exceptions, miss his point and garble the issues. But Turing and his test do indicate that Descartes’ creativity observations, especially his emphasis upon appropriateness, were to the point.¹⁰

Rarely do people, even when asked to describe the same situation, use exactly the same words, much less arrange them in the same ways. Checking the written reports of thirty eyewitnesses of an automobile accident will turn up few, if any, repeated sentences. The range of different sentences – potentially infinite, even in the performance of what might seem to be a specific ‘job’ such as describing an accident – shows that novelty and innovation are the rule, not the exception. Moreover, it appears that neither external nor internal stimuli cause any of the sentences. Not even coercion, or the threat of it, is sufficient to produce a particular sentence: even with a gun to their heads, people still have the potential to say (and certainly, think) whatever they may wish. As for coherence and appropriateness, even if a sentence appears *outré* on first hearing, we do our best to find an interpretation that makes it coherent and appropriate. Unless there is strong reason to think otherwise, we treat it as appropriate to whatever circumstance we take to be relevant and regard its speaker as a rational agent in control of and responsible for what he or she says. It is irrelevant that the eyewitnesses’ different tales can be valued differently. For instance, if their stories are regarded as contributions to reports in a court of law, one might be more highly valued for what is seen as its greater probity, clarity, or attention to detail. On the other hand, if assessed in terms of the accident’s relevance to the question of increasing the regulation of automobile manufacturers, one report might be more valued because of its sympathetic treatment of the victims of the accident. Or, taken as a contribution to a newspaper editorialist’s lament on the sad state of the town’s roads, reports that remark on the size of the ruts that caught the wheels of the vehicle might be more highly valued. Certainly some stories may be seen as “more appropriate,” “more coherent,” or “truer” (depending on the kind of ‘job’ they are seen as contributing to) than others, but basically they are all intended to be appropriate, and are read as such.

While in the illustration above language use is portrayed as intended to be heard by others, it is important to notice that by far the greatest number of sentences produced by speakers are never uttered or written at all. They are produced silently for any number of purposes – ruminating, working out strategies, speculating. . . . This emphasizes that while all sentences might be produced ‘for reasons’, the majority are not produced to do the ‘jobs’ that others (or institutions, etc.) might want them to do. It also emphasizes that those who like to

think that the function or purpose of language is communication are just wrong. Not even the majority of the small number of sentences actually uttered is uttered with the intention of communicating. The rationalists emphasized all this by remarking that about all one can say about the function of language is that it is used for the free expression of thought.

Except for regimented or formulaic speech of some sort (perhaps that used on an assembly line or for polite greetings), the sentences people produce have often never appeared before and might have little or nothing to do with their current circumstances. Yet they make coherent and appropriate contributions to the performance of whatever cognitive tasks the speaker happens to be engaged in. The carpenter jokes, gossips, and speculates with her co-workers; the four-year-old talks to his imaginary companions, advising them to hurry or they won't get into the (cardboard box) castle in time; the ice skater silently gives her judges advice she would rather they not hear; the job candidate wonders about what the interviewer's political views are. Innovative, uncaused, coherent and appropriate or 'rational' uses of language occur everywhere.

Linguistic creativity seems to contribute significantly to what Chomsky sometimes calls "intelligent behavior". It plays a role in many – perhaps most – human actions. As the 20th century philosopher Ludwig Wittgenstein pointed out, it is impossible to disentangle the use of language from the performance of any number of tasks or projects. When judging whether a sentence is appropriate, one has to take into account why a person says what he or she says, and that is possible only if one takes into account the task to which the sentence contributes – coaxing a companion, getting a salesman to lower his price... Given the fact that language use and action are inextricably combined, that the ordinary use of language is creative, and that natural languages offer their users an indefinitely large number of cognitive perspectives that can illuminate actions, help bring them about, and provide ways to articulate goals and strategies, it follows that creativity in language use contributes to making everyday efforts to 'solve problems' of all sorts creative too. Linguistic creativity is thus an extremely important part of intelligent human action and behavior in general. This is so because language enters "in crucial ways into [human] thought, action, and social relations."

II. Dealing with the creative aspect of language use

The science of language

Observing and characterizing linguistic creativity is relatively easy; the difficult job is to take it into account in one's view of mind and language. Descartes did little more than put a label on the problem. To make sense of why this lin-

guistic creativity seems to arise only in the actions of human beings, he postulated the existence of a mental “substance” – dominated, significantly, by a completely free will (though endowed with a limited understanding) – that is distinct from the substance “body” (which includes everything that can be explained by the principles of his contact mechanics). As Chomsky points out elsewhere (1972, 1996), Descartes’ conception of body turned out to be wrong. Newton’s work with gravitation half a century later demonstrated this. He showed that his “mathematical principles” described the ‘bodily’ phenomena of gravitation and seemed to require some kind of ‘action at a distance’, however this kind of “action” is ultimately explained. The principles of Descartes’ contact mechanics neither described the phenomena nor could explain them. They clearly failed, then, as a scientific account of gravitation, however appealing they may have been then and since to common sense and the “folk science” it includes. Further, Chomsky suggests (1995a, 1996), with the abandonment of contact mechanics and the inclusion of what common sense sees as ‘occult forces’ in the worlds of science, the motivation for thinking of the mind and mental operations as separate from the body and its functions should disappear too. To a significant extent, this happened in the 18th century. The chemist-philosopher Joseph Priestley, for example, pointed out that since Newton showed that matter as science understands it has what seem to common sense to be occult properties such as attraction at a distance, certain organized forms of matter might well have properties such as sensation and thought too. But with occasional exceptions, this insight was forgotten: philosophers now continue to debate “the mind-body problem” (and the “free will problem”) as if something like Descartes’ conception of body could still be taken seriously. It is difficult to understand why. It may be that a dualism of mind and body is somehow built into our common-sense understanding of the world. But that is no reason to take it or Descartes’ version of it seriously in the science of mind – or in philosophical discussions that take science seriously.

Although Descartes’ attempt to deal with matter failed and the dualism he postulated to deal with creativity was poorly motivated, he was correct to emphasize that creativity poses a barrier to our kind of scientific understanding. That may well be because – as Chomsky sometimes (1975, 1995a) suggests – we are biologically limited to understanding only in certain kinds of ways, those offered in common sense (Descartes’ *bon sens*) and in formal theory construction (science). Nevertheless, that should not lead one to think that science cannot contribute to understanding ordinary linguistic creativity. What is needed, Chomsky argues in *CL* and elsewhere, is a science of language and a scientific understanding of the mind and its operations that make clear how ordinary linguistic creativity and its contributions to intelligent human behavior and action are *possible*. The aim

is not a science of intelligent human behavior: a science of behavior is probably impossible, for it would have to be a science of everyday human creativity, virtually a contradiction in terms. It is a matter of constructing sciences of language and of any other mental faculties that lend themselves to scientific inquiry and then, with these in hand, of providing a picture of the mind that accommodates both these sciences and the obvious facts of creativity.

It is interesting that Chomsky's contributions to the science of language began before he read any of the historical works discussed in *CL* and so before he explicitly addressed, in the terms set by that reading, the issue of how language understood as the object of a science could fit with the facts of linguistic creativity. His contributions began with his 1949 undergraduate thesis *Morphophonemics of Modern Hebrew* (1951/1979) and – with no help from others – reached the remarkably advanced stage of his 1955 *The Logical Structure of Linguistic Theory* (published 20 years later as 1975b) by the mid-1950s. Nevertheless, the science he developed, supplemented by a developing picture of the human mind, turned out to be just what was needed to speak to at least one aspect of the historical issue, for it portrays language as an inner faculty that is capable of generating endless numbers of sentences or expressions out of a finite number of lexical items. Furthermore, two of his works in the later 1950s addressed inadequacies in the prevailing empiricist understanding of the mind of that time (and often since) – inadequacies due, in part, to ignoring the facts of creativity. His *Syntactic Structures* argued against the crude and superficial understanding of natural languages and the operations of the mind found in early information-processing models of mental processes (and, too often, still). And his devastating arguments against the pretensions of a behaviorist 'theory' of language use in his 1959 review of B.F. Skinner's *Verbal Behavior* showed that the 'scientific' project of behaviorism is hopeless. So in the later 1950s and early 1960s Chomsky must have been pleased to find in his reading others who had struggled with the same issues. *CL* is, in part, a record of those precedents.

In barest outline (the text provides details), the late 17th and 18th century Port-Royal grammarians (Arnauld, Lancelot, du Marsais, Beauzée) had made some progress towards advancing a science of language that was similar in some respects to Chomsky's early efforts. In an attempt to capture the relevant 'machinery of the mind', they tried to say what it is about language that allows for the production of (in principle) endless numbers of sentences, no matter which language one happens to speak: their Philosophical Grammar anticipated – at least, in its aims – Chomsky's Universal Grammar. The 19th century German linguist and philosopher Wilhelm von Humboldt, apparently unaware of their work, made a different but related sort of contribution. Like the Port-Royal grammarians, he recognized that there must be an innate and universal basis (his

“Form” of language) underlying all natural languages although, unlike them, he had little to contribute towards an explicit theory of that basis, apart from some very insightful ideas about what such a theory should deal with. Perhaps his most important contributions were in exploring the implications for creative activity, education, and politics of an innate generative faculty. (Most of the other romantics – A. W. Schlegel and Coleridge were exceptions – seem to have had no inkling that interesting varieties of creative activity require a fixed but productive basis.) In addition, several philosophers and philosopher-linguists (prominently, Ralph Cudworth and Herbert of Cherbury) contributed by helping establish that the mind’s contents are largely innate, that humans have ‘free will’, and that there is some kind of connection between these facts. (Cudworth also seems to have recognized that what must be innate in the mind is a generative device that puts together or manufactures ‘ideas’ – his “innate cognoscitive power.”) As they make similar assumptions and come up with similar contributions, they may all be called “Cartesian linguists” – as may Chomsky, who brought these various contributions together for the first time, developed them systematically, and constructed a science of natural languages. His science of language – considerably improved upon since 1966 – and his view of mind – which takes into account sciences of mind as advanced by others, such as the science of human vision advanced by David Marr and his followers – have increasingly shown that biologically based minds like ours make ‘ordinary’ linguistic creativity possible.¹¹

Language and its free use: the problem of appropriateness

Any attempt to speak to linguistic creativity in a scientific way must recognize a difference between language and the use of language. Descartes’ observations focus not on language but on its use in the actions to which language contributes – and thus on much of intelligent behavior. Language itself – what persons have in their minds or (as English speakers put it) *know* when they are competent in a language – is an inner system. It is a biologically based structure that can in principle produce an endless number of sentences, or what Chomsky now prefers to call “expressions,” each of which consists – speaking informally – of a specific sound associated with a specific meaning.

By using commonsense concepts that all humans have available, it is easy for anyone to describe the creative actions to which language contributes. Our innately configured commonsense concepts – those of what Descartes called *bon sens* – offer rich resources for dealing with human actions. We readily recognize, and can describe, subtle differences between people’s intentions and interests; we can sense deceit, we gauge how well someone has contributed to a task, we admire Harriet’s just-right comments, and fault Mort’s bad timing. It is because we

have these resources that we can readily recognize that the everyday use of language is uncaused, innovative, and appropriate – in short, that it is creative. To describe the inner system that makes this possible, however, linguists must abandon common sense and develop new concepts. As with physics, which long ago abandoned the commonsense concept *particle* and developed formally (mathematically) explicit substitutes that moved further and further from common sense, Chomskyan linguistics has abandoned the commonsense concepts *expression* and *sentence* and introduced theoretically defined substitutes. In Chomsky's current terminology, the linguist introduces and defines these scientific concepts and the others that play a role in linguistic theory by developing a “computational theory” that aims to describe both the items (‘words’, lexical features) that ‘enter into’ internal linguistic processing and the ways in which these items can be combined to generate more complex expressions such as phrases and clauses. By detailing possible inputs and the combinatorial options that the inner system makes available, such a theory provides, in effect, a description of the infinite set of (internal) outputs that can be generated by a particular person's linguistic system at a particular stage of its development. Chomsky calls the internal linguistic system a particular person has at a particular stage of his or her linguistic development an “I-language” for *i*ndividual, *i*nternal, and *i*ntensional language (system). The computational theory that can describe a person's I-language – and any other I-language for any person who has any of the thousands of natural languages at any time – is called “Universal Grammar” (UG). Unlike the tens of thousands of commonsense concepts, the few concepts of formal linguistics (and physics, etc.) are outside most people's conceptual competence. Understanding the place of language in the mind and its potential for contributing to creative action, however, are plainly within anyone's grasp. We can all appreciate, at least in outline, some of those factors that give the human mind a “species-specific capacity, a unique type of mental organization” (CL 52) that enables us, with a very considerable amount of aid from language, to be creative agents.

In discussing these matters, I use current terminology. Let us assume that linguistic creativity involves producing linguistic actions that are stimulus-free in their etiologies, potentially boundless in range, and appropriate to whatever circumstances are at issue in a discourse (or soliloquy). Let us also assume that the human mind consists of several interacting but more-or-less independent systems such as language, vision, facial configuration, audition, and the like. In effect, the mind is made up of a set of “modular” systems having “interfaces” that allow them to “communicate” or “exchange information” in various ways. If the mind has components and structure like this, the language module's contributions to action can be stimulus-free because the system itself is both modular (independent of others) and readily set into activity, apparently ‘at will’. We

seem to have no other way to describe our control over language than to say that we can produce sentences at will. It may help to grasp the significance of this fact if we contrast our control over language with the comparatively smaller degree of control we have over faculties that typically operate when prompted by ‘signals’ from without. Vision, for example, seems to be far less within our control than language. As some 17th century philosophers put it, when we produce a colored visual scene in imagination, it is “less vivid” than those produced by sensory system promptings. There are other differences too. For example, language seems to be able to easily recruit aspects of other systems and bring them to bear on whatever tasks a person might want to put them to. Language seems to have some of the characteristics of what others (notably Jerry Fodor) call a “central” system. For present purposes, though, it is enough to notice that language really does seem to be completely stimulus-free.

As for boundlessness, the language system (Chomsky calls it the “language faculty”) readily provides for it, because it is a productive “generative” system. It can – in principle – generate an indefinitely large number of ‘outputs’ in the form of what Chomsky calls “expressions,” each consisting of a sound paired with a meaning. It seems to be unlike all other mental systems in humans or – so far as we can tell – other organisms in producing what is called a “discrete infinity” of outputs (expressions) which are discriminable from each other by some feature or features that those with a language faculty can, in principle, register. By contrast, the visual system produces scenes along dimensions (height, depth, breadth) that are continuous or “dense,” so that distinctions between different lengths, breadths, or depths are so fine as to be beyond any finite means of discrimination. The details are not important for present purposes; it is important only to keep in mind that if the language system can produce endless numbers of readily used, stimulus-free, and recognizably discrete ‘meanings’, it provides more expressive range than anyone – or the whole population of humans for all time – could possibly put to use. The I-language of one person may lack some lexical items that the I-language of another has, so that the sentential concepts or meanings available at a particular time and hence also the range of things that can be understood are different for the two persons. But lexical items, and specifically the sounds and concepts they contain, seem to be readily acquired; so differences of this sort create no real barriers to understanding. The only differences between one language and another that can be hard for those with already-developed I-languages to acquire are those that are “parameterized” – basically, differences in linguistic structure and sound. I say more about parameters later.

What about appropriateness? This is where the resources of the science of language and mind run out. We have seen that the modularity and generativity of the language faculty that the science of language reveals help make sense

of how people can, in using language in the ordinary way, produce linguistic behavior in the form of utterances that anyone can observe to be stimulus-free and unlimited in number. They help explain (although not in a scientific sense of 'explain') how these two aspects of readily observed linguistic creativity can arise – how they are possible, to use Kant's turn of phrase. With appropriateness, however, we are dealing with something that obviously involves contributions not only from other systems in the head (such as vision), but also from a person's choices. We are judging whether the cognitive perspective that an expression represents contributes well or badly to a complex, freely undertaken human action. And, to make matters worse, we are assessing this contribution with respect to the performance of some task that the perspective is seen to contribute to: the expression is appropriate, reasonable, or coherent with regard to what could be any task-specified 'circumstance'. About all one can expect a science of language and mind to be able to do in the way of speaking to how linguistic behavior *can* be appropriate is to detail what kinds of tools language and other systems provide the person who uses them, and to make clear how these tools can contribute to and coordinate with other systems. Chomsky's current effort to advance the science of mind (increasingly since his very early work a collaborative effort on the part of many workers who often engage in healthy disagreement) speaks to both matters.

While even in the 1960s Chomsky recognized that the language faculty must be able to 'communicate' with other biologically based systems in the head, it was not so clear then as it is now how to conceive the issue, much less address it. It was always clear that language has to communicate with perceptual-articulatory systems in order to produce and 'decode' linguistic signals and with what Chomsky calls "conceptual-intentional" systems in order to perform the various cognitive tasks that linguistic concepts can contribute to. But only recently has it become clear that the *whole* set of operations of the language faculty is virtually designed to produce specific "representations" that can communicate at both a sound and a meaning interface – technically, the "phonetic interface" and the "semantic interface." Whatever appears at the sound/sign interface, for example, must be able to serve and "instruct" perceptual and articulatory systems. Think of it this way: if people are to use language as they sometimes do to speak or sign to others, the internal system of the language faculty must be able to satisfy whatever "interface conditions" a perceptual or an articulatory system might impose. Otherwise, no one could speak/sign and be heard/seen. So, for example, speech has a continuous linear temporal form, and the language faculty must 'code' the information that appears at the sound/sign interface in such a way that it can inform the articulatory systems how to modulate signals they produce in such a way that they can prompt another person's mind when it hears and

responds to produce a state that is similar in phonetic features to the state in the mind of the person who spoke/signed. In a related vein, at the semantic interface the language faculty must ‘code’ to meet any demands that conceptual and intentional systems impose. Unlike the articulatory and perceptual systems, it is less clear just what these conceptual and intentional systems are, but the basic point is uncontroversial.

When engineers plan an interface between a computer and a printer, they make sure that the information the computer sends to the printer is in a form that the printer can receive. In the case of a biological system such as the mind, there are no engineers and the systems with which the language faculty communicates have whatever form they have, which developed for indeterminate reasons – perhaps evolutionary-selectional, perhaps as a mathematical/structural consequence of whatever physical/biological laws govern the components of that system, perhaps just through chance.¹² Because we do not yet have a clear idea of what the conceptual-intentional systems are, we are forced to look instead at what we know the language faculty provides and judge whether these are the sorts of things that are likely to serve whatever “conceptual and intentional” needs the organism – a human being who gets satisfaction from free action – might have. Let us put a label on those needs and call them the needs of intelligent behavior, taking this to include everything from dealing with a dominating boss to writing a line of poetry, but excluding the needs of science (for the concepts of the sciences are not oriented towards serving practical human needs). A few examples chosen from the thousands of lexical concepts that can appear at the semantic interface show that they offer exactly what people need if language is to play a significant role in such diverse intelligent human actions: concepts such as *wish* and *want*, *louse* and *log*, *up* and *underneath*, *good* and *ugly* seem to be virtually designed to serve human interests and needs. And since the language faculty combines these lexical concepts in countless sentential constructions providing what Chomsky calls sentential “perspectives” that allow us to do all kinds of cognitive jobs – ask questions, make subtle points, criticize and cajole, worry about how long it is taking someone to arrive, etc. – it is difficult to imagine coming up with a better-designed system. In fact, it turns out, it is even better designed than its usefulness alone would make it appear, for it also seems to be relatively simple and efficient in its operations. This, as Chomsky points out (1996), is unusual for biological systems – typically, one finds biology making do with what happens to be in place, however it may have got there and whatever biological function it may originally have served, if any.

The upshot is that the language faculty seems to be well designed to enable and even facilitate creative human action – *not* to serve as some kind of causal intermediary between perception and behavior, as behaviorists, connectionists,

and functionalists would have it. In fact, the case is even stronger than this against the idea that the mind, and language in it, serves as a causal intermediary. No attempt to construct a serious science of the human mind that tries to treat mental processes as mere causal intermediaries has ever met with success. Indeed, even sciences of the minds of insects that attempt this are rudimentary, at best; the only real successes are with single-cell organisms. Of course, it would be foolish to declare that there cannot ever be such science for human beings. But it is fair to say that there is no reason to think that there can be. Not only have attempts to construct one failed, but the lack of any progress whatsoever suggests that if there can be such a science, it is beyond our comprehension. It would hardly be surprising if our biologically based capacity to form sciences – a capacity unduplicated among any other creatures of which we are aware – also had biologically based limits. Perhaps – as Chomsky with tongue firmly in cheek puts it in his 1988 – a science of intelligent human behavior is within the cognitive range of another kind of creature, perhaps Martians. But it does not seem to be within ours.

Assuming all this, we should embrace the idea that creative human action manifested in intelligent behavior is undetermined and yet reasonable – that is, coherent and appropriate. In describing it as reasonable, we take it to be caused in a different sense. We see it as the product of what is sometimes called “agent causation,” perhaps even – as Descartes might have put it – as the product of a non-mechanical, creative principle consisting of intellect and (free) will. In the *Blue Book*, Wittgenstein says that in explaining actions in terms of their coherence and appropriateness with respect to human motives, interests, thoughts, beliefs, and the like, we “give reasons”, not “give causes.” (The latter he says is a task for the scientist.) Cases where we give reasons seem to be those that Descartes and Chomsky have in mind when they speak of creative linguistic actions that are uncaused but appropriate and coherent.

When we acknowledge that in saying something someone *did* something – when we attribute responsibility to a person and say that he or she chose to do it – we are not acting as scientists but exercising our commonsense understanding on an apparently free and creative human action. Commonsense descriptions of actions presuppose that the action is free – this seems to be built into the notion of human action that figures so heavily in commonsense verbs (‘wash’, ‘crash’, ‘persuade’, ‘think’...). No science proves anything to the contrary; indeed, the failure of attempts to show otherwise provides another reason to think that we are free. One could continue to insist that all human action is caused by external or internal circumstances and that some science will eventually show how, but this is only blind faith: there is no evidence from common sense or from science to support it. People persist in assuming and – occasionally – trying to show oth-

erwise, but it is not clear why. Rather than denying the apparent facts or trying to create a science of a subject matter (human behavior) that seems to be beyond the reach of science as we can understand it, perhaps we should take seriously the idea that human beings have a 'free will'. Perhaps we should see benefits instead: the sciences of mind as we understand them and the structure of mind that we can discern indicate that, so far as anyone can tell, we are biologically 'designed' for freely exercised intelligent behavior. And perhaps we should start to do what Humboldt suggested and Chomsky attempts – try to see what the implications are for our understanding of human actions and ourselves if we are so 'designed'.

The evidence seems strong not only that there is no incompatibility between the science of mind and human freedom, but that the two are complementary. We have many modular cognitive systems, such as language, vision, and facial configuration (a considerable part of our brains is devoted to representing small differences in human facial configuration), each of which provides its own form of conceptual contribution to the overall cognitive functioning of human beings. Language provides the sounds and meanings of an infinite set of expressions, and vision all the possible color-position combinations that a human visual field is capable of (or, at another level, the set of possible configurations that visually distinguishable objects can assume). Some systems are readily exercised 'at will': certainly language is, and we all seem to be able to produce visual and auditory images to at least some degree. So we are capable, for example, of speaking of things far away, or in totally fictional worlds. Moreover, these systems or "faculties" seem to be flexibly organized. That is, they do not seem to feed some 'central processor' that coordinates the outputs from the various modules that might be brought to bear on the performance of an action. No doubt coordination takes place, for it is evident in human actions; "coordination" is virtually another word for Descartes' "Reason" and for appropriateness and coherence. But there is no reason to think that coordination takes place in a central processor or autonomous, coordinating system that has this as its function – any more reason than to think that reasoning requires and takes place in a separate faculty, Reason.¹³

Nativism

As we have seen, observations of the creative aspect of language use play an important role in what Chomsky and other rationalist-romantics have to say about creativity and the structure ("unique form of mental organization") of the mind. Another set of readily observed facts plays a crucial role in discussions of the innateness of the systems and the concepts that the rationalist-romantic thinks enable human creativity. They are the "poverty of stimulus" facts. These facts about cognitive development draw attention to the contrast between how much

knowledge individuals acquire in certain cognitive domains with how little they need in the way of relevant forms of experience or ‘data’ to acquire this knowledge. No one denies that children require little time and no training to acquire the cognitive resources provided by vision. Several, at least, correctly conclude from this that the visual sensory concepts such as the distinct colors, shapes, and positions in terms of which we see are innate.¹⁴ With language, however, many balk even at allowing that the structures characteristic of natural languages are innate, not to mention all the detail found in specific ‘lexical’ concepts such as *curry* and *walk*. The linguistic poverty of stimulus facts indicate that they must be wrong.

The relevant facts are: (1) Children acquire languages quickly. They can often understand relatively complicated constructions before they can talk, they acquire vocabulary at the extraordinary rate of approximately a root word per waking hour between the ages of 2 and 8, and virtually every child has adult competence by the age of six. (2) They acquire language at approximately the same rate across the human population and go through the same stages at the same ages, without regard to which of the thousands of natural languages they happen to acquire, the amount of ‘training’ they receive (if any), whether they use speech or sign, and their native intelligence. (3) They acquire language despite receiving only a small amount of data, some of it ‘defective’ (ungrammatical, halting, and incomplete speech, for instance). In sum, observations indicate that children acquire one or more of any of the complex internal systems that constitute I-languages uniformly and virtually automatically, so long as they are provided at least some ‘data’ in the form of speech or sign on the parts of other human beings.

As with the creativity observations, the linguist has the task of explaining how these poverty of stimulus facts could arise. There is a big difference, however, in what a science of language can hope to accomplish with these readily observed facts as opposed to the creativity ones. We have seen that linguistics and the science of mind are very unlikely ever to yield a science of the creative use of language – especially where (as virtually throughout) human decisions and choices play a role. The free use of language is likely, as Chomsky put it in his 1975, to remain a mystery and never become a problem. Probably the best we can hope for is a theory of the internal system of language and theories of the other parts of the mind and of overall mental organization that explain how creativity is possible by, showing, among other things, how natural languages and their individual variants (I-languages), plus their connections to other systems, provide speakers with potentially infinite expressive resources. In contrast to this indirect approach, a Chomskyan science of language speaks directly to the poverty of stimulus facts. Chomskyan linguists seem to be on the way to solving “Plato’s problem”, as

Chomsky calls it: they have constructed a science of language that shows in outline how an internal biological system can, with little prompting from data and almost automatically, develop in each individual that rich form of cognitive competence we call “knowing a language.” Chomsky calls the problem set by the poverty of stimulus facts “Plato’s problem” because Plato confronted it and pointed to the only possible solution: the relevant kind of knowledge must be, in some sense, innate, and its activation non-intrusive and virtually automatic. In the *Meno*, Plato portrayed a slave boy who quickly comes to understand the principles behind the Pythagorean Theorem without being instructed in them. He asks the dialogue’s protagonist Meno and the reader to assume that the slave boy must have had latent knowledge of the concepts and principles of geometry before his encounter with Socrates, who drew them out, changing the slave boy’s latent knowledge into knowledge that he could exercise in solving cases that he had not encountered before. Socrates – in Plato’s terminology – must have served only as “midwife” to ideas that the slave boy already had. He did not instruct him; at most, he asked leading questions. Plato suggests that we have no choice but to assume that the slave boy knew a great deal before he was put in Socrates’ presence, for otherwise he would not have been able to come to use the relevant concepts so quickly without instruction. Similarly, Chomsky claims, we must assume that children know a great deal about language before being put in the presence of other speakers, since otherwise they could not quickly and without effort come to display the rich and intricate knowledge that having a language involves. The linguist’s task is much more complicated and difficult than Plato’s. Solving Plato’s problem for language acquisition involves saying both *what* is known when one knows a language and *how* one comes to know it, and doing this with a science of the mind, not philosophical speculation. It is clear that answering the *what* question is going to be very difficult. Only a few concepts are involved in the Pythagorean Theorem; no matter what language one speaks, they are the same; and they had been identified and well articulated by Plato’s time. There are thousands of natural languages and countless individual variants of each, and a theory must cope with not just them, but with any possible natural language and any possible variant of each. Examining the full range of natural languages, we find many differences in form of sound and structure. We find combinatory principles that seem to differ in many respects. We find in each competent individual’s variant of a natural language many thousands of lexical concepts. Few but linguists have articulate knowledge of any of these differences and combinatory principles, and even linguists have serious difficulties in dealing with the intricate and rich ‘contents’ of individual concepts. Complicating matters even more, scientists of language are interested not just in existing languages, but in all possible languages. Their aim is a serious, naturalistic theory of all this, including an account of

how any infant can acquire any possible language.

As for the how question, when it came to explaining how the slave boy came to know – describing the mechanisms of virtually automatic acquisition – Plato resorted to myth. He spoke of the slave boy's soul, along with all other souls, having had a prior existence in a World of Forms, of being incarnated and made to forget, and of education as a matter of 'remembering' (reminiscence). The scientist of language, in contrast, must construct a naturalistic theory of a biological system that makes language acquisition virtually automatic. In Chomsky's terminology, one must provide an adequate scientific theory of all possible natural languages – that is, a theory of UG (Universal Grammar).

To solve Plato's problem for language, then, linguists must produce a unified, descriptively adequate (for the what question) and explanatorily adequate (for the how question) scientific theory. To ensure descriptive adequacy, they must construct a theory that describes the full set of concepts, forms, and combinatorial principles (the full systems) of all possible natural languages and their individual variants (I-languages). That is, they must construct a theory of UG that says what the possible languages are. To do this satisfactorily, linguists must make sure that their hypotheses about the nature of UG are "powerful enough" (as Chomsky says in *CL*) to allow for the systematic and articulate description of any of the actual and possible natural languages and their variants. To deal with the variants, linguists must contend with possible lexical items, for while people's I-languages will differ in their lexical items or 'words' (their mental vocabularies), naturalistic linguists must be able to say what the possible words of languages are – specifically, what the biologically possible sounds and linguistically representable concepts are that can be associated in various ways to make up "lexical items."¹⁵ But the descriptively adequate theory of UG must also be explanatorily adequate. To ensure explanatory adequacy, and answer the how question, linguists must construct and confirm hypotheses that show how children quickly and almost automatically acquire structures, sounds, and concepts, any of which can differ from I-language to I-language. Intuitively, linguists' UG hypotheses must explain how the minds of human beings acquire linguistic concepts and sounds, and how they 'choose' between any structural options available for natural languages, at the same time defaulting to the relevant combinatorial principles. They must offer a theory of the biological 'mechanisms' of language and language acquisition that describe these mechanisms' built-in principles ("linguistic universals"), any options that the mechanism's principles allow (now called "parameters"), and the conditions that the mechanisms set on what can count as a possible 'trigger' for sounds, concepts, and option settings.

Clearly, then, the innateness of language, so far as naturalistic science is concerned, is the innateness of the biological mechanisms detailed in UG. Earlier

rationalist-romantics did not fully recognize the extent to which innateness is biological, although they would likely have welcomed the move away from Plato's myth or Descartes' God to structures in the head, for it is consistent with their basically scientific project. (Descartes' dualism was, after all, a scientific hypothesis.) They did not know of genetic transmission and could not have had any understanding of the extraordinary extent to which human cognitive capacities can rest on a biological base of concept and structure acquisition mechanisms that need only a little input to produce rich conceptual materials. Contemporary linguists are aware of this, although it does not make their task any easier. Instead, it adds another item to the list of scientific to-dos: show how your theory can be accommodated to (biological) theories of the brain.

Chomsky assumes that Universal Grammar is available to the child at birth, somehow embodied in the biological mechanisms of the mind as a "language acquisition device." If it were not innate in this way, it could not explain how the poverty of the stimulus facts could arise – how children can acquire languages so easily – and would not help solve Plato's problem. Notice, however, that the poverty of stimulus facts do not themselves constitute an "argument for innateness." Instead, they pose a problem that the scientist solves by offering a theory of a complex biological mechanism, UG – a theory of mental components and operations that can, one hopes, eventually be shown to be somehow 'embodied' in the brain.

At the moment, it is not at all clear how language is embodied in the brain. We know a lot more about UG thought of as a formal 'computational' system in the head than we know about the specific operations of the brain itself and what leads to their development. Indeed, we know only a little about UG – enough to indicate that constructing a naturalistic theory of UG is possible and that Chomskyan linguists are on the right track, but not much more. We are still a long way from describing the mechanisms that put together word meanings, for example. But, fortunately, there has been considerable progress in developing those branches of UG that describe the mechanisms that allow children to develop the capacity to deal with the specific linguistic *sounds* and *structures* of the language(s) spoken in their environments. The abstract study of sound-producing mechanisms and their differences is called "phonology" and the study of structure-producing mechanisms and their differences "(narrow) syntax." It is fortunate that there has been so much progress in phonology and syntax, because not only has this study revealed several linguistic universals (where no choices are required), but it seems likely that the greatest differences between languages lie in sounds and structures, not in the root meanings of words (concepts). If we can postulate and find evidence for mechanisms that embody these crucial 'choices' then we have made progress in solving the "what?" aspect of Plato's problem for

language. If it turns out, furthermore, that the study of phonology and narrow syntax reveals that there are few choices and that it is not difficult to imagine automatic ‘triggers’ that make them, we have some reason to think that we on the way to answering the “how?” issue.

Chomsky has over the years given different accounts of how those choices are to be understood. When *CL* was published in 1966, the theory of UG looked quite different than it does now. At that time, and in a way that was similar to the Port-Royal grammarians discussed in the text, Chomsky hypothesized that languages are the same in their “Deep Structure” and differ in their “Surface Structure.” Deep Structures are ‘meanings’ and determine “semantic interpretation”, and Surface Structures are ‘sounds’ and determine “phonetic interpretation”. Deep and Surface structures are linked by “optional transformations.” A child was assumed to have available in UG certain constraints on acceptable grammars that guide acquisition; they were taken to provide – among other things – an “evaluation procedure” that “selects” the best grammar (“theory”) for a specific set of data received. I will not go into details; it is enough to say that this early hypothesis both gave too many choices to the minds of children, and made such choices appear to be rational decisions, where they clearly are not.

A much better picture, which also has the advantage of being intuitively easier to grasp, emerged in the early 1980s (Chomsky 1981; Baker 2001). Chomsky’s “Principles and Parameters” view holds that children are born with a UG that contains a set of “parameters” which are automatically set as the child develops. Parameters can be thought of as switches that determine the structure of a language acquired – the phonological and narrow syntactic options mentioned above. For example, languages differ in the basic orderings of their phrases, such as noun phrases and verb phrases. Japanese and Miskito are “head final” languages where the object of a verb appears before the verb “head” of the phrase. A verb phrase might appear in the form “winches carry” whereas in English or French, which are “head initial” languages, the phrase would appear as “carry winches.” Depending on the linguistic data a child receives early in development, the switch might be set in a way that would lead to acquiring Japanese or Miskito, or in the way that would lead to acquiring French or English. The child does not choose how the switch is set; UG’s mechanisms, provided with minimal ‘data’, do it automatically. Something like this happens with phonological acquisition too. The set of sounds that a child will easily recognize and fluently produce are determined by early settings of switches. It does not take many switches to determine all the known differences in structures and sounds in all natural languages. Here, then, we have a picture that not only makes sense of how children (children’s minds) can easily and quickly make crucial ‘decisions’, but also shows why it is plausible to say that a child’s UG ‘contains’ all possible

languages in its invariant universals and its parametric options. If so, current theories of UG seem to be on the way to capturing the mechanisms of the mind that automatically ‘choose’ a natural language without any effort on the part of the child, at the same time providing the resources to describe the structural differences between natural languages. This is encouraging, especially when one keeps in mind that even a ‘fundamental’ science such as physics is very far from complete.

One obvious gap in this story lies in the fact that a complete answer to Plato’s problem would have to identify the possible individual concepts that play a role in linguistic computations and explain how they are acquired. The theory of UG must explain how children acquire (root) concepts so quickly. It has not yet done so. It is not as if no one has a clue about how to proceed. Basic structural facts about verbs and their ‘argument structure’ and about nouns and what Aristotle thought of as their causal or explanatory structure have been known for centuries. It is obvious that these structures and the features they bring together in a specific concept integrate with those of others in the derivation or generation of sentences. That is the point of a linguistic derivation – to produce a complex ‘meaning’ from elements. But what is missing is a theory of how children acquire specific concepts. Chomsky and the other Cartesian linguists seem to think that, as with visual concepts, there must be some kind of mechanism or mechanisms involved – for Chomsky, a biological one. Ralph Cudworth late in the 17th century seems to have had a mechanism of this sort in mind when he wrote of an “innate cognoscitive power” that humans have.¹⁶ It is also what others such as John Stuart Mill and at one stage Jerry Fodor had in mind when they spoke of a system that performs some kind of mental chemistry. So perhaps looking for such a mechanism is on the right track. There are, however, very difficult issues to resolve before one can become very enthusiastic about this approach, such as determining the extent to which the language system can ‘recruit’ conceptual materials from other systems, and speaking to what is located in the “conceptual and intentional” systems on the other side of language’s semantic interface. The facts of lexical acquisition make it natural to assume the innateness of a mechanism that can produce the rich and intricate conceptual materials that appear at language’s semantic interface, but the nature of this innate mechanism is unclear.

To help allay qualms about the notion that people have innate ideas, notice how the idea of a biological concept-forming device clarifies what it is for an infant to have an innate idea. When rationalist-romantics say that infants have innate ideas, they do not mean that infants have hundreds of thousands of fully formed latent ideas lodged in the child’s mind/brain at birth. This would imply that concepts such as *internet* and *keyboard* were fully formed in the

Mesopotamian's mind, and that concepts for which we have no use yet are fully formed in ours. It is much more plausible to think that the mind has mechanisms which somehow assemble or construct 'ideas' or concepts such as these, plus *wash* or *wiggle*, *under* or *above*, *wombat* or *whisk*, *good* or *ugly*, "on the occasion of" receiving some input that the inner mechanisms deem to be relevant.

In a late section of *CL*, "Acquisition and Use of Language," Chomsky points to some interesting consequences of innateness and a theory of UG for the creative use of language. One consequence is found in his remark that "rationalistic psychology and philosophy of mind eliminated the need for a sharp distinction between a theory of perception and a theory of learning." Intuitively, he is saying, we can perceive something as a such-and-such only if we have the concept of a such-and-such already, at least implicitly; and we can acquire this concept "on the occasion" of being provided input that our inner systems determine to be a such-and-such trigger. In brief, the child perceives the dog for the first time when and as it also acquires, by triggering, the concept *dog*. This oversimplifies, of course, and it leaves completely unspecified how triggering and the (not independent) inner machinery that produces the concept *dog* work. It must be supplemented by serious hypotheses about triggering and concept-forming mechanisms. But it offers insight into how the rationalist-romantic thinks of innateness and 'triggering'. And it leaves open the fascinating possibility – mentioned in the quotations from Humboldt at the end of this section of *CL* – that concepts are not 'stored' in the mind at all, but are regenerated (perhaps in slightly modified forms) when and as occasion requires. (The story also ignores the increasing sophistication that uses of a concept – and perhaps the later addition to it of 'content' – can certainly bring. Chomsky points to some of these factors by quoting Cudworth on the differences between the vulgar ear and the sophisticate's.)

On the face of it, the rationalist-romantic story looks more plausible than the empiricist's. For the empiricist, a child somehow has to learn 'by experience' that something is a dog, but can do so only by first constructing the concept *dog* (it is rarely explained how) and then 'testing' hypotheses of the form "That is a dog" on chairs, cats, picture frames, and – one hopes – dogs. Because empiricists are unwilling to say that the mind is born with the machinery needed to automatically construct the concept *dog*, they must depend on a mysterious form of bootstrapping attributed to influences outside the mind – correction by 'instructors', for example. Children cannot have experience 'as of' a dog unless they have the concept *dog*, the concept that they are supposed to be acquiring.

The rationalist-romantic view of perception and triggering is related to a second consequence, which Chomsky emphasizes by a quotation from Herbert of Cherbury in the same section of *CL*. Herbert in essence said that unless we had

innate ideas, we could not develop knowledge of the world. More generally, we could not “behave intelligently” and display creativity unless we had the innate equipment on hand ahead of time. For if we did not have this equipment, it would take far too long to develop the concepts it provides all of us (and we would differ in the rates at which we acquired them, depending on opportunity, general intelligence, etc.).

In sum, it seems plausible that experience and even, in a way, the things of the world as we can conceive them depend essentially on what the mind brings to experience – the concepts it can provide. This point is often used these days by postmodernists and others who, enamored of the idea that “the world is text,” counsel us to believe in relativism. The rationalist-romantic easily avoids this sort of intellectual nonsense while continuing to recognize the mind’s contribution to knowledge of the world. The machinery that yields our concepts is innate, and while the machinery and the creative actions it makes possible can support and aid all sorts of individual and cultural differences, it remains true that – because we are one biological species with an adaptable and flexible but fixed set of mechanisms – people’s minds are the same.

Conclusion: summary and implications

Rationalism-romanticism and empiricism

When *CL* was published in 1966, the large majority of those philosophers, psychologists, and linguists who thought themselves expert on two of *CL*’s central topics, mind and language, assumed that the empiricist picture of the mind and concept acquisition was the only scientific one. Many ‘experts’ still assume that it is. Empiricists think that the concepts that figure in interesting cognitive actions – those resulting in intelligent behavior or problem solving of various sorts, such as using language in the ordinary way to express oneself, make judgments, draw conclusions, produce art, . . . – are “learned.” They are the result of cumulative molding of the mind by the environment (including society). Empiricists adopt a special form of dualism: they treat human bodies as biological organisms that develop as biological organisms do, but treat the human mind as somehow divorced from biology, a biological clean slate that can be written on in any number of ways. They view the mind as largely unformed and plastic at birth and take its concepts to be molded and in fact created anew through training, forming habits, etc. However this is conceived, it is thought to result from a set of learning procedures that apply to all cognitive domains beyond the sensory ones; they are “generalized learning procedures.” Examples – none of which really say where a concept comes from – include association, negative and positive reinforcement routines, habituation, etc.

As should be clear already, rationalist-romantics hold that while the mind needs experience of diverse and varying sorts to develop at all, the course of development of a particular faculty such as language, along with the ‘contents’ of concepts produced in its development, is fixed by innate mechanisms. Experience does not form concepts; it serves to trigger an internal mechanism – language, perhaps, or vision – prompting it to produce a concept that is one of the possible configurations of that particular mental mechanism. The mind’s contents – the primitive concepts and various ways in which they can be combined – are determined and shaped by what the mind’s machinery, available at birth, can provide, not by repetitive training. Rationalist-romantics are nativists and, because they think that the relevant concepts are constituted by internal machinery alone, are also internalists.

In *CL* Chomsky places in the rationalist-romantic camp the Port-Royal grammarians and Wilhelm von Humboldt, the poet Coleridge, the philosophers Descartes, Leibniz, A. W. Schlegel, and the Cambridge Platonists Herbert of Cherbury and Ralph Cudworth. Chomsky himself is, of course, in that camp too. In later works, such as “Language and Freedom,” he includes others – prominently, the radical Rousseau of the *Second Discourse on Inequality*;¹⁷ the list is, however, quite short. In the empiricist camp he places, among others, the linguist Claude Vaugelas, the physician-philosopher-biologist J. O. de La Mettrie, the late 18th century English linguist James Harris and his contemporary, the German philosopher J. G. Herder. As indicated, many of Chomsky’s own contemporaries were empiricists. Certainly all those who practiced what in *CL* he calls “modern linguistics” were; the list, then, is long. Not all of them adopted the behaviorist version of the empiricist’s picture of a plastic mind held by Chomsky’s philosophy teacher at the University of Pennsylvania, Nelson Goodman, and by the pre-eminent American linguist at the time, Leonard Bloomfield. Chomsky’s linguistics teacher Zellig Harris, for example, thought himself a strict methodologist, and was undoubtedly sympathetic to an empiricist view of the mind (for it is difficult to see how he could have justified limiting his scientific efforts otherwise), but at least he was not a behaviorist. All of these “modern linguists” assumed that language is something located outside the head and in some way a cultural, environmental product: Martin Joos, C. F. Hockett, and even – to an extent – Otto Jespersen made this assumption. Their European counterparts included the ‘structuralists’, prominently Ferdinand de Saussure and – in a slightly different camp – Jean Piaget. For all of them, language, like mind, is plastic; as Joos put it (quoted in *CL*, note 48), “languages [can] differ from each other without limit and in unpredictable ways.” They are a particular form of cultural product. Thanks to the success of Chomsky’s internalist and nativist science of the mind, there are fewer empiricist linguists now than there used to be. But the

picture of a child as born with a mind that is largely unformed and plastic and of language as a set of ‘behaviors’ or linguistic phenomena outside the head and shaped to conform to ‘reality’ and the community still attracts the great majority of philosophers, psychologists, and cognitive scientists. It takes many forms: there are few acknowledged behaviorists left, though many functionalists and connectionists of various sorts. It is not clear why.

Steven Pinker in *The Language Instinct* (1995, 406–7) illustrates the empiricist idea of a plastic mind in his discussion of what he calls the “standard social science model” by quoting the views of the anthropologist Margaret Mead and the psychologist James Watson. Mead had suggested that human nature must be infinitely malleable because people can be educated to such different roles, and Watson claimed that if he were given a child, he could, by training, turn it into whatever one desired – a fireman, banker, or revolutionary. The phenomenon that Mead and Watson focus on, humans’ ready adaptation to different social roles, offers a range of examples that are a species of what is in fact a much broader range of phenomena, all of which attest to human cognitive flexibility. Even restricting ourselves to the limited examples that role-adaptation afford, however, there is little reason to take Mead and Watson and their empiricist explanation of adaptability to social role seriously. Ironically, in fact, the extreme cognitive relativism that they seem to endorse – their apparent view that a person’s understanding of his or her ‘station and its duties’ (and, it is suggested, of themselves and their relations to others in and out of their social roles) depends entirely on training received in what that community demands of a task-identified group of its members – appears on closer inspection to presuppose an extreme form of nativism. For while no one adopts or adapts to a social role by taking a pill, nor do people in general find any difficulty – social and economic constraints and individual talents aside – in adapting to or adopting one as opposed to another, usually with little training except of the ‘skills’ sort that channels already-available understanding of the relevant concepts and of how they are to be applied. In effect, training in these cases might improve and refine, or perhaps make one more sensitive to likely problems and their solution, but it presupposes that a person has the relevant concepts and can use them to the extent of recognizing where and when he or she has erred or succeeded. Moreover, humans seem to be able to consider and adopt social roles at a very early age, even if only in imagination and play. Watching children at play, it is hard not to notice that they easily move from being fire chief to being the mother, the evil genius.... This surely presupposes at least some understanding of the relevant concepts, including those of social hierarchies, authority and its distribution, specific responsibilities, etc. Children are not instructed in or taught these; it is hard to imagine that they could be in the time it would

take them, if they did not already have them. Furthermore, watching children placed in any number of different social circumstances, even in different cultural settings, it is hard not to notice that they readily adapt to them and recognize what they are to do and what not – sometimes, with greater ease than adults. If they can do these things so early, and if they and adults seem to be able to adopt and adjust to roles remarkably quickly while understanding what they involve, it is clear that people must be able to consider and adopt roles on extremely thin ‘input’ and evidence. If so, poverty of the stimulus considerations require that humans have a rich native endowment that provides in its machinery for any number of social ‘options’ that involve a person who deals with circumstances in specific ways. Empiricist training of the sort that Mead and Watson want to rely upon for concept acquisition and application has nothing relevant to say about this. Thus, ironically, the extreme relativist who appeals to adaptability to *any* social role turns out on inspection to presuppose an extreme form of nativism, not the plastic and unformed mind of empiricist legend.

Role adaptation requires more than native machinery, of course. In order to make sense of the complex and context-weighted knowledge that playing a role involves along with the open-ended set of issues that someone playing a role (or pretending to) might have to confront, we need to include in our picture of the mind many modular systems and some kind of modifiable form of coordination between them. For while modules often provide for many – perhaps infinite – sets of concepts and sensory states (in the case of vision, for example, colored scenes that consist of any combination of the scales of hues, brightnesses, saturations, altitudes, azimuths and depths along which the human visual system can vary), any given module is biologically limited to its specific range, whether it be linguistic, visual, auditory.... A human contending with varying circumstances can, presumably, rely upon and call on the elements of these ranges; but bringing them to bear on a specific circumstance – one that could easily involve the senses, language, facial configuration modules, ‘intention of agents’ modules, etc. – takes coordination. Furthermore, to deal with matters flexibly but with at least some understanding of the issues and how to evaluate various solutions to them – especially with humans, where creativity is such an obvious phenomenon – we should probably assume the degree and kind of cooperative coordination itself to be flexible in some way. These points are emphasized even more by the general set of phenomena that human cognitive employment and all that it involves presents – everything included in practical problem-solving, whether social, personal, political, job-related, recreational..., and including all the phenomena discussed earlier as exhibiting the creative use of language. As indicated earlier, it is unlikely that there will be a science of this kind of flexible coordination, but a plausible picture of the mind must at least allow for it.

Mead and Watson's plasticity explanation of role-adaptation extended to the general set of phenomena would likely be that humans can solve problems that arise in arbitrary circumstances and in general be creative because their minds are malleable, or plastic and trainable. Perhaps they would add, "... and, to solve 'problems in general', trained in some general problem-solving procedure." None of this is credible. Appeals to plasticity and training do not explain how a specific set of cognitive phenomena such as role adaptation are possible, and there is no reason to think that an appeal to plasticity and training can explain other phenomena where humans obviously require concepts in order to understand what a circumstance and problem are, not to mention contending with it. As for the addition of a claim about a general problem-solving procedure: this claim is empty unless the procedure is clearly specified and its application demonstrated. It might be thought that, in circumstances where we cannot say much at all, this claim is as good as another. But even the commonplace that we do what we can with what we have is better. The commonplace at least acknowledges that in order to act as rational agents we must have in place the (biological) tools we happen to have.

Oddly, many intelligent people have been attracted to the "flexibility *because of malleability*" view that empiricists seem to like. In note 29 of *CL* Chomsky remarks that the English linguist James Harris makes "the gratuitous assumption, typical of the modern variants of this doctrine, that, since man is capable of 'infinite directions,' he is therefore completely plastic; that is, the assumption that innate factors govern his intellectual development only marginally, if at all." Arguably, even Descartes shared this assumption. Noting the mind's flexibility and adaptability in the *Discourse*, he said that it is "a universal instrument that can be used in all kinds of situations." Unless there is explicit denial (Descartes offers none), "universal instrument" suggests something like a universal problem-solving capacity.¹⁸ If so, Descartes might well have been inconsistent, for he not only suggests elsewhere that the problem of free will is beyond human comprehension, but his rationalist defense of innate ideas must assume that we have the modules and concepts (in his terminology, the limited "intellect") that we do. Of course, we *are* flexible practical problem-solvers. That is obvious from our ordinary forms of creativity. But – as I have been pointing out – what one needs to do to speak to this fact is *not* to jump as the empiricist does to 'explanations' in terms of plasticity and training or (as it is put by some of those discussed in *CL*) in terms of an absence of 'instinct' and acculturation, but rather to discover what it is about the mind's native mechanisms and "unique form of mental organization" that allow and underwrite this flexibility and ordinary creativity – creativity that is found even in children.

Clearly, our minds are biologically limited to the conceptual capacities we

have, as are the minds of all species. The differences between our cognitive range and those other creatures have are explained, presumably, by what we have biologically that other species do not. The most prominent difference between us and other organisms seems to be that we have language. So perhaps it is language – a biological organ unique to us that provides us a potential infinity of sentential “perspectives” and that seems to be under our control to the extent of allowing us to freely express our thoughts – that gives us cognitive and practical problem-solving capacities unavailable to other creatures. If this were to be correct, it would not stretch matters far to say that it also gives us ‘symbolic behavior’ of a unique type and all that it allows, including storytelling and narrative, oral and recorded history, and – plausibly – even the individual and social cultures that make our understanding of ourselves and the world so different from that of other animals’.

In sum, we all seem to have minds with several native cognitive systems, each of which yields a range of concepts that are available to other systems and, through them, to the person as agent. We also seem to have, in some areas, modifiable forms of cooperation between these systems. Language in particular, with its potential infinity of different expressions, offers at its “conceptual-intentional” interface an endless number of rich and structured cognitive “perspectives” which can be used in various ways, to serve different purposes; furthermore, it seems to have some of the characteristics of a ‘central system’, one that can coordinate materials provided by other systems. This seems to be an important element in the creative and flexible human mind. And – very significantly, for the purposes of the scientist of mind – we have in Chomskyan linguistics a recognizably successful theory that is in place and that describes, at an abstract level, how these “perspectives” are put together. Perhaps eventually we will also begin to understand, at least to a degree, how these perspectives can ‘communicate’ with other cognitive systems in the head to allow humans to be the creative individuals they so obviously are.

Empiricists have little to offer that can make sense of even the necessary precondition of all this: the infinite productivity of the cognitive “perspectives” that natural language affords. When asked to explain how it is that people seem to be able to produce and understand endless number of sentences, the American linguist Hockett gave a typical empiricist answer. Children (and adults), he said, proceed by analogy: we construct and understand novel sentences ‘on analogy’ with those we have constructed and understood before. This answer is typical of the empiricist insofar as it relies on the idea that similarity plays the central role in learning, productivity, and use. Every empiricist version of a generalized learning procedure relies on similarity at some point. There is no doubt that in the use of language and other cognitive faculties to classify the things

we perceive and to carry out inferences of all sorts, we often classify similar things together; but we can do this because we have the concepts and principles already. The crucial question is whether analogy (not defined, and hardly an apt candidate for a fundamental notion of a science of language) can adequately explain how children acquire concepts and put them together in the ways they so readily do - in the case of language, to produce sentences. Conceivably, similarity plays some role in triggering, but because we know so little about it, it is hard to tell. It is clear, however, that Hockett's proposal - that similarity plays the central role in acquisition and productivity - is hopeless. Suppose a child hears and understands "John is easy to please" and then is confronted with "John is eager to please." The child has to determine who is pleasing whom, for that is crucial to understanding the sentences. In the first sentence, someone is pleasing John. So, 'by analogy' - for the sentences are surely similar - in the second John should still be the person whom someone is pleasing. But he obviously is not - and no child makes such an error, nor needs to be instructed that it is an error. Children 'get it' (in both cases) right away, assuming they have the relevant vocabulary items. The innate machinery that makes generativity possible also makes available language's range. Without that innate machinery, we would be very different creatures indeed.

One of *CL*'s major points is that empiricists must account not just for the poverty of stimulus facts, but for the creative aspect of language use too. At the very least, they should be able to explain how small children manage to integrate the rich resources their cognitive faculties give them and produce sophisticated creative cognitive behavior at a very early age. It is difficult to see how empiricists can make sense of this. If anything, their picture of the mind and its contents commit them to the preposterous idea that young children acquire language by rigorous training and apply it tentatively and with care, ever mindful of breaking some socially prescribed rule. In fact, they acquire it with ease and employ it creatively.

Chomsky has often remarked that empiricism (not empirical study, a very different matter) is dogmatic, being simply blind faith in a view of the mind that cannot be justified by rational inquiry. This harsh accusation should be assessed in light of the relative success of empiricist and rationalist-romantic efforts. Fiona Cowie's empiricist critique of nativism, *What's Within?* remarks, "the development of [empiricist] theories that might reasonably be expected to give Chomskyanism a run for its money has been stifled over the last three decades, and it is hardly fair to expect the Chomskyan to show that his theory is better than rivals that do not yet exist" (Cowie 1999, 249). It is true that no real rivals exist. But it is not true that research into empiricist alternatives has been "stifled." In the years before Chomsky's work appeared, it was thought to be the

only 'scientific' approach to the mind and received substantial financial support. Chomsky's work had the effect, if anything, of increasing the zeal of empiricist researchers. And there is no reason to think that after Chomsky's work appeared, empiricist research of the sort found in connectionism and functionalism lacked either proponents or funding. (Chomsky, working alone, came up with most of the leading ideas of his approach to linguistics by the mid-1950s.) If there are no serious rival empiricist theories and if empiricists do not even seem to recognize the difficulties that not just the poverty of the stimulus facts but adaptability, creativity, and flexibility pose for their picture of the mind, perhaps their assumptions about the mind and its study are wrong.

Politics and education

Important parts of Chomsky's discussion of Humboldt in *CL* are a relatively early effort on his part to suggest that the rationalist-romantic model of the mind is not only supported by observations and scientific evidence, but has important political and educational implications. It seems to suggest a political ideal.

If human beings are biologically constituted to be creative creatures, it follows that a potential for freedom and creativity is part of human nature. Assuming, furthermore, the empirical principle that organisms thrive (get satisfaction) when they fulfill their natures and the moral/ethical principle that they should be given opportunities to do so, it is reasonable to assume that a form of social organization giving them these opportunities is better than one that does not. There is plenty of evidence that people thrive when they exercise their freedom and autonomy – for instance, job satisfaction is a good predictor of longer life, and correlates strongly with exercise of autonomy and self-expression. The moral principle seems to be as obvious as any can be. It might justifiably be overridden in certain cases – for example, where there is genuine reason to think that survival is at stake – but no one except for moral monsters will simply deny the principle. It should, in any case, certainly constitute a fundamental principle of the ideal form of social organization. If all this is so, there is reason to think that our biological natures underwrite a libertarian or classical liberal view of social organization. Biological underpinnings aside, this is a traditional Enlightenment view. Its liberalism is not the neoliberalism of today. It is a crucial aspect of Humboldt's political views, as well as of Chomsky's libertarian-socialist political principles.

Humboldt's and Chomsky's views of education stem from the same rationalist-romantic account of human nature. Education, on their account, should not be a matter of training children to have the marketable skills and ideologies that an economy wants, for people are not cogs in a machine that is controlled by those with the power to make economic decisions. Children develop best when

they are stimulated by many experiences and allowed to develop in accordance with their own interests. Hence they should be allowed to apply and use the concepts that nature provides them in their own ways.

It is interesting to note that Humboldt's libertarianism and his educational proposals make no sense if he is seen as one of those romantics who think of language as essentially social in origin. Most romantics – certainly those influenced by Hegel and Herder – have been empiricists. This is the kind of romanticism found in nationalist, fascist, and tribalist ideologies, which assume that adults are the products of society so that those in one society are different in crucial ways from those in another. And they think of children as plastic, to be molded so that they become properly mindful of 'social values'. If Humboldt and Chomsky are right, this empiricist version of romanticism not only distorts language and language acquisition, but makes no sense of creativity.

Postscript

Writing almost forty years after *CL*'s publication, it is clear that it has had little impact of the sort for which Chomsky surely hoped. There are reasons for this. Some, such as the untranslated quotations, are easy to rectify. Others, such as the grip that empiricist views seem to have on discussion and study of the mind, are more difficult to contend with, for they seem to be based on dogma and faith, not on reason. The attraction of the "flexibility because of malleability" assumption is one sign of empiricism's grip. It is a start to recognize that the rationalist view of mind is much closer to the truth as we can understand it at the moment than the empiricist, and that it makes much better sense of human creativity and flexibility.

Notes

1. I do not discuss the reviews here. It is worth remarking, however, that Chomsky's careful 1959 review of B.F. Skinner's *Verbal Behavior* helped bring to an end a popular view of language and the mind (or at least, the behaviorist form of it). The negative reviews of *CL* had no similar effect on Chomsky's work on language and the mind.
2. Chomsky and his co-editor and colleague Morris Halle explained – as they write in the original preface – that *CL* was to be the first in an ambitious series of works that would try "to deepen our understanding of the nature of language and the mental processes and structures that underlie its use and acquisition."
3. A few translations of the French – primarily in Chomsky's notes – are by Steve McKay and by me.

Introduction for Cybereditions

4. It remains a challenge, although aspects of what Descartes took to be characteristic of linguistic creativity (in particular, the capacity to produce endless numbers of sentences and the capacity to be ‘stimulus free’) can be simulated on computers. See below.
5. Note, however, that Herbert of Cherbury (as observed in the text of *CL*) recognized in his *De Veritate* (1624) that innate ideas are a necessary condition of being able to develop knowledge of the world. It is a short step from this to recognizing the connection with creativity of the sort that Descartes and Chomsky are interested in – a creativity that is revealed in using language to ‘solve’ the kinds of problems that humans encounter every day.
6. Chomsky does not develop the distinction between rationalist and empiricist study of the mind in detail in *CL*, but he does note that it would be a useful way to structure the discussion: “A study of this sort could profitably be developed as part of a more general investigation of Cartesian linguistics as contrasted with a set of doctrines and assumptions that might be referred to as ‘empiricist linguistics’ and illustrated by modern structural and taxonomic linguistics as well as by parallel developments in modern psychology and philosophy. I will not attempt to develop this distinction any more fully or clearly here, however” (note 3). He develops it in detail in many of his other works. See, for example, Chomsky 1972, 1975, 1979, 1980, 1988, 2000. See also *CL*, note 110.
7. Perhaps there are no ‘pure’ empiricists or rationalist-romantics, with the possible exception of Chomsky himself. The labels are intended to capture the majority of the views a specific figure has. Harris is not a complete empiricist; see Chomsky’s note 42. Nor – as Chomsky points out – is Vaugelas. The same is true of Leonard Bloomfield, who in the 1930s published an article in a Czech journal of linguistics (scarcely known in North America, although it had (before Hitler) been an important journal among the structuralists) that presented a generative theory. Bloomfieldians ignored this publication.
8. For discussion of the differences (related to the technical difference between “strong” and “weak” generative capacity), see Chomsky 1965, 1986, and – for a brief but very useful informal discussion of implications for the study of mind – the second chapter of Chomsky 1996.
9. A. W. Schlegel (discussed in the text) argued that poetry (or poetizing) and thus the creativity made available to humans by language underlies all the arts. It is not entirely clear what he had in mind, although it is clear that he held that poetry’s medium, language – which he held to be innate – somehow intrinsically lends itself to creativity in ways that other media do not.
10. As Chomsky points out in *CL*, it is easy enough to produce computer output that is stimulus-free with respect to external input: just build in a randomizing device. It is also easy to make computers meet the condition of being able to produce a

boundless number of sentence-like entities: build recursion into the system by which they produce their ‘sentences’. Even the simplest sort of phrasal structure (a very, very, very,... long sentence) can, potentially, be extended without limit. The difficult task is to meet the uncaused and boundless conditions while still producing what people consider appropriate outputs.

11. It is important to recognize that for Chomsky, most of what goes under the name of a science of mind these days – including large parts of “cognitive science” – are not sciences at all. They fail in descriptive or explanatory adequacy, in formal explicitness, in simplicity, etc. Vaugelas as “a simple observer” renounced pretensions to explanation, although – as Chomsky points out – he did not fully resist.
12. Chomsky often points out (as did Darwin) that evolution can and should include more than just natural selection. To say that something came about through evolution is virtually the same as saying that it came about through biological processes. Thus, a mathematical consequence of the basic structure of a biological system can be called an evolutionary consequence. Alan Turing, no friend of selection, sought to find mathematical patterns in biological systems – in the morphogenesis of plant species, for example. If Turing had adopted Chomsky’s broad version of evolution, he could have said that these patterns are the result of evolution, even though they are not the result of selection. A recent summary of Chomsky’s views on the evolution of language (focusing on structure, not concepts), can be found in Hauser, Chomsky, Fitch 2002.
13. Evidence of what is involved comes not only from study of ‘normal’ individuals, but from those who have biologically-based difficulties. See Smith and Tsimpli 1995.
14. This awkward terminology (“in terms of which we see”) is chosen for three reasons.

First, it is an attempt to avoid the terms ‘represent’ and ‘representation’. The phrase could have been written, “the colors, shapes, and positions that our visual systems represent,” but this would be a technical use of ‘represent’, not the use that suggests that when the mind represents, it re-presents something ‘outside the head’. When the scientist of vision says that the visual system represents a blob or the scientist of language that the language faculty represents the feature CAUSE, neither intends that the relevant system re-presents blobs or causes ‘out there’ in the world. They intend only that the system in question is in such-and-such a state – a blob-state or a CAUSE-state.

Second, it is intended to reflect the fact that it is people who see and refer to and describe things in the world, using the materials that language and vision and other internal systems provide them. Their internal systems do not see or refer.

Third, it is intended to suggest that the conceptual materials that our internal

Introduction for *Cybereditions*

systems provide us with *are* the concepts that we use (as ‘tools’) to see, refer, describe, etc. They do not express those concepts or refer to them, for they are the tools themselves. When a person says that she sees a roan horse, she sees and judges in terms of inner events – here, both visual and linguistic. Abandoning all concerns about being awkward, one could say that she sees “roanly horsly.” (Du Marsais makes a related point in a passage quoted in *CL* where he remarks that saying “I have an idea” leads to confusion. One should say, “I think in such-and-such a manner.”) These points bear on what concepts are and what it is for concepts to be innate.

15. One can only be tentative at the moment and make guesses that are reasonable, all things considered. Here is one way that a catalogue of possible concepts might go: catalogue the semantic ‘features’ that the language faculty can contend with and indicate what sorts of structured arrays they can appear in.

Linguists do not have to explain why certain sounds come to be associated with certain concepts in lexical items. Because the associations between sounds and concepts that appear in specific words or lexical items are – as Chomsky says – arbitrary, there is no reason to expect a naturalistic theory of language acquisition to deal with them. Someone could associate the sound “arthritis” with the concept *disease of the limb* or the concept *underneath*. I, wanting others to understand my intentions, choose to associate it with the concept *disease of the joint* instead. The important question is not the issue of how some one person, or a group of people, happens to associate sounds with meanings, but how anyone acquires a specific concept and, for a language, a specific range of sounds. With an account of sound and concept acquisition in hand, the naturalistic scientist’s work is done; the rest is association.

16. Cudworth’s fairly short (compared to his other major work) *Treatise Concerning Eternal and Immutable Morality* is replete with poverty of stimulus observations. A new (1996) edition edited by Sarah Hutton (and including Cudworth’s important essay on free will) makes this useful resource much more accessible than it was.
17. See also *CL*, note 51.
18. In focusing in this introduction on ordinary creativity and excluding scientific, I focused on the sort of practical problem solving that we all display and that is characteristic of what Chomsky calls “common sense.” When Descartes spoke of a “universal instrument” in the *Discourse*, he could not – given the context – have had scientific problem solving in mind. But even if he had, he would still have had to recognize innate constraints on what we take to be a scientific theory. (He probably did: God gives us the “light of nature” to guide scientific inquiry, he said.) For discussion of the differences between common sense and science, see Chomsky’s 1975, 1995a and my 1999.

CARTESIAN LINGUISTICS

Preface

The aim of this series of studies, of which the present work is the first, is to deepen our understanding of the nature of language and the mental processes and structures that underlie its use and acquisition. The idea that the study of language provides insight into human psychology is by no means novel. It has always been clear that the normal, everyday use of language involves intellectual abilities of the highest order. In view of the complexity of this achievement and its uniqueness to man, it is only natural to suppose that the study of language contributes significantly to our understanding of the nature of the human mind and its functioning.

Modern linguistics has provided a great deal of new information concerning a wide range and variety of languages. It has sought, with much success, to achieve significantly higher standards of clarity and reliability than those reached in earlier studies of language. At the same time, there has been a continuing interest in theoretical questions that has led to significant clarification of the foundations of linguistics. These advances make it possible to formulate, in a fairly precise way, the fundamental question of how experience and maturational processes interrelate within the framework of innate limiting conditions to yield the linguistic competence exhibited by a normal speaker of a language. It does not seem unrealistic, therefore, to hope that research of the sort that can be undertaken at present may lead to a plausible and informative account of the mental abilities that underlie the achievement of normal linguistic competence, abilities that may be as individual and species-specific as that of a bird to learn a particular class of songs, of a beaver to build dams, or of a bee to integrate its own actions into the intricate social activity of the hive.

The studies to be included in this series will be chosen for the light that they shed on the basic questions posed above. In selecting descriptive or theoretical works for the series, we shall ask ourselves, therefore, whether the linguistic data examined contribute to our understanding of the structures that underlie them, whether the linguistic structures exhibited provide insight into the general properties of human language, and whether the general properties of human language dealt with lead to inferences about the nature of the organism that is able to use and acquire language. Analogous considerations will guide our choice of historical and background studies. No such limitations will obtain regarding subject matter, for it is our express purpose to illustrate the full range of modern and traditional concerns with the problems of language.

From the point of view of subject matter the works to be included in the se-

ries may conveniently be grouped under three major headings: (1) investigations that focus directly on the nature of language, (2) studies dealing with the use of language and the abilities and mental organization that it presupposes, and (3) background studies placing the various approaches to the study of language in the appropriate historical and intellectual setting.

Under the first heading we plan to offer a number of studies that deal with specific aspects of individual languages. These will include descriptions of the syntax, semantics, and phonology of different languages as well as investigations into their evolution. Parallel to these we hope to issue several studies of the theoretical foundations on which the descriptive studies are based. Again, we expect to include works on grammar, semantics, and phonology, and an inquiry into the mechanism and causes of the still puzzling phenomenon of language change, which until a generation ago was the dominant subject of interest to linguists. Finally, to round out this part of the series, there will be a number of books on the purely formal aspects of language, envisaged as a mathematical object.

The second major grouping will, first of all, comprise studies in the psychology of language. We plan to include here attempts to develop models of language use, investigations into the perception of language and the effects of language on perception in general; studies of language learning both by children and by adults; and discussions of language pathology and various language surrogates, for example, the gesture language of the deaf. A second subclass in this category will be constituted by inquiries into the use of language for literary purposes; the study of the formal devices of poetry (meter, versification, etc.), of the syntactic features of prose style, and the semantic structure of narrative. Finally in a third subcategory we hope to publish works on the sociology of language, and the relation of language to and of its role in other forms of social interaction, such as ritual, kinship organization, magic, and art.

Among the background studies we hope to be able to include historical investigations of the technique of linguistic description, especially as it was practiced by the great forerunners of modern linguistics—the Sanskrit grammarians, the students of language in classical antiquity, in the middle ages (both Arabic and Western), and in more recent times. These will be contrasted with studies of a more philosophical bent, devoted to the deep intellectual connections that have always existed between the study of language, on the one hand, and theoretical psychology and the philosophy of the mind, on the other.

NOAM CHOMSKY
MORRIS HALLE

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A brief, and sufficiently accurate, description of the intellectual life of the European races during the succeeding two centuries and a quarter up to our own times is that they have been living upon the accumulated capital of ideas provided for them by the genius of the seventeenth century..

A. N. Whitehead, *Science and the Modern World*

Introduction

Whitehead's often quoted remark, cited above, provides a useful background for a discussion of the history of linguistics in the modern period. As applied to the theory of language structure, his assessment is quite correct with regard to the eighteenth and early nineteenth centuries. Modern linguistics, however, has self-consciously dissociated itself from traditional linguistic theory and has attempted to construct a theory of language in an entirely new and independent way. The contributions to linguistic theory of an earlier European tradition have in general been of little interest to professional linguists, who have occupied themselves with quite different topics within an intellectual framework that is not receptive to the problems that gave rise to earlier linguistic study or the insights that it achieved; and these contributions are by now largely unknown or regarded with unconcealed contempt. The few modern studies of the history of linguistics have typically taken the position that "everything before the 19th century, not yet being linguistics, can be dealt with in a few lines."¹ In recent years, there has been a noticeable reawakening of interest in questions that were, in fact, studied in a serious and fruitful way during the seventeenth, eighteenth, and early nineteenth centuries, though rarely since. Furthermore, this return to classical concerns has led to a rediscovery of much that was well understood in this period—what I will call the period of "Cartesian linguistics," for reasons that will be sketched below.

A careful study of the parallels between Cartesian linguistics and certain contemporary developments can be rewarding in many ways. A full account of them would go well beyond the scope of this essay, and any attempt to give such an account would, furthermore, be quite premature, in view of the sorry state of the field of the history of linguistics (itself in part a consequence of the disparagement of earlier work that has marked the modern period). I will limit myself here to something less ambitious, namely, a preliminary and fragmentary sketch of some of the leading ideas of Cartesian linguistics with no explicit analysis of its relation to current work that seeks to clarify and develop these ideas. The reader acquainted with current work in so-called "generative grammar" should have little difficulty in drawing these connections for himself.² Questions of current interest will, however, determine the general form of this sketch; that is, I will make no attempt to characterize Cartesian linguistics as it saw itself,³ but rather will concentrate on the development of ideas that have reemerged, quite independently, in current work. My primary aim is simply to bring to the attention of those involved in the study of generative grammar and its implications some

of the little-known work which has bearing on their concerns and problems and which often anticipates some of their specific conclusions.

This will be something of a composite portrait. There is no single individual who can be shown, on textual grounds, to have held all the views that will be sketched; perhaps Humboldt, who stands directly in the crosscurrents of rationalist and romanticist thought and whose work is in many ways the culmination as well as the terminal point of these developments, comes closest to this. Furthermore, the aptness of the term "Cartesian linguistics" for these developments in linguistic theory may well be questioned, on several grounds. First, these developments have roots in earlier linguistic work; second, several of the most active contributors to them would surely have regarded themselves as quite antagonistic to Cartesian doctrine (see note 3); third, Descartes himself devoted little attention to language, and his few remarks are subject to various interpretations. Each of these objections has some force. Still, it seems to me that there is, in the period under review here, a coherent and fruitful development of a body of ideas and conclusions regarding the nature of language in association with a certain theory of mind⁴ and that this development can be regarded as an outgrowth of the Cartesian revolution. In any event, the aptness of the term is a matter of little interest. The important problem is to determine the exact nature of the "capital of ideas" accumulated in the premodern period, to evaluate the contemporary significance of this contribution, and to find ways to exploit it for advancing the study of language.

Creative Aspect of Language Use

Although Descartes makes only scant reference to language in his writings, certain observations about the nature of language play a significant role in the formulation of his general point of view. In the course of his careful and intensive study of the limits of mechanical explanation, which carried him beyond physics to physiology and psychology, Descartes was able to convince himself that all aspects of animal behavior can be explained on the assumption that an animal is an automaton.⁵ In the course of this investigation, he developed an important and influential system of speculative physiology. But he arrived at the conclusion that man has unique abilities that cannot be accounted for on purely mechanistic grounds, although, to a very large extent, a mechanistic explanation can be provided for human bodily function and behavior. The essential difference between man and animal is exhibited most clearly by human language, in particular, by man's ability to form new statements which express new thoughts and which are appropriate to new situations. It is quite easy, in his view, to

conceive of a machine so constructed so that it utters words, and even words which correspond to bodily actions causing a change in its organs (for instance, if you touch it in one place it asks what you want of it; if you touch it in another place it cries out that you are hurting it, and so on). But it is not conceivable that such a machine should produce different arrangements of words so as to give an appropriately meaningful answer to whatever is said in its presence, as the dullest of men can do. (CSM I, 39)⁶

This ability to use language must not be confused with "natural movements which express passions and which can be imitated by machines as well as by animals." The crucial difference is that automata "could never use words or put together other signs as we do in order to declare our thoughts for others." This is a specific human ability, independent of intelligence. Thus,

it is quite remarkable that there are no men so dull-witted or stupid – and this includes even madmen – that they are incapable of arranging various words together and forming an utterance from them in order to make their thoughts understood; whereas there is no other animal, however perfect and well endowed it may be, that can do the same. (CSM I, 39–140)

Nor can this distinction between man and animal be based on peripheral

physiological differences. Thus Descartes goes on to point out that

this does not happen because they lack the necessary organs, for we see that magpies and parrots can utter words as we do, and yet they cannot speak as we do: that is, they cannot show that they are thinking what they are saying. On the other hand, men born deaf and dumb, and thus deprived of speech-organs as much as the beasts, or even more so, normally invent their own signs to make themselves understood by those who, being regularly in their company, have the time to learn their language.

In short, then, man has a species-specific capacity, a unique type of intellectual organization which cannot be attributed to peripheral organs or related to general intelligence⁷ and which manifests itself in what we may refer to as the “creative aspect” of ordinary language use – its property being both unbounded in scope and stimulus-free. Thus Descartes maintains that language is available for the free expression of thought or for appropriate response in any new context and is undetermined by any fixed association of utterances to external stimuli or physiological states (identifiable in any noncircular fashion).⁸

Arguing from the presumed impossibility of a mechanistic explanation for the creative aspect of normal use of language, Descartes concludes that in addition to body it is necessary to attribute mind – a substance whose essence is thought – to other humans. From the arguments that he offers for the association of mind to bodies that “bear a resemblance” to his, it seems clear that the postulated substance plays the role of a “creative principle” alongside the “mechanical principle” that accounts for bodily function. Human reason, in fact, “is a universal instrument which can serve for all contingencies,” whereas the organs of an animal or machine “have need of some special adaptation for any particular action.”⁹

The crucial role of language in Descartes’s argument is brought out still more clearly in his subsequent correspondence. In his letter to the Marquis of Newcastle (1646), he asserts that “none of our external actions can show anyone who examines them that our body is not just a self-moving machine, but contains a soul with thoughts – with the exception of spoken words or other signs having reference to particular topics without expressing any passion.”¹⁰ The final condition is added to exclude “cries of joy or sadness and the like” as well as “whatever can be taught by training to animals.” (CSMK, 303)¹¹ He goes on, then, to repeat the arguments in the *Discourse on the Method*, emphasizing once again that there is no man so imperfect as not to use language for the expression of his thoughts and no “animal so perfect as to use a sign to make other animals understand something which bore no relation to its passions”; and, once again,

Creative Aspect of Language Use

pointing to the very perfection of animal instinct as an indication of lack of thought and as a proof that animals are mere automata. In a letter of 1649 to Henry More, he expresses himself in the following terms:

But in my opinion the main reason for holding that animals lack thought is the following. Within a single species some of them are more perfect than others, as humans are too. This can be seen in horses and dogs, some of which learn what they are taught much better than others; and all animals easily communicate to us, by voice or bodily movement, their natural impulses of anger, fear, hunger and so on. Yet in spite of all these facts, it has never been observed that any brute animal has attained the perfection of using real speech, that is to say, of indicating by word or sign something relating to thought alone and not to natural impulse. Such speech is the only certain sign of thought hidden in a body. All human beings use it, however stupid and insane they may be, even though they may have no tongue and organs of voice; but no animals do. Consequently this can be taken as a real specific difference between humans and animals. (CSMK, 366)^{12, 13}

In summary, it is the diversity of human behavior, its appropriateness to new situations, and man's capacity to innovate – the creative aspect of language use providing the principal indication of this – that leads Descartes to attribute possession of mind to other humans, since he regards this capacity as beyond the limitations of any imaginable mechanism. Thus a fully adequate psychology requires the postulation of a “creative principle” alongside of the “mechanical principle” that suffices to account for all other aspects of the inanimate and animate world and for a significant range of human actions and “passions” as well.

Descartes's observations on language in relation to the problem of mechanistic explanation were elaborated in an interesting study by Cordemoy.¹⁴ His problem in this study is to determine whether it is necessary to assume the existence of other minds.¹⁵ A great deal of the complexity of human behavior is irrelevant to demonstrating that other persons are not mere automata, since it can be explained on hypothetical physiological terms, in terms of reflex and tropism. Limitations of such explanations are suggested by the fact that “they confidently approach something that will destroy them, and abandon what could save them” (p. 7). This suggests that their actions are governed by a will, like his own. But the best evidence is provided by speech, by

the connection I find among the words I constantly hear them utter. (p. 8)

For although I readily conceive that a mere machine could utter some words, I know at the same time that if there was a particular order among the

springs that distribute the wind or open the pipes from which the sounds came then they could never change it; so that as soon as the first sound is heard, those which usually follow it will also necessarily be heard, provided that the machine does not lack wind – whereas the words I hear uttered by bodies constructed like mine almost never follow the same sequence.

I observe moreover that these words are the same as those I would use to explain my thoughts to other subjects capable of conceiving them. Finally, the more I attend to the effect produced by my words when I utter them before these bodies, the more it seems they are understood, and the words they utter correspond so perfectly to the sense of my words that there is no reason to doubt that a soul produces in them what my soul produces in me. (pp. 8–10)

In short, Cordemoy is arguing that there can be no mechanistic explanation for the novelty, coherence, and relevance of normal speech. He emphasizes, however, that care must be exercised in using ability to speak as evidence for the inadequacy of mechanistic explanation. The fact that articulate sounds are produced or that utterances can be imitated in itself proves nothing, as this can be explained in mechanical terms. Nor is it of any relevance that “natural signs” may be produced that express internal states or that specific signs may be produced that are contingent on the presence of external stimuli. It is only the ability to innovate, and to do so in a way which is appropriate to novel situations and which yields coherent discourse, that provides crucial evidence. “To speak is not to repeat the same words that one has heard, but . . . to utter different words in response to those” (p. 19). To show that other persons are not automata, one must provide evidence that their speech manifests this creative aspect, that it is appropriate to whatever may be said by the “experimenter”; “. . . if I find, by all the observations I can make, that they use language [*La Parole*] as I do, then I will have an infallible reason to believe that they have a soul as I do” (p. 21). Possible types of experiment are then outlined. For example, one can construct new “conventional signs” [*signes d’institution*]:

I see that I can agree with others that what ordinarily signifies one thing will signify another, and that this has the result that only those with whom I make this agreement seem to understand what I am thinking. (pp. 22–23)

Similarly, evidence is provided

when I see that these bodies produce signs that bear no relation to their present state or to their preservation; when I see that these signs match those which I would produce to express my thoughts; when I see that they give me ideas

Creative Aspect of Language Use

which I did not have previously and which refer to things that I already had in mind; and finally when I see a close correlation between their signs and mine; (pp. 28–29)

or by behavior that indicates “that they intended to deceive me” (pp. 30–31). Under such circumstances, when many experiments of this sort have succeeded, “it will not be reasonable for me to believe that they are not like me” (p. 29).

Throughout, what is stressed is the innovative aspect of intelligent performance. Thus,

... the new thoughts that come through our conversations with other men are a sure sign to all of us that they have a mind like ours (p. 185);

... our whole reason for believing that there are minds united with the bodies of men who speak to us is that they often give us new thoughts that we did not have, or they oblige us to change the thoughts that we did have.... (p. 187).

Cordemoy consistently maintains that the “experiments” that reveal the limitations of mechanical explanation are those which involve the use of language—in particular, what we have called its creative aspect. In this, as in his discussion of the acoustic and articulatory basis for language use and the methods of conditioning, association, and reinforcement that may facilitate acquisition of true language by humans and nonlinguistic functional communication systems by animals, Cordemoy is working completely within the framework of Cartesian assumptions.

For our purposes what is important in this is the emphasis on the creative aspect of language use and on the fundamental distinction between human language and the purely functional and stimulus-bound animal communication systems, rather than the Cartesian attempts to account for human abilities.

It is noteworthy that subsequent discussion rarely attempts to meet the Cartesian arguments regarding the limitations of mechanical explanation. Descartes argued that a “thinking substance” must be postulated to account for the facts that he cites. This proposal is generally countered by the claim that a more complex organization of the body is sufficient to account for human abilities, but no serious attempt is made to show how this might be possible (as Descartes, Cordemoy, and others tried to show how animal behavior and human bodily functions of many kinds can be explained on the basis of assumptions about physical organization). La Mettrie, for example, holds that man is simply the most complex of machines. “He is to the ape and the cleverest of animals what the Huyghen’s planetary clock is to one of Julien Leroy’s watches” (p. 34; *MaM*, p. 140).¹⁶ There is, in his opinion, no difficulty in accounting for thought

on mechanical principles. “I believe thought to be so little incompatible with organised matter, that it seems to be one of its properties, like electricity, motive power, impenetrability, extension, etc.” (p. 35; *MaM*, pp. 143–144). There should, furthermore, be no obstacle in principle to teaching an ape to speak. It is only “a defect in the speech organs” that stands in the way, and this can be overcome by proper training (p. 11; *MaM*, p. 100). “I hardly doubt at all that if this animal were perfectly trained, we would succeed in teaching him he might at last be taught to utter sounds and consequently to learn a language. Then he would no longer be a wild man, nor an imperfect man, but a perfect man, a little man of the town” (p. 12; *MaM*, p. 103). Similarly, a talking machine is not beyond imagination. “If it took Vaucanson more artistry to make his flautist than his duck, he would have needed even more to make a speaking machine, which can no longer be considered impossible ...” (p. 34; *MaM*, pp. 140–141).

Several years before the publication of *L’Homme Machine*, in a slight and presumably only semi-serious work, Bougeant produced one of the very few attempts to refute explicitly the Cartesian argument that human and animal language differ in a fundamental way,¹⁷ but his supposed counterargument merely reaffirms the Cartesian position regarding human and animal language. He bases his claim that “animals speak and understand each other just as well as we do, and sometimes better” (p. 4) on the grounds that they can be trained to respond to signals, that they exhibit their “various feelings” by external signs, that they can work in cooperation (for example, beavers, to whom he ascribes a language that has much in common with those “language games” that Wittgenstein regards as “primitive forms” of human language). However, he recognizes that “the language of animals is entirely limited to expressing feelings of their passions, which may all be reduced to a small number” (p. 152). “It is necessary that they always repeat the same expression, and that this repetition last as long as the object occupies their attention” (p. 123). They have no “abstract or metaphysical ideas”:

They have only direct cognitions that are completely limited to the material objects that strike their senses. Man is infinitely superior in his language, as in his ideas, being incapable of expressing himself without composing his speech of proper names and relative terms, which determine its sense and application. (p. 154)

Animals, in effect, have only names for various “passions that they feel” (p. 155). They cannot produce “a phrase which is personalized and composite [*personifiée et composée*] as we do” (p. 156):

Creative Aspect of Language Use

Why has nature given animals the faculty of speech? Solely so they can express to each other their desires and feelings, and thereby satisfy their needs and whatever may be necessary for their preservation. I know that language in general has quite a different objective, which is to express ideas, cognitions, reflections, reasonings. But whatever theory one holds regarding the knowledge of animals ... it is certain that nature has endowed them with knowledge only of what is useful to them or necessary for the survival of the species and of individuals – consequently, with no abstract ideas, no metaphysical reasoning, no enquiry or curiosity about the objects surrounding them, no knowledge except how to conduct themselves, keep well, avoid whatever may harm them, and acquire goods. Nor has one ever seen them engaged in public discussion, or argument about causes and effects. They know only the life of an animal. (pp. 99–100)

In short, animal “language” remains completely within the bounds of mechanical explanation as this was conceived by Descartes and Cordemoy.

Evidently, neither La Mettrie nor Bougeant comes to grips with the problem raised by Descartes – the problem posed by the creative aspect of language use, by the fact that human language, being free from control by identifiable external stimuli or internal physiological states, can serve as a general instrument of thought and self-expression rather than merely as a communicative device of report, request, or command.¹⁸ Modern attempts to deal with the problem of intelligent behavior are hardly more satisfactory. Ryle, for example, in his critique of “Descartes’s myth”¹⁹ simply avoids the issue entirely. He claims that the Cartesians should have been “asking by what criteria intelligent behavior is actually distinguished from non-intelligent behavior” (p. 21) rather than seeking an explanation for the former. Properly understood, these are not mutually exclusive alternatives. The criteria that Ryle discusses differ little, in principle, from Cordemoy’s proposed “experiments”; but whereas Ryle is content simply to cite the fact that “intelligent behavior” has certain properties,²⁰ the Cartesians were concerned with the problem of accounting for such behavior in the face of their inability to provide an explanation in mechanical terms. It can hardly be claimed that we have advanced significantly beyond the seventeenth century in determining the characteristics of intelligent behavior, the means by which it is acquired, the principles that govern it, or the nature of the structures that underlie it. One may choose to ignore these problems, but no coherent argument has been offered that suggests that they are either unreal or beyond investigation.

Modern linguistics has also failed to deal with the Cartesian observations regarding human language in any serious way. Bloomfield, for example, observes

that in a natural language “the possibilities of combination are practically infinite,” so that there is no hope of accounting for language use on the basis of repetition or listing, but he has nothing further to say about the problem beyond the remark that the speaker utters new forms “*on the analogy* of similar forms which he has heard.”²¹ Similarly, Hockett attributes innovation completely to “analogy.”²² Similar remarks can be found in Paul, Saussure, Jespersen, and many others. To attribute the creative aspect of language use to “analogy” or “grammatical patterns” is to use these terms in a completely metaphorical way, with no clear sense and with no relation to the technical usage of linguistic theory. It is no less empty than Ryle’s description of intelligent behavior as an exercise of “powers” and “dispositions” of some mysterious sort, or the attempt to account for the normal, creative use of language in terms of “generalization” or “habit” or “conditioning.” A description in these terms is incorrect if the terms have anything like their technical meanings, and highly misleading otherwise, in so far as it suggests that the capacities in question can somehow be accounted for as just a “more complicated case” of something reasonably well understood.

We have seen that the Cartesian view, as expressed by Descartes and Cordemoy as well as by such professed anti-Cartesians as Bougeant, is that in its normal use, human language is free from stimulus control and does not serve a merely communicative function, but is rather an instrument for the free expression of thought and for appropriate response to new situations.²³ These observations concerning what we have been calling the creative aspect of language use are elaborated in several ways in the eighteenth and early nineteenth centuries, as we shall see directly. At the same time, Descartes’s second test for determining whether automata are “real men” is also reinterpreted, within the context of the “great chain of being.” Descartes makes a sharp distinction between man and animal, arguing that animal behavior is a matter of instinct and that the perfection and specificity of animal instinct make it subject to mechanical explanation. A characteristic subsequent view is that there is a gradation of intelligence and that perfection of instinct varies inversely with intellectual ability. To La Mettrie, for example, it seems to be a universal law of nature “that the more one gains in intelligence [*du côté de l’esprit*], the more one loses in instinct” (p. 99). (Cf. notes 7, 29.)

The two Cartesian tests (possession of language, diversity of action) are inter-related by Herder, in an original way, in his influential Prize Essay on the origin of language.²⁴ Like Descartes, Herder argues that human language is different in kind from exclamations of passion and that it cannot be attributed to superior organs of articulation, nor, obviously, can it have its origins in imitation of nature or in an “agreement” to form language.²⁵ Rather, language is a natural property of the human mind. But nature does not provide man with an instinctive language,

or an instinctive faculty of language, or a faculty of reason of which language is a "reflection." Man's fundamental quality is, rather, weakness of instinct, and man is clearly far inferior to animals in strength and certainty of instinct. But instinct and refinement of sense and skill correlate with narrowness of the scope and sphere of life and experience, with the focusing of all sensitivity and all power of representation on a narrow fixed area (pp. 15–16). The following can be taken as a general principle: "the sensitivity, capability, and productive drive of animals increase in power and intensity in inverse proportion to the magnitude and diversity of their sphere of activity" (pp. 16–17). But man's faculties are less acute, more varied and more diffuse. "Man does not have an unvaried and narrow sphere of activity, where only one task awaits him" (p.17). He is not, in other words, under the control of external stimuli and internal drives and compelled to respond in a perfect and specific way. This freedom from instinct and from stimulus control is the basis for what we call "human reason": "... if man had the drives of animals, he could not have in him what we now call reason, since such drives would unknowingly pull his forces towards a single point, so that he would have no free sphere of awareness" (p. 22). It is this very weakness of instinct that is man's natural advantage, that makes him a rational being. "If man cannot be an instinctive animal, he must – enabled by the freely working positive power of his soul – become a reflective creature" (p. 22). In compensation for his weakness of instinct and sense, man receives the "advantage of freedom" (p. 20). "No longer inevitably a machine in the hands of nature, he himself becomes the purpose and the objective of his efforts" (p. 20).

Free to reflect and to contemplate, man is able to observe, compare, distinguish essential properties, identify, and name (pp. 23f.). It is in this sense that language (and the discovery of language) is natural to man (p. 23), that "the human being is formed to be a creature of language" (p. 43). On the one hand, Herder observes that man has no innate language – man does not speak by nature. On the other hand, language in his view is so specifically a product of man's particular intellectual organization that he is able to claim: "If I were to gather up all the loose ends and display that fabric called human nature: definitely a linguistic weave!" The resolution of the apparent paradox lies in his attempt to account for human language as a consequence of the weakness of human instinct.

Descartes had described human reason as "a universal instrument which can be used in all kinds of situations"²⁶ and which therefore provides for unbounded diversity of free thought and action.²⁷ Herder does not regard reason as a "faculty of the mind" at all but defines it rather as the freedom from stimulus control, and he attempts to show how this "natural advantage" makes it possible – in fact, necessary (p. 25) – for humans to develop language.

Somewhat before Herder, James Harris had given a characterization of "ra-

tionality” in terms rather similar to his, that is, as freedom from instinct rather than as a faculty with fixed properties. Harris distinguishes between the “*Human Principle*,” which he calls “reason,” and the “*Brutal Principle*,” which he calls “instinct,” in the following passage:

MARK then ... the Difference between *Human Powers* and *Brutal* – The Leading Principle of BRUTES appears to tend in each Species to *one single Purpose* – to this, in general, it *uniformly arrives*; and here, in general, it as *uniformly stops* – it needs no Precepts or Discipline to instruct it; nor will it easily be *changed*, or *admit a different Direction*. On the contrary, the Leading Principle of MAN is capable of *infinite Directions* – is convertible to *all sorts of Purposes* – equal to *all sorts of Subjects* – neglected, remains ignorant, and void of every Perfection – cultivated, becomes adorned with Sciences, and Arts – can raise us to excel, not only *Brutes*, but *our own Kind* – with respect to our *other Powers and Faculties*, can instruct us how to *use* them, as well as *those* of the various *Natures*, which we see existing around us. In a word, to oppose the two Principles to each other – The Leading Principle of *Man*, is *Multiform, Originally Uninstructed, Pliant and Docil* – The Leading Principle of *Brutes* is *Uniform, Originally Instructed*; but, in most Instances afterward, *Inflexible and Indocil*.²⁸

Thus we may say “that MAN is by Nature a RATIONAL ANIMAL,” meaning by this nothing more than that he is free from the domination of instinct.²⁹

A concern for the creative aspect of language use persists through the romantic period, in relation to the general problem of true creativity, in the full sense of this term.³⁰ A. W. Schlegel’s remarks on language in his *Kunstlehre*³¹ give a characteristic expression to these developments. In discussing the nature of language, he begins by observing that speech does not relate merely to external stimuli or goals. The words of language, for example, may arouse in the speaker and hearer ideas [*Vorstellungen*] of things that they have not directly perceived but know only by verbal description or that they “aren’t able to intuit sensuously at all because they exist in an intellectual [*geistigen*] world.” Words may also designate abstracted properties and relations of the speaker to the hearer and to the topic of discourse, and relations among the elements of the latter. In combining our “thoughts and ideas” we use “words with such subtle meanings that to clarify them would disconcert a philosopher.” Still, they are used freely by the uninstructed and the unintelligent:

We fit all these words together in ways that allow others to not merely understand our purpose but glimpse our innermost feelings; in this way we

Creative Aspect of Language Use

excite the most diverse passions, affirm or negate moral decisions, and incite a crowd to collective action. The greatest things as well as the least significant, the greatest marvel never before heard – indeed the most impossible and unthinkable things – slide off our tongues with equal ease.

So characteristic of language is this freedom from external control or practical end, for Schlegel, that he elsewhere³² proposes that “anything by means of which the inner manifests itself outwardly is rightly called language.”

From this conception of language, it is only a short step to the association of the creative aspect of language use with true artistic creativity.³³ Echoing Rousseau and Herder, Schlegel describes language as “the most marvelous creation of the poetic faculty of the human being” (*Sprache und Poetik*, p. 145). Language is “an ever-becoming, self transforming, unending poem of the entire human race” (*Kunstlehre*, p. 226). This poetic quality is characteristic of the ordinary use of language, which “can never be so completely depoetized that it should find itself scattered into an abundance of poetical elements, even in the case of the most calculating and rational use of linguistic signs, all the more so in the case of everyday life – in impetuous, immediate, often passionate colloquial language” (*ibid*, p. 228). There would have been little difficulty, he continues, in demonstrating to Molière’s M. Jourdain that he spoke poetry as well as prose.

The “poetical” quality of ordinary language derives from its independence of immediate stimulation (of “the physically perceivable universe”) and its freedom from practical ends. These characteristics, along with the boundlessness of language as an instrument of free self-expression, are essentially those emphasized by Descartes and his followers. But it is interesting to trace, in slightly greater detail, the argument by which Schlegel goes on to relate what we have called the creative aspect of language use to true creativity. Art, like language, is unbounded in its expressive potentiality.³⁴ But, Schlegel argues, poetry has a unique status among the arts in this respect; it, in a sense, underlies all the others and stands as the fundamental and typical art form. We recognize this unique status when we use the term “poetical” to refer to the quality of true imaginative creation in any of the arts. The explanation for the central position of poetry lies in its association with language. Poetry is unique in that its very medium is unbounded and free; that is, its medium, language, is a system with unbounded innovative potentialities for the formation and expression of ideas. The production of any work of art is preceded by a creative mental act for which the means are provided by language. Thus the creative use of language, which, under certain conditions of form and organization, constitutes poetry (cf. p. 231), accompanies and underlies any act of the creative imagination, no matter what the medium in which it is realized. In this way, poetry achieves its unique status among the arts, and

artistic creativity is related to the creative aspect of language use.³⁵ (Compare Huarte's third kind of wit – see note 9.)

Schlegel distinguishes human from animal language in the typical Cartesian manner. Thus he observes that one cannot attribute man's linguistic ability to the "natural disposition of his organs":

Various species share to a certain extent with human beings the ability, although totally mechanical, to learn language. By means of training and frequent repetition a stimulus towards certain reactions is brought about in their organs, but they never use the words they learned autonomously (even though it might seem so), in order to designate, and their speech is just as little an authentic language as the sounds produced by a speaking machine (p. 236).

We cannot draw analogies between human and animal intellectual function. Animals live in a world of "states of affairs" [*Zustände*] not of "objects" [*Gegenstände*] in the human sense (the same is true, in part, of young children, which accounts for the confused and incoherent character of even the liveliest childhood memories). The "animal dependency" [*tierische Abhängigkeit*] is, for Schlegel, sharply opposed to the "spontaneous principle" [*selbsttätige Prinzip*] of "rational volition" [*verständige Willkür*] that characterizes human mental life. It is this principle that provides the basis for human language. It leads to a search for coherence and unity in experience, to comparison of sensible impressions (which requires mental signs, of some sort), and to the unique human capacity and need "through language to want to refer to even those things that cannot be given in any sensuous intuition." What results is a human language, which serves primarily "as the organ of thought, as a means of reflection" and only derivatively for the purposes of "social communication" (pp. 237–241).

The Cartesian emphasis on the creative aspect of language use, as the essential and defining characteristic of human language, finds its most forceful expression in Humboldt's attempt to develop a comprehensive theory of general linguistics.³⁶ Humboldt's characterization of language as *energeia* ("activity" [*Thätigkeit*]) rather than *ergon* ("product" [*Werk*]),³⁷ as "a generative activity [*eine Erzeugung*]" rather than "a lifeless product" [*ein todes Erzeugtes*] extends and elaborates – often, in almost the same words – the formulations typical of Cartesian linguistics and romantic philosophy of language and aesthetic theory. For Humboldt, the only true definition of language is "a productive activity" [*eine genetische*]: "It is the ever repeated *mental labour* [*Arbeit des Geistes*] of making *articulated sound* capable of expressing *thought*" (p. 57). There is a constant and uniform factor underlying this "mental labour"; it is this which Humboldt calls the "Form" of language.³⁹ It is only the underlying laws of generation that

are fixed, in language. The scope and manner in which the generative process may operate in the actual production of speech (or in speech perception, which Humboldt regards as a partially analogous performance – see pp. 102–103 below) are totally undetermined. (See note 38.)

The concept of Form includes the “rules of speech articulation” [*Redefügung*] as well as the rules of “word formation” [*Wortbildung*] and the rules of formation of concepts that determine the class of “root words” [*Grundwörter*] (p. 61). In contrast, the substance [*Stoff*] of language is unarticulated sound and “the totality of sense-impressions and spontaneous mental activities that precede the creation of the concept with the aid of language” (p. 61). The Form of language is a systematic structure. It contains no individual elements as isolated components but incorporates them only in so far as “a method of language formation” can be discovered in them (p. 62).

The fixed mechanisms that, in their systematic and unified representation, constitute the form of the language must enable it to produce an indefinite range of speech events corresponding to the conditions imposed by thought processes. The domain of language is infinite and boundless, “the essence of all that can be thought” (p. 122). Consequently, the fundamental property of a language must be its capacity to use its finitely specifiable mechanisms for an unbounded and unpredictable set of contingencies. “It must therefore make infinite use of finite means, and is able to do so through the productive power that is the identity of language and thought” (p. 122).

Not even the lexicon of a language can, according to Humboldt, be regarded as an “inert completed mass”. Even apart from the formation of new words, the use of the lexicon by the speaker or the hearer involves “a continuous generation and regeneration of the word-making capacity” (pp. 125–126). This is true of the original formation of the language and its acquisition by children, and it is also true of the daily use of speech (cf. note 25). He thus regards the lexicon, not as a memorized list from which words are simply extracted as language is used (“No human memory would be equal to this, if the soul did not simultaneously carry by instinct within itself the key to the formation of the words themselves”), but rather as based on certain organizing generative principles that produce the appropriate items on given occasions. It is from such an assumption that he develops his well-known view that (in modern terms) concepts are organized in terms of certain “semantic fields” and that they receive their “value” in terms of their relation to the principles that determine this system.

Speech is an instrument of thought and self-expression. It plays an “immanent” and “constitutive” role in determining the nature of man’s cognitive processes, his “thinking and, through thought, creative power” [*denkende und im Denken schöpferische Kraft*] (p. 36), his “world view” and processes of “tying

together thoughts" [*Gedankenverknüpfung*] (p. 50). More generally, a human language as an organized totality is interposed between man and "the nature that affects him, both inwardly and outwardly" (p. 74). Although languages have universal properties, attributable to human mentality as such, nevertheless each language provides a "thought world" and a point of view of a unique sort. In attributing such a role in the determination of mental processes to individual languages, Humboldt departs radically from the framework of Cartesian linguistics, of course, and adopts a point of view that is more typically romantic.

Humboldt does remain within the Cartesian framework, however, in so far as he regards language primarily as a means of thought and self-expression rather than as an animal-like functional communication system – when he maintains, for example, that man "surrounds himself with a world of sounds, so as to take up and process within himself the world of objects" (p. 74). Thus even in its beginnings, "language ... is extended unthinkingly to all objects of casual sense perception and inner concern" (p. 75; Humboldt 1988: 60). He regards it as a mistake to attribute language primarily to the need for mutual assistance. "Man is not so needy – and inarticulate sounds would suffice for the rendering of assistance." There are, to be sure, purely practical uses of language, as, for example, if a man orders a tree to be felled and "thinks of nothing by that term but the trunk that he designates" (p. 220). The same words might, however, have an "enhanced significance" if they were used in a description of nature or in a poem, for example, in which case the words are not used simply as instruments or with a purely referential function, are not used "in a *localized activity of the soul* for a limited *purpose*" but are rather referred to "the inner whole of thought-association and feeling" (p. 221; Humboldt 1988: 156). It is only in the latter case that the full resources of language are used in forming or interpreting speech, that all aspects of the lexical and grammatical structure of an utterance make their full contribution to its interpretation. The purely practical use of language is characteristic of no real human language, but only of invented parasitic systems.⁴⁰

In developing the notion of "form of language" as a generative principle, fixed and unchanging, determining the scope and providing the means for the unbounded set of individual "creative" acts that constitute normal language use, Humboldt makes an original and significant contribution to linguistic theory – a contribution that unfortunately remained unrecognized and unexploited until fairly recently.⁴¹ The nature of Humboldt's contribution can be appreciated by comparing his notion of "form" to that developed in Harris's *Hermes* (1751), for example. For Harris, a language is essentially a system of words. Their meanings (the ideas of which they are the symbols) constitute the form of language; their sound, its matter (substance). Harris's notion of form is modeled on a classical pattern, the underlying conception being that of shape or orderly ar-

rangement. But in his work on language, Harris does not suggest that a description of its form requires more than a specification of elements, categories, and the association of “content elements” to “expression elements.” He does not, in other words, give any indication of grasping Humboldt’s insight that language is far more than “patterned organization” of elements of various types and that any adequate description of it must refer these elements to the finite system of generative principles which determine the individual linguistic elements and their interrelations and which underlie the infinite variety of linguistic acts that can be meaningfully performed.⁴²

The development of Humboldt’s notion of “form of language” must be considered against the background of the intensive discussion during the romantic period of the distinction between “mechanical form” and “organic form.” A. W. Schlegel makes the distinction in the following way:

Form is mechanical when, through external force, it is imparted to any material merely as an accidental addition without reference to its quality; as, for example, when we give a particular shape to a soft mass that it may retain the same after its induration. Organical form, again, is innate; it unfolds itself from within, acquires its determination contemporaneously with the perfect development of the germ.⁴³

In Coleridge’s paraphrase:

The form is mechanic, when on any given material we impress a pre-determined form, not necessarily arising out of the properties of the material; – as when to a mass of wet clay we give whatever shape we wish it to retain when hardened. The organic form, on the other hand, is innate; it shapes, as it develops, itself from within, and the fulness of its development is one and the same with the perfection of its outward form. Such as the life is, such is the form. Nature, the prime genial artist, inexhaustible in diverse powers, is equally inexhaustible in forms, – each exterior is the physiognomy of the being within, – its true image reflected and thrown out from the concave mirror...⁴⁴

The context, in both cases, is an investigation of how individual works of genius are constrained by rule and law. Humboldt’s concept of the “organic form” of language, and its role in determining the individual creations of speech, is a natural by-product of the discussion of organic and mechanical form, particularly in the light of the connection that had already been drawn between artistic creativity and the creative aspect of language use (cf. pp. 61–62, above).⁴⁵

The parallel between Humboldt’s notion of “organic form” in language and

Goethe's much earlier theory of "Urform" in biology⁴⁶ is also quite striking. The concept of "Urform" was intended as a new dimension beyond the "static" concept of form of Linneaus and Cuvier, for example (namely, the concept of form as structure and organization). But, at least at one stage of his thought, Goethe took this dimension to be one of logical rather than temporal order. In a letter to Herder, in 1787, Goethe writes:

The primordial plant is the most marvelous created thing in the world, and nature herself should envy me it. With this model and its key one is able thereby to invent other plants *ad infinitum*, which must be consistent with the model. That is, even if these invented plants do not exist, they *could* exist. They are not, for example, pictorial or poetic shadows and illusions; they rather have an inner truth and necessity. The same law applies to all other living beings.⁴⁷

Thus, the Urform is a kind of generative principle that determines the class of physically possible organisms; and, in elaborating this notion, Goethe tried to formulate principles of coherence and unity which characterize this class and which can be identified as a constant and unvarying factor beneath all the superficial modifications determined by variation in environmental conditions. (Cf. Magnus, *op. cit.*, chap. 7, for some relevant material.) In a similar way, Humboldt's "linguistic form" constrains all individual acts of speech production or perception in a particular language, and, more generally, the universal aspects of grammatical form determine the class of possible languages.⁴⁸

Finally, we should note that Humboldt's conception of language must be considered against the background provided by his writings on social and political theory⁴⁹ and the concept of human nature that underlies them. Humboldt has been described as "the most prominent representative in Germany" of the doctrine of natural rights and of the opposition to the authoritarian state.⁵⁰ His denunciation of excessive state power (and of any sort of dogmatic faith) is based on his advocacy of the fundamental human right to develop a personal individuality through meaningful creative work and unconstrained thought:

Naturally, freedom is the necessary condition without which even the most soul-satisfying occupation cannot produce any wholesome effects of this sort. Whatever task is not chosen of man's free will, whatever constrains or even only guides him, does not become part of his nature. It remains forever alien to him; if he performs it, he does so not with true humane energy but with mere mechanical skill (Cowan, *op. cit.*, pp. 46–47).

[Under the condition of freedom from external control] ... all peasants and craftsmen could be transformed into *artists*, i.e., people who love their craft

Creative Aspect of Language Use

for its own sake, who refine it with their self-guided energy and inventiveness, and who in so doing cultivate their own intellectual energies, ennoble their character, and increase their enjoyments. This way humanity would be ennobled by the very things which now, however beautiful they might be, degrade it (ibid., p. 45).

The urge for self-realization is man's basic human need (as distinct from his merely animal needs). One who fails to recognize this "ought justly to be suspected of failing to recognize human nature for what it is and of wishing to turn men into machines" (ibid, p. 42). But state control is incompatible with this human need. It is fundamentally coercive, and therefore "it produces monotony and uniformity, and alienates people's actions from their own character" (ibid., p. 41: "so bringt er Einformigkeit und eine fremde Handlungsweise"). This is why "true reason cannot desire for man any condition other than that in which ... every individual enjoys the most absolute, unbounded freedom to develop himself out of himself, in true individuality" (ibid, p. 39). On the same grounds, he points to the "pernicious results of limitations upon freedom of thought" and "the harm done if the government takes a positive promoting hand in the business of religious worship" (ibid, pp. 30–31), or if it interferes in higher education (ibid, pp. 133f.), or if it regulates personal relations of any sort (e.g., marriage; ibid, p. 50), and so on. Furthermore, the rights in question are intrinsically human and are not to be limited to "the few in any nation"; "there is something utterly degrading to humanity in the very thought that some human being's right to be human could be abrogated" (ibid, p. 33). To determine whether the fundamental human rights are being honored, we must consider, not just what a person does, but the conditions under which he does it – whether it is done under external control or spontaneously, to fulfill an inner need. If a man acts in a purely mechanical way, "we may admire what he does, but we despise what he is" (ibid, p. 37).⁵¹

It is clear, then, that Humboldt's emphasis on the spontaneous and creative aspects of language use derives from a much more general concept of "human nature," a concept which he did not originate but which he developed and elaborated in original and important ways.

As remarked above, Humboldt's effort to reveal the organic form of language – the generative system of rules and principles that determines each of its isolated elements – had little impact on modern linguistics, with one significant exception. The structuralist emphasis on language as "un système du tout se tient" is conceptually, at least, a direct outgrowth of the concern for organic form in Humboldtian linguistics. For Humboldt, a language is not to be regarded as a mass of isolated phenomena – words, sounds, individual speech productions,

etc. – but rather as an “organism” in which all parts are interconnected and the role of each element is determined by its relation to the generative processes that constitute the underlying form. In modern linguistics, with its almost exclusive restriction of attention to inventories of elements and fixed “patterns” the scope of “organic form” is far more narrow than in the Humboldtian conception. But within this more narrow frame, the notion of “organic interconnection” was developed and applied to linguistic materials in a way that goes far beyond anything suggested in Humboldt. For modern structuralism, the dominant assumption is that “a phonological system [in particular] is not the mechanical sum of isolated phonemes, but an organic whole of which the phonemes are the members and of which the structure is subject to laws.”³² These further developments are familiar, and I will say nothing more about them here.

As noted above, the form of language, for Humboldt, embraces the rules of syntax and word formation as well as the sound system and the rules that determine the system of concepts that constitute the lexicon. He introduces a further distinction between the form of a language and what he calls its “character.” It seems to me that, as he employs this term, the character of a language is determined by the manner in which it is used, in particular, in poetry and philosophy; and the “inner character” (p. 208) of a language must be distinguished from its syntactic and semantic structure, which are matters of form, not use. “Without changing the language in its sounds, and still less in its forms and laws, *time*, through a growing evolution of ideas, a heightened power of thought, and a more deeply penetrating capacity for feeling, will often bring into a language what it did not formerly possess” (p. 116; Humboldt 1999, 86-7). Thus a great writer or thinker can modify the character of the language and enrich its means of expression without affecting its grammatical structure. The character of a language is closely related to other elements of the national character and is a highly individual creation. For Humboldt, as for his Cartesian and romantic precursors, the normal use of language typically involves creative mental acts; but it is the character of a language rather than its form that reflects true “creativity” in a higher sense – in the sense that implies value as well as novelty.

For all his concern with the creative aspect of language use and with form as generative process, Humboldt does not go on to face the substantive question: what is the precise character of “organic form” in language. He does not, so far as I can see, attempt to construct particular generative grammars or to determine the general character of any such system, the universal schema to which any particular grammar conforms. In this respect, his work in general linguistics does not reach the levels achieved by some of his predecessors, as we shall see directly. His work is also marred by unclarity regarding several fundamental questions, in particular, regarding the distinction between the rule-governed creativity which

constitutes the normal use of language and which does not modify the form of the language at all and the kind of innovation that leads to a modification in the grammatical structure of the language. These defects have been recognized and, to some extent, overcome in more recent work. Furthermore, in his discussion of generative processes in language it is often unclear whether what he has in mind is underlying competence or performance – Aristotle’s first or second grade of actuality of form (*De Anima*, book II, chap. 1). This classical distinction has been reemphasized in modern work. See note 2, and references given there. The concept of generative grammar, in the modern sense, is a development of the Humboldtian notion of “form of language” only if the latter is understood as form in the sense of “possession of knowledge” rather than “actual exercise of knowledge,” in Aristotelian terms. (See note 39.)

It should, incidentally, be noted that the failure to formulate rules of sentence construction in a precise way was not simply an oversight of Cartesian linguistics. To some extent it was a consequence of the express assumption that the sequence of words in a sentence corresponds directly to the flow of thought, at least in a “well-designed” language,⁵³ and is therefore not properly studied as part of grammar. In the *Grammaire générale et raisonnée* it is maintained that, except for the figurative use of language, there is little to be said in grammar regarding rules of sentence construction (p. 145). In Lamy’s rhetoric, shortly after, omission of any discussion of “the order of words and the rules that must be observed in the composition of speech” is justified on the grounds that “the natural light shows so vividly what must be done” that no further specification is necessary (p. 25).⁵⁴ At about the same time, Bishop Wilkins⁵⁵ distinguishes those constructions that are merely “customary” (*take one’s heels and fly away, hedge a debt, be brought to heel*, etc.) from those which follow the “natural sense and order of the words” and therefore need no special discussion (p. 354); for example, the arrangement of Subject, Verb, and Object, or Subject, Copula, and Adjective, or the ordering of “grammatical” and “transcendental” particles relative to the items they govern, etc. (p. 354).

At the opposite pole from the belief in “natural order” is the view that each language contains an arbitrary collection of “patterns” learned through constant repetition (and “generalization”) and forming a set of “verbal habits” or “dispositions.” The belief that language structure and language use can somehow be described in these terms underlies much of the modern study of language and verbal behavior, often coupled with a denial of the possibility of useful cross-linguistic generalizations in syntax (see pp. 57–58, above). Like the reliance on a presumed natural order, it has helped foster a neglect of the problem of specifying the “grammatical form” of particular languages or the general abstract schema to which each language must conform.⁵⁶

In summary, one fundamental contribution of what we have been calling “Cartesian linguistics” is the observation that human language, in its normal use, is free from the control of independently identifiable external stimuli or internal states and is not restricted to any practical communicative function, in contrast, for example, to the pseudo language of animals. It is thus free to serve as an instrument of free thought and self-expression. The limitless possibilities of thought and imagination are reflected in the creative aspect of language use. Language provides finite means but infinite possibilities of expression constrained only by rules of concept formation and sentence formation, these being in part particular and idiosyncratic but in part universal, a common human endowment. The finitely specifiable form of each language – in modern terms, its generative grammar (cf. note 39) – provides an “organic unity” interrelating its basic elements and underlying each of its individual manifestations, which are potentially infinite in number.

The dominant view throughout this period is that “languages are the best mirror of the human mind.”⁵⁷ This virtual identification of linguistic and mental processes is what motivates the Cartesian test for the existence of other minds, discussed above. It finds expression throughout the romantic period. For Friedrich Schlegel, “Mind and language are so inseparable, thought and word are so essentially one, that, just as certainly as thoughts are considered to be the characteristic privilege of humankind, we can call the word, in accordance with its inner meaning and dignity, the original essence of man.”⁵⁸ We have already made reference to Humboldt’s conclusion that the force that generates language is indistinguishable from that which generates thought. Echoes of this conclusion persist for some time,⁵⁹ but they become less frequent as we enter the modern period.

The association of language and mind, it should be noted, is regarded rather differently in the earlier and later phases of the period under review. The earlier view is that the structure of language reflects the nature of thought so closely that “the science of language differs hardly at all from that of thought” (Beauzée, p. x)⁶⁰; the creative aspect of language use is accounted for on the basis of this assumption.⁶¹ On the other hand, the observation that language serves as a medium of thought begins to be rephrased as the view that language has a constitutive function with respect to thought. La Mettrie, for example, in discussing how the brain compares and relates the images that it discerns, concludes that its structure is such that, once the signs of objects and their differences “have been traced or imprinted on the brain, the soul necessarily examines their relations⁶² – an examination that would have been impossible without the discovery of signs or the invention of language” (op. cit., p. 105); prior to the discovery of language, things could only be perceived in a vague or superficial way. We have already re-

Creative Aspect of Language Use

ferred to Humboldt's view that "Man lives primarily with objects, indeed, since feeling and acting in him depend on his presentations [*Vorstellungen*], he actually does so exclusively, as language presents them to him (op. cit., p. 74; Humboldt 1988: 60)." Under the impact of the new relativism of the romantics, the conception of language as a constitutive medium for thought undergoes a significant modification, and the notion that language difference can lead to differences, even incomparability in mental processes, is explored.⁶⁵ This development, however, is not part of our main theme; its modern elaboration is familiar, and I will discuss it no further here.

Deep and Surface Structure

We have observed that the study of the creative aspect of language use develops from the assumption that linguistic and mental processes are virtually identical, language providing the primary means for free expression of thought and feeling, as well as for the functioning of the creative imagination. Similarly, much of the substantive discussion of grammar, throughout the development of what we have been calling “Cartesian linguistics,” derives from this assumption. The Port-Royal *Grammar*, for example, begins the discussion of syntax with the observation that there are “three operations of our minds: *conceiving, judging, and reasoning*” (p. 27), of which the third is irrelevant to grammar (it is taken up in the Port-Royal *Logic*, which appeared two years later, in 1662). From the manner in which concepts are combined in judgments, the *Grammar* deduces what it takes to be the general form of any possible grammar, and it proceeds to elaborate this universal underlying structure from a consideration of “the natural manner in which we express our thoughts” (p. 30).⁶⁴ Most subsequent attempts to develop a schema of universal grammar proceed along the same lines.

James Harris’s *Hermes*, which does not bear the imprint of the Port-Royal *Grammar* to the extent usual in eighteenth-century work, also reasons from the structure of mental processes to the structure of language, but in a somewhat different way. In general, he maintains, when a man speaks, “his Speech or Discourse is *a publishing of some Energie or Motion of his soul*” (p. 223).⁶⁵ The “powers of the soul” are of two general types: perception (involving the senses and the intellect) and volition (the will, passions, appetites—“all that moves to Action whether rational or irrational” (p. 224). It follows that there are two kinds of linguistic acts: to assert, that is, “to publish some Perception either of the Senses or the Intellect”; or to “publish volitions,” that is, to interrogate, command, pray, or wish (p. 224). The first type of sentence serves “to declare ourselves to others”; the second, to induce others to fulfill a need. Continuing in this way, we can analyze the volitional sentences in terms of whether the need is “to have some perception informed” or “some volition gratified” (the interrogative and requisitive modes, respectively); the requisitive is further analyzed as imperative or precative, depending on whether the sentence is addressed to inferiors or non-inferiors). Since both interrogatives and requisitives serve “to answer to a need,” both types “require a return”—a return in words or deeds, to the requisitive, and in words alone, to the interrogative (p. 293f.).⁶⁶ Thus the

framework for the analysis of types of sentences is provided by a certain analysis of mental processes.

Pursuing the fundamental distinction between body and mind, Cartesian linguistics characteristically assumes that language has two aspects. In particular, one may study a linguistic sign from the point of view of the sounds that constitute it and the characters that represent these signs or from the point of view of their “signification,” that is, “the manner in which men use them for signifying their thoughts” (Port-Royal *Grammar*, p. 41). Cordemoy announces his goal in similar terms: “in this discourse I make a precise survey of everything that speech [*la Parole*] derives from the soul and everything it borrows from the body” (*Discours Physique de la Parole*, Preface). Similarly, Lamy begins his rhetoric by distinguishing between “the soul of words” (that is, “their mental [*spirituel*] aspect,” “what is particular to us”—the capacity of expressing “our ideas”) from “their body”—“their corporeal aspect,” “what the birds that imitate the voices of men have in common with us,” namely, “the sounds, which are signs of their ideas” (*De l’Art de Parler*).

In short, language has an inner and an outer aspect. A sentence can be studied from the point of view of how it expresses a thought or from the point of view of its physical shape, that is, from the point of view of either semantic interpretation or phonetic interpretation.

Using some recent terminology, we can distinguish the “deep structure” of a sentence from its “surface structure.” The former is the underlying abstract structure that determines its semantic interpretation; the latter, the superficial organization of units which determines the phonetic interpretation and which relates to the physical form of the actual utterance, to its perceived or intended form. In these terms, we can formulate a second fundamental conclusion of Cartesian linguistics, namely, that deep and surface structures need not be identical. The underlying organization of a sentence relevant to semantic interpretation is not necessarily revealed by the actual arrangement and phrasing of its given components.

This point is brought out with particular clarity in the Port-Royal *Grammar*, in which a Cartesian approach to language is developed for the first time, with considerable insight and subtlety.⁶⁷ The principal form of thought (but not the only one—cf. p. 79 below) is the judgment, in which something is affirmed of something else. Its linguistic expression is the proposition, the two terms of which are the “subject, which is that of which one affirms” and the “predicate, which is that which is predicated” (p. 29; PRG 67). The subject and the attribute may be *simple*, as in “Earth is round”, or *complex* [*composé*], as in “An able

magistrate is a man useful to the republic” or “Invisible God created the visible world”. Furthermore, in such cases as these, the propositions

contain, at least in our mind, several judgments, from which one can make as many propositions. Thus, for example, when I say “Invisible God created the visible world” three judgments that pass through my mind are included in this proposition. For I judge:

- (1) that God is invisible;
- (2) that He created the world;
- (3) that the world is visible;

and of these three propositions, the second is the principal and essential one of the original proposition. But the first and the third are only subordinate, and comprise only part of the principal proposition – the first composing its subject, the third its predicate. (p. 68; PRG 99–100)

In other words, the deep structure underlying the proposition “Invisible God created the visible world” consists of three abstract propositions, each expressing a certain simple judgment, although its surface form expresses only the subject-attribute structure. Of course, this deep structure is implicit only; it is not expressed but is only represented in the mind:

Now these subordinate propositions are often in our mind, without being expressed in words, as in the example cited [viz. “Invisible God created the visible world”]. (p. 68; PRG 100)

It is sometimes possible to express the deep structure in a more explicit way, in the surface form, “as when I reduce the above example to these terms: ‘God WHO is invisible created the world WHICH is visible’” (pp.68–69; PRG 100). But it constitutes an underlying mental reality—a mental accompaniment to the utterance—whether or not the surface form of the utterance that is produced corresponds to it in a simple, point-by-point manner.

In general, constructions of a noun with a noun in apposition, an adjective, or a participle are based on a deep structure containing a relative clause: “all these modes of speech include the relative pronoun in their meaning, and may be resolved by using it” (p. 69; PRG 100). The same deep structure may be realized differently in different languages, as when Latin has “video canem currentem,” and French “Je voy un chien qui court” (pp. 69–70; PRG 100). The position of the relative pronoun in the “subordinate proposition” [*proposition incidente*] is determined by a rule that converts deep structure to surface structure. We see this, for example, in such phrases as “God whom I love” and “God by whom the

world has been created.” In such cases,

the relative pronoun is always placed at the beginning of the proposition (although, according to the meaning it ought to be only at the end), unless it is governed by a preposition, for the preposition comes first, at least ordinarily. (p. 71; PRG 101)

In the case of each of the sentences just discussed, the deep structure consists of a system of propositions, and it does not receive a direct, point-by-point expression in the actual physical object that is produced. To form an actual sentence from such an underlying system of elementary propositions, we apply certain rules (in modern terms, grammatical transformations). In these examples, we apply the rule preposing the relative pronoun that takes the place of the noun of the incident proposition (along with the preposition that precedes it, if there is one). We may then, optionally, go on to delete the relative pronoun, at the same time deleting the copula (as in “Dieu invisible”) or changing the form of the verb (as in “canis currens”). Finally, we must, in certain cases, interchange the order of the noun and the adjective (as in “un habile magistrat”).⁶⁸

The deep structure that expresses the meaning is common to all languages, so it is claimed, being a simple reflection of the forms of thought. The transformational rules that convert deep to surface structure may differ from language to language. The surface structure resulting from these transformations does not directly express the meaning relations of the words, of course, except in the simplest cases. It is the deep structure underlying the actual utterance, a structure that is purely mental, that conveys the semantic content of the sentence. This deep structure is, nevertheless, related to actual sentences in that each of its component abstract propositions (in the cases just discussed) could be directly realized as a simple propositional judgment.

The theory of essential and incident propositions as constituent elements of deep structure is extended in the Port-Royal *Logic*⁶⁹ with a more detailed analysis of relative clauses. There, a distinction is developed between *explicative* (nonrestrictive or appositive) and *determinative* (restrictive) relative clauses. The distinction is based on a prior analysis of the “comprehension” and “extension” of “universal ideas,”⁷⁰ in modern terms, an analysis of meaning and reference. The comprehension of an idea is the set of essential attributes that define it, together with whatever can be deduced from them; its extension is the set of objects that it denotes:

The comprehension of an idea is the constituent parts which make up the idea, none of which can be removed without destroying the idea. For example, the idea of a triangle is made up of the idea of having three sides, the idea of hav-

ing three angles, and the idea of having angles whose sum is equal to two right angles, and so on.

The extension of an idea is the objects to which the word expressing the idea can be applied. The objects which belong to the extension of an idea are called the inferiors of that idea, which with respect to them is called the superior. Thus, the general idea of triangle has in its extension triangles of all kinds whatsoever (p. 51; PRL 39–40).

In terms of these notions, we can distinguish such “explications” as “Paris, which is the largest city in Europe” and “man, who is mortal” from “determinations” such as “transparent bodies, wise men” or “a body which is transparent, men who are pious” (pp. 59–60, 118; PRL 44–45, 89):

A complex expression is a mere *explication* if either (1) the idea expressed by the complex expression is already contained in the comprehension of the idea expressed by the principal word of the complex expression, or (2) the idea expressed by the complex expression is the idea of some accidental characteristic of all the inferiors of an idea expressed by the principal word (pp. 59–60; PRL 45).

A complex expression is a *determination* if the extension of the idea expressed by the complex term is less than the extension of the idea expressed by the principal word (p. 60; PRL 45).

In the case of an explicative relative clause, the underlying deep structure actually implies the judgment expressed by this clause, when its relative pronoun is replaced by its antecedent. For example, the sentence *men, who were created to know and love God, ...* implies that *men were created to know and love God*. Thus an explicative relative clause has the essential properties of conjunction. But in the case of a restrictive relative clause (a determination), this is obviously not true. Thus in saying “Men who are pious are charitable”, we do not affirm either that men are pious or that men are charitable. In stating this proposition,

we form a complex idea by joining together two simple ideas—the idea of man and the idea of piety—and we judge that the attribute of being charitable is part of this complex idea. Thus the subordinate clause asserts nothing more than that the idea of piety is not incompatible with the idea of man. Having made this judgment we then consider what idea can be affirmed of this complex idea of pious man (p. 119; PRL 89–90).

Similarly, consider the expression “The doctrine which identifies the sovereign

good with the sensual pleasure of the body, which was taught by Epicurus, is unworthy of a philosopher.”⁷¹ This contains the subject “The doctrine which ... taught by Epicurus” and the predicate “unworthy of a philosopher.” The subject is complex, containing the restrictive relative clause “which identifies the sovereign good with the sensual pleasure of the body” and the explicative relative clause “which was taught by Epicurus.” The relative pronoun in the latter has as its antecedent the complex expression “the doctrine which identifies the sovereign good with the sensual pleasure of the body.” Since the clause “which was taught by Epicurus” is explicative, the original sentence does imply that the doctrine in question was taught by Epicurus. But the relative pronoun of the restrictive clause cannot be replaced by its antecedent, “the doctrine,” to form an assertion implied by the full sentence. Once again, the complex phrase containing the restrictive relative clause and its antecedent expresses a single complex idea formed from the two ideas of a doctrine and of identifying the sovereign good with the sensual pleasure of the body. All this information must be represented in the deep structure of the original sentence, according to the Port-Royal theory, and the semantic interpretation of this sentence must proceed in the manner just indicated, utilizing this information (pp. 119–120; PRL 90).

A restrictive relative clause is based on a proposition, according to the Port-Royal theory, even though this proposition is not affirmed when the relative clause is used in a complex expression. What is affirmed in an expression such as men who are pious, as noted above, is no more than the compatibility of the constituent ideas. Hence in the expression “minds which are square are more solid than those which are round,” we may correctly say that the relative clause is “false,” in a certain sense, since “the idea of being square” is not compatible with “the idea of mind understood as the principle of thought” (p. 124; PRL 93).

Thus sentences containing explicative as well as restrictive relative clauses are based on systems of propositions (that is, abstract objects constituting the meanings of sentences);⁷² but the manner of interconnection is different in the case of an explicative clause, in which the underlying judgment is actually affirmed, and a determinative clause, in which the proposition formed by replacing the relative pronoun by its antecedent is not affirmed but rather constitutes a single complex idea together with this noun.

These observations are surely correct, in essence, and must be accommodated in any syntactic theory that attempts to make the notion “deep structure” precise and to formulate and investigate the principles that relate deep structure to surface organization. In short, these observations must be accommodated in some fashion in any theory of transformational generative grammar. Such a theory is concerned precisely with the rules that specify deep structures and relate them to surface structures and with the rules of semantic and phonological interpretation

that apply to deep and surface structures respectively. It is, in other words, in large measure an elaboration and formalization of notions that are implicit and in part expressly formulated in such passages as those just discussed. In many respects it seems to me quite accurate, then, to regard the theory of transformational generative grammar, as it is developing in current work, as essentially a modern and more explicit version of the Port-Royal theory.

In the Port-Royal theory, the relative pronoun that occurs in the surface form does not always have the dual function of standing for a noun and connecting propositions. It may be “shorn of its pronominal nature” and may thus serve only the latter role. For example, in such sentences as “I suppose that you will be wise” and “I tell you that you are wrong” we find that, in the deep structure, “these propositions, ‘you will be wise’, ‘you are wrong,’ make up only part of the whole propositions ‘I suppose . . .’ and ‘I tell you . . .’” (*Grammaire*, p. 73; PRG 104–105).⁷³

The *Grammar* goes on to argue that infinitival constructions play the same role in the verbal system that relative clauses play in the nominal system, providing a means for extending the verbal system through the incorporation of whole propositions: “the infinitive is, among the other moods of the verb, what the relative is among the other pronouns” (pp. 111–112; PRG 139); like the relative pronoun, “the infinitive has, over and above the affirmation of the verb, the power to join the proposition in which it appears to another proposition” (p. 112; PRG 139). Thus the meaning of “scio malum esse fugiendum” is conveyed by a deep structure based on the two propositions expressed by the sentences “scio” and “malum est fugiendum.” The transformational rule (in modern terms) that forms the surface structure of the sentence replaces “est” by “esse”, just as the transformations that form such sentences as “Dieu (qui est) invisible a créé le monde (qui est) visible” perform various operations of substitution, reordering, and deletion on the underlying systems of propositions. “And from this has come the fact that in French we almost always render the infinitive by the indicative of the verb and the particle ‘que’: ‘Je sais que le mal est à fuir’” (p. 112; PRG 140). In this case, the identity of deep structure in Latin and French may be somewhat obscured by the fact that the two languages use slightly different transformational operations to derive the surface forms.

The *Grammar* goes on to point out that indirect discourse can be analyzed in a similar way.⁷⁴ If the underlying embedded proposition is interrogative, it is the particle “if” rather than “that” that is introduced by the transformational rule, as in “They asked me if I could do that,” where the “discourse which is reported” is “Can you do that?” Sometimes, in fact, no particle need be added, a change of person being sufficient, as in “He asked me: Who are you?” as compared with “He asked me who I was” (p. 113; PRG 140–141).

Deep and Surface Structure

Summarizing the Port-Royal theory in its major outlines, a sentence has an inner mental aspect (a deep structure that conveys its meaning) and an outer, physical aspect as a sound sequence. Its surface analysis into phrases may not indicate the significant connections of the deep structure by any formal mark or by the actual arrangement of words. The deep structure is, however, represented in the mind as the physical utterance is produced. The deep structure consists of a system of propositions, organized in various ways. The elementary propositions that constitute the deep structure are of the subject-predicate form, with simple subjects and predicates (i.e., categories instead of more complex phrases). Many of these elementary objects can be independently realized as sentences. It is not true, in general, that the elementary judgments constituting the deep structure are affirmed when the sentence that it underlies is produced; explicative and determinative relatives, for example, differ in this respect. To actually produce a sentence from the deep structure that conveys the thought that it expresses, it is necessary to apply rules of transformation that rearrange, replace, or delete items of the sentence. Some of these are obligatory, further ones optional. Thus “God, who is invisible, created the world, which is visible” is distinguished from its paraphrase, “Invisible God created the visible world,” by an optional deletion operation, but the transformation that substitutes a relative pronoun for the noun and then preposes the pronoun is obligatory.

This account covers only the sentences based exclusively on judgments. But these, although the principal form of thought, do not exhaust the “operations of our minds,” and “one must still relate to what occurs in our mind the conjunctions, disjunctions, and other similar operations of our minds, and all the other movements of our souls, such as desires, commands, questions, etc.” (p. 29; PRG 67). In part, these other “forms of thought” are signified by special particles such as “and,” “not,” “or,” “if,” “therefore”, etc. (pp. 137–8; PRG 168). But with respect to these sentence types as well, an identity of deep structure may be masked through divergence of the transformational means whereby actual sentences are formed, corresponding to intended meanings. A case in point is interrogation. In Latin, the interrogative particle *ne* “has no object outside the mind, but only marks the movement of the soul, by which we wish to know a thing” (p. 138; PRG 168). As for the interrogative pronoun, “it is nothing more than a pronoun to which the signification of ‘ne’ is added; that is to say, which, beyond taking the place of a noun like the other pronouns, further marks this movement of the soul which desires to know something and which demands to be instructed about it” (p. 138; PRG 168). But this “movement of the soul” can be signified in various ways other than by the addition of a particle, for example, by vocal inflection or inversion of word order, as in French, where the pronominal subject is “transported” to the position following the person marker of the verb (preserv-

ing the agreement of the underlying form). These are all devices for realizing the same deep structure (pp. 138–139; PRG 168–169).

Notice that the theory of deep and surface structure as developed in the Port-Royal linguistic studies implicitly contains recursive devices and thus provides for infinite use of the finite means that it disposes, as any adequate theory of language must. We see, moreover, that, in the examples given, the recursive devices meet certain formal conditions that have no a priori necessity. In both the trivial cases (e.g., conjunction, disjunction, etc.) and the more interesting ones discussed in connection with relatives and infinitives, the only method for extending deep structures is by adding full propositions of a basic subject-predicate form. The transformational rules of deletion, rearrangement, etc., do not play a role in the creation of new structures. The extent to which the Port-Royal grammarians may have been aware of or interested in these properties of their theory is, of course, an open question.

In modern terms, we may formalize this view by describing the syntax of a language in terms of two systems of rules: a base system that generates deep structures and a transformational system that maps these into surface structures. The base system consists of rules that generate the underlying grammatical relations with an abstract order (the rewriting rules of a phrase-structure grammar); the transformational system consists of rules of deletion, rearrangement, adjunction, and so on. The base rules allow for the introduction of new propositions (that is, there are rewriting rules of the form $A \rightarrow \dots S \dots$, where S is the initial symbol of the phrase-structure grammar that constitutes the base); there are no other recursive devices. Among the transformations are those which form questions, imperatives, etc., when the deep structure so indicates (i.e., when the deep structure represents the corresponding “mental act” in an appropriate notation).⁷⁵

The Port-Royal grammar is apparently the first to develop the notion of phrase structure in any fairly clear way.⁷⁶ It is interesting, therefore, to notice that it also states quite clearly the inadequacy of phrase-structure description for the representation of syntactic structure and that it hints at a form of transformational grammar in many respects akin to that which is being actively studied today.

Turning from the general conception of grammatical structure to specific cases of grammatical analysis, we find many other attempts in the Port-Royal *Grammar* to develop the theory of deep and surface structure. Thus adverbs are analyzed as (for the most part) arising from “the desire that men have to abbreviate discourse,” thus as being elliptical forms of preposition-noun constructions, for example, “wisely” for “with wisdom” or “today” for “on this day” (p. 88; PRG 121). Similarly, verbs are analyzed as containing implicitly an underlying copula that expresses affirmation; thus, once again, as arising from the desire to abbreviate the actual expression of thought. The verb, then, is “a

word whose principal use is to signify affirmation or assertion, that is, to indicate that the discourse where this word is employed is the discourse of a man who not only conceives things, but who judges and affirms them” (p. 90; PRG 122). To use a verb, then, is to perform the act of affirming, not simply to refer to affirmation as an “object of our thought,” as in the use of “a number of nouns which also mean affirmation, such as ‘affirmans’ and ‘affirmatio’” (p. 90; PRG 122). Thus the Latin sentence “*Petrus vivit*” has the meaning “Peter is living” (p. 90; PRG 123), and in the sentence “*Petrus affirmat*” “*affirmat*” is the same as ‘*est affirmans*’” (p. 98; PRG 128). It follows, then, that in the sentence “*Affirmo*” (in which subject, copula, and attribute are all abbreviated in a single word), two affirmations are expressed: one regarding the act of the speaker in affirming, the other the affirmation that he attributes (to himself, in this case). Similarly, “the verb ‘*nego*’ . . . contains an affirmation and a negation” (p. 98; PRG 128).⁷⁸

Formulating these observations in the framework outlined above, what the Port-Royal grammarians are maintaining is that the deep structure underlying a sentence such as “Peter lives” or “God loves mankind” (*Logic*, p. 108; PRL 83) contains a copula, expressing the affirmation, and a predicate (“living,” “loving mankind”) attributed to the subject of the proposition. Verbs constitute a subcategory of predicates; they are subject to a transformation that causes them to coalesce with the copula into a single word.

The analysis of verbs is extended in the *Logic*, where it is maintained (p. 117) that, despite surface appearances, a sentence with a transitive verb and its object “expresses a complex proposition and in one sense two propositions.” Thus we can contradict the sentence “Brutus killed a tyrant” by saying that Brutus did not kill anyone or that the person whom Brutus killed was not a tyrant. It follows that the sentence expresses the proposition that Brutus killed someone who was a tyrant, and the deep structure must reflect this fact. It seems that this analysis would also apply, in the view of the *Logic*, if the object is a singular term; e.g., “Brutus killed Caesar.”

This analysis plays a role in the theory of reasoning developed later on in the *Logic*. It is used to develop what is in effect a partial theory of relations, permitting the theory of the syllogism to be extended to arguments to which it would otherwise not apply. Thus it is pointed out (pp. 206–207; PRL 159–160) that the inference from “The divine law commands us to honor kings” and “Louis XIV is a king” to “The divine law commands us to honor Louis XIV” is obviously valid, though it does not exemplify any valid figure as it stands, superficially. By regarding “kings” as “the subject of a sentence contained implicitly in the original sentence,” using the passive transformation⁷⁹ and otherwise decomposing the original sentence into its underlying prepositional constituents, we can finally reduce the argument to the valid figure *Barbara*.

Reduction of sentences to underlying deep structure is resorted to elsewhere in the *Logic*, for the same purpose. For example, Arnauld observes (p. 208; PRL 160) that the sentence *There are few pastors nowadays ready to give their lives for their sheep*, though superficially affirmative in form, actually “contains implicitly the negative sentence ‘Many pastors nowadays are not ready to give their lives for their sheep.’” In general, he points out repeatedly that what is affirmative or negative “in appearance” may or may not be in meaning, that is, in deep structure. In short, the real “logical form” of a sentence may be quite different from its surface grammatical form.⁸⁰

The identity of deep structure underlying a variety of surface forms in different languages is frequently stressed, throughout this period, in connection with the problem of how the significant semantic connections among the elements of speech are expressed. Chapter VI of the Port-Royal *Grammar* considers the expression of these relations in case systems, as in the classical languages, or by internal modification, as in the construct state in Hebrew, or by particles, as in the vernacular languages, or simply by a fixed word order,⁸¹ as in the case of the subject-verb and verb-object relations in French. These are regarded as all being manifestations of an underlying structure common to all these languages and mirroring the structure of thought. Similarly, Lamy comments in his rhetoric on the diverse means used by various languages to express the “relations, and the consequence and interconnexion between all the ideas that the consideration of things excites in our mind” (*De l’Art de Parler*, pp. 10–11). The encyclopedist Du Marsais also stresses the fact that case systems express relations among the elements of discourse that are, in other languages, expressed by word order or specific particles, and he points out the correlation between freedom to transpose and wealth of inflection.⁸²

Notice that what is assumed is the existence of a uniform set of relations into which words can enter, in any language, these corresponding to the exigencies of thought. The philosophical grammarians do not try to show that all languages literally have case systems, that they use inflectional devices to express these relations. On the contrary, they repeatedly stress that a case system is only one device for expressing these relations. Occasionally, they point out that case names can be assigned to these relations as a pedagogic device; they also argue that considerations of simplicity sometimes may lead to a distinction of cases even where there is no difference in form. The fact that French has no case system is in fact noted in the earliest grammars. Cf. Sahlin, p. 212.

It is important to realize that the use of the names of classical cases for languages with no inflections implies only a belief in the uniformity of the grammatical relations involved, a belief that deep structures are fundamentally the same across languages, although the means for their expression may be quite

diverse. This claim is not obviously true—it is, in other words, a nontrivial hypothesis. So far as I know, however, modern linguistics offers no data that challenge it in any serious way.⁸³

As noted above, the Port-Royal theory of grammar holds that for the most part, adverbs do not, properly speaking, constitute a category of deep structure but function only “for signifying in a single word what could otherwise be indicated only by a preposition and a noun” (p. 88; PRG 121). Later grammarians simply drop the qualification to “for the most part.” Thus for Du Marsais, “what distinguishes adverbs from other kinds of words is that adverbs have the value of a preposition and a noun, or a preposition with its complement: they are words which abbreviate” (p. 660). This is an unqualified characterization, and he goes on to analyze a large class of items in this way—in our paraphrase, as deriving from a deep structure of the form: preposition-complement. This analysis is carried still further by Beauzée.⁸⁴ He, incidentally, maintains that, although an “adverbial phrase” such as “with wisdom” does not differ from the corresponding adverb “wisely” in its “signification,” it may differ in the “accessory ideas” associated with it: “when it is a matter of contrasting an action with a habit, the adverb is more appropriate for indicating the habit and the adverbial phrase for indicating the action; thus I would say ‘A man who conducts himself wisely cannot promise that all his actions will be performed with wisdom’” (p. 342).⁸⁵ This distinction is a particular case of “the antipathy that all languages naturally show towards a total synonymity, which would enrich an idiom only with sounds that do not subserve accuracy and clarity of expression.”

Earlier grammarians provide additional instances of analysis in terms of deep structure, as, for example, when imperatives and interrogatives are analyzed as, in effect, elliptical transforms of underlying expressions with such supplementary terms as “I order you ...” or “I request...”⁸⁶ Thus “Come see me” has the deep structure “I order/beg you to come see me”; “Who found it?” has the meaning of “I ask who found it?” etc.

Still another example that might be cited is the transformational derivation of expressions with conjoined terms from underlying sentences, in the obvious way; for example, in Beauzée, *op. cit.*, pp. 399f. Beauzée’s discussion of conjunctions also provides somewhat more interesting cases, as, for example, when he analyses “how” [*comment*] as based on an underlying form with “manner” [*manière*] and a relative clause, so that the sentence “I know how it happened” has the meaning of “I know the manner in which it happened”; or when he analyzes “the house which I acquired.” In this way, the underlying deep structure with its essential and incident propositions is revealed.

An interesting further development, along these lines, is carried out by Du Marsais in his theory of *construction* and *syntax*.⁸⁷ He proposes that the term

“construction” be applied to “the arrangement of words in discourse,” and the term “syntax”, to “the relations which words bear to one another.” For example, the three sentences “*accepi litteras tuas,*” “*tuas accepi litteras,*” and “*litteras accepi tuas*” exhibit three different constructions, but they have the same syntax; the relations among the constituent elements are the same in all three cases. “Thus, each of these three arrangements produces the same meaning [*sens*] in the mind: ‘I have received your letter.’” He goes on to define “syntax” as “what brings it about, in every language, that words produce the meaning we wish to arise in the minds of those who know the language . . . the part of grammar that provides knowledge of the signs established in a language to produce understanding in the mind” (pp. 229–231). The syntax of an expression is thus essentially what we have called its deep structure; its construction is what we have called its surface structure.⁸⁸

The general framework within which this distinction is developed is the following. An act of the mind is a single unit. For a child, the “idea” [*sentiment*] that sugar is sweet is at first an unanalyzed, single experience (p. 181); for the adult, the meaning of the sentence “Sugar is sweet,” the thought that it expresses, is also a single entity. Language provides an indispensable means for the analysis of these otherwise undifferentiated objects. It provides a

means of clothing our thought, so to speak, of rendering it perceptible, of dividing it, of analyzing it – in a word, of making it such that it is communicable to others with more precision and detail

Thus, particular thoughts are each an ensemble, so to speak, a whole that the usage of language divides, analyzes and distributes into parts by means of different articulations of the speech organs which form the words. (p. 184)

Similarly, the perception of speech is a matter of determining the unified and undifferentiated thought from the succession of words. “[The words] work together to produce the whole sense or the thought we wish to arise in the minds of those who read or hear them” (p. 185). To determine this thought, the mind must first discover the relations among the words of the sentence, that is, its syntax; it must then determine the meaning, given a full account of this deep structure. The method of analysis used by the mind is to bring together those words that are related, thus establishing a “meaningful order” [*ordre significatif*] in which related elements are successive. The actual sentence may, in itself, have this “meaningful order,” in which case it is called a “simple construction (natural, necessary, meaningful, assertive)” (p. 232). Where it does not, this “meaningful order” must be reconstructed by some procedure of analysis – it must be “re-established by the mind, which grasps the meaning [*sens*] only by this order” (pp.

191–192). To understand a sentence of Latin, for example, you must reconstruct the “natural order” that the speaker has in his mind (p. 196). You must not only understand the meanings of each word, but, furthermore,

you would not understand anything in it except by putting together in your mind the words in their relation to one another, and you can do this only after you have heard the whole sentence. (pp. 198–199)

In Latin, for example, it is the “relative word-endings which makes us consider the words in the completed proposition in accordance with the order of their interrelations, and hence in accordance with the order of the *simple, necessary and meaningful construction*” (pp. 241–242). This “simple construction” is an “order which is always indicated, but rarely observed in the usual construction of languages whose nouns have cases” (p. 251). Reduction to the “simple construction” is an essential first step in speech perception:

The words form a whole that has parts. The simple perception of the relations between these parts makes us conceive the whole of them, and comes to us solely from the simple construction. Setting forth the words in accordance with the order of succession of their relations, this presents them in a manner that is best fitted to make us recognize these relations and to make the whole thought arise. (pp. 287–288)

Constructions other than the “simple constructions” (namely, “figurative constructions” [*constructions figurées*])

are understood only because the mind corrects their irregularities, with the help of accessory ideas which make us conceive what we read and hear as if the sense were expressed in the order of the simple construction. (p. 292)

In short, in the “simple construction” the relations of “syntax” are represented directly in the associations among successive words, and the undifferentiated thought expressed by the sentence is derived directly from this underlying representation, which is regarded, throughout, as common to all languages (and, typically, as corresponding to the usual order of French—cf., e.g., p. 193).

The transformations which form a “figurative construction” effect reordering and ellipsis. The “fundamental principle of all syntax” (p. 218) is that reordering and ellipsis must be recoverable by the mind of the hearer (cf. pp. 202, 210ff., 277); that is, they can be applied only when it is possible to recover uniquely “the strict metaphysical order” of the “simple construction.”⁸⁹

Many examples of reduction to simple constructions are presented to illustrate this theory.⁹⁰ Thus the sentence “Who said it?” is reduced to the simple construction “The one who said it is which person?” (Sahlin, p. 93); the sentence “Being loved as much as lovers, you are not forced to shed tears” is reduced to “Since you are loved as much as you are lovers,...;” the sentence “It is better to be just than to be rich, to be reasonable than to be wise” is reduced to four underlying propositions, two negative, two positive, in the obvious way (Sahlin, p. 109); etc.

A rather different sort of example of the distinction between deep and surface structure is provided by Du Marsais in his analysis (pp. 179–180) of such expressions as “I have an idea/fear/doubt”, etc. These, he says, should not be interpreted as analogous to the superficially similar expressions “I have a book/diamond/watch”, in which the nouns are “names of real objects that exist independently of our thought [*manière de penser*]” In contrast, the verb in “I have an idea” is “a borrowed [*empruntée*] expression,” produced only “by imitation.” The meaning of “I have an idea” is simply “I am thinking” or “I am conceiving something in such-and-such a way.” Thus the grammar gives no license for supposing that such words as “idea,” “concept,” “image” stand for “real objects,” let alone “perceptible objects.” From this grammatical observation it is only a short step to a criticism of the theory of ideas, in its Cartesian and empiricist forms, as based on a false grammatical analogy. This step is taken by Thomas Reid, shortly after.⁹¹

As Du Marsais indicates with abundant references, his theory of construction and syntax is foreshadowed in scholastic and renaissance grammar (see note 67). But he follows the Port-Royal grammarians in regarding the theory of deep and surface structure as, in essence, a psychological theory, not merely a means for the elucidation of given forms or for analysis of texts. As indicated above, it plays a role in his hypothetical account of the perception and production of speech, just as, in the Port-Royal *Grammar*, the deep structure is said to be represented “in the mind” as the utterance is heard or produced.

As a final example of the attempt to discover the hidden regularities underlying surface variety, we may mention the analysis of French indefinite articles in Chapter VII of the Port-Royal *Grammar*, where it is argued, on grounds of symmetry of patterning, that *de* and *des* play the role of the plural of *un*, as in *Un crime si horrible mérite la mort, Des crimes si horribles méritent la mort, De si horribles crimes méritent la mort*, etc. To handle the apparent exception, *Il est coupable de crimes horribles (d’horribles crimes)*, they propose the “rule of cacophony” that a *de de* sequence is replaced by *de*. They also note the use of *des* as a realization of the definite article, and other uses of these forms.

Perhaps these comments and examples are sufficient to suggest something

Deep and Surface Structure

of the range and character of the grammatical theories of the “philosophical grammarians.” As noted above, their theory of deep and surface structure relates directly to the problem of creativity of language use, discussed in the first part of the present work.

From the standpoint of modern linguistic theory, this attempt to discover and characterize deep structure and to study the transformational rules that relate it to surface form is something of an absurdity;⁹² it indicates lack of respect for the “real language” (i.e., the surface form) and lack of concern for “linguistic fact.” Such criticism is based on a restriction of the domain of “linguistic fact” to physically identifiable subparts of actual utterances and their formally marked relations.⁹³ Restricted in this way, linguistics studies the use of language for the expression of thought only incidentally, to the quite limited extent to which deep and surface structure coincide; in particular, it studies “sound-meaning correspondences” only in so far as they are representable in terms of surface structure. From this limitation follows the general disparagement of Cartesian and earlier linguistics,⁹⁴ which attempted to give a full account of deep structure even where it is not correlated in strict point-by-point fashion to observable features of speech. These traditional attempts to deal with the organization of semantic content as well as the organization of sound were defective in many ways, but modern critique generally rejects them more for their scope than for their failures.

Description and Explanation in Linguistics

Within the framework of Cartesian linguistics, a descriptive grammar is concerned with both sound and meaning; in our terminology, it assigns to each sentence an abstract deep structure determining its semantic content and a surface structure determining its phonetic form. A complete grammar, then, would consist of a finite system of rules generating this infinite set of paired structures and thus showing how the speaker-hearer can make infinite use of finite means in expressing his “mental acts” and “mental states.”

However, Cartesian linguistics was not concerned simply with descriptive grammar, in this sense, but rather with “grammaire générale,” that is, with the universal principles of language structure. At the very outset of the work under review, a distinction was made between general and particular grammar. These are characterized by Du Marsais in the following way:

Some points [*observations*] of grammar apply to all languages. These form what we call general grammar – for example, those we made regarding articulated sounds and the letters which are the signs of these sounds, the nature of words and the various ways they must be ordered or terminated in order to have meaning. Apart from these general points, there are some which are peculiar to one particular language, and these form the special grammar of that language.⁹⁵

Beauzée elaborates the distinction in the following way:

GRAMMAR, whose object is the expression of thought with the help of spoken or written words, comprises two sorts of principles. One sort, being immutably true and universally applicable, derive from the nature of thought itself, following its analysis and being its result. The other sort are only hypothetically true and depend on conventions which, being accidental, arbitrary and changeable, have given rise to different idioms. The first sort of principles constitute general grammar and the second are the object of various particular grammars.

GENERAL GRAMMAR is therefore the rational science of the immutable and general principles of spoken or written Language [*Langage*], whatever language [*langue*] this may be.

A PARTICULAR GRAMMAR is the art of applying the arbitrary and usual

Description and Explanation in Linguistics

conventions of a particular language to the immutable and general conventions of written or spoken Language.

General Grammar is a *science*, because its object is rational speculation on the immutable and general principles of Language.

A *particular Grammar* is an *art*, because it considers the practical application of the arbitrary and usual conventions of a particular language to the general principles of Language.

The *science of grammar* is anterior to all languages in so far as its principles presuppose only the possibility of languages and are the same as those which guide human reason in its intellectual operations; in short, because they are eternally true.

The *art of grammar*, by contrast, is posterior to languages in so far as linguistic usages must exist before they can stand in an artificial relation to the general principles of Language, and the analogical systems that form this art can be determined only by observations made on these pre-existent usages.⁹⁶

In his *Eloge de du Marsais*, D'Alembert gives this account of "philosophical grammar":

Grammar is therefore the work of philosophers. Only a philosophical mind can ascend to the principles on which its rules are based... This mind first recognizes, in the grammar of each language, the general principles which are common to all of them, and which form General Grammar. It then distinguishes, among the usages peculiar to each language, those which can be founded on reason from those which are the work of chance or negligence: it observes the reciprocal influences that languages have had on each other and the alterations that this mingling has brought about without entirely destroying their individual character; it weighs their mutual advantages and disadvantages; differences in their construction...; the diversity of their genius...; their richness and freedom, poverty and servitude. The development of these various factors is the true metaphysics of grammar. Its object... is to advance the human mind in the generation of its ideas and in the use it makes of words to transmit thoughts to other men.⁹⁷

The discovery of universal principles would provide a partial explanation for the facts of particular languages, in so far as these could be shown to be simply specific instances of the general features of language structure formulated in the "grammaire générale." Beyond this, the universal features themselves might be explained on the basis of general assumptions about human mental processes or the contingencies of language use (for example, the utility of elliptical trans-

formations). Proceeding in this way, Cartesian linguistics attempts to develop a theory of grammar that is not only “general” but also “explanatory” [*raisonnée*].

The linguistics of Port-Royal and its successors developed in part in reaction against the prevailing approaches represented, for example, in such work as Vaugelas’s *Remarques sur la langue Française* (1647).⁹⁸ Vaugelas’s goal is simply to describe usage “which everyone recognizes as the master and ruler of living languages” (Preface). His book is called *Remarques* ... rather than *Décisions* ... or *Loix* ... because he is “a simple observer [*tesmoin*].” He disclaims any intention of explaining the facts of speech or finding general principles that underlie them, just as he generally suggests no modification or “purification” of usage on rational or esthetic grounds. His grammar, then, is neither “explanatory” nor prescriptive.⁹⁹ He is quite aware of the problems of determining actual usage and provides an interesting discussion of “elicitation procedures” (pp. 503f.), in which, among other things, he points out the inadequacy of the kinds of “direct question” tests for grammaticality that have occasionally been proposed and applied by structural linguists, with predictably inconclusive results. He does not restrict his descriptive comments to surface structure.¹⁰⁰ For example, he points out that one cannot determine from the form of a word whether it has a “active meaning” [*signification*] or a “passive meaning” or, ambiguously, both (pp. 562–563). Thus in the sentence “My esteem isn’t something from which you can derive any great advantage,” the phrase “my esteem” has the sense “the esteem which I hold for you,” whereas in the sentence “My esteem does not depend on you,” it means “the esteem in which I am held” or “the esteem in which I may be held;” and the same is true of such words as “aid,” “help,” and “opinion.” There are other examples of a concern for descriptive adequacy on a broad scale. At the same time, Vaugelas’s work foreshadows many of the defects of modern linguistic theory, for example, in his failure to recognize the creative aspect of language use. Thus he regards normal language use as constructed of phrases and sentences that are “authorized by usage,” although new words (e.g., *brusqueté*, *pleurement*) can be correctly formed by analogy (pp. 568f.). His view of language structure, in this respect, seems not very different from that of Saussure, Jespersen, Bloomfield, and many others who regard innovation as possible only “by analogy,” by substitution of lexical items for items of the same category within fixed frames. (Cf. p. 58 above.)

The reaction of “philosophical grammar” is not against the descriptivism of Vaugelas and others as such¹⁰¹ but against the restriction to *pure* descriptivism. The Port-Royal *Grammar* takes it as a general maxim for anyone working on a living language that “the ways of speaking that are authorised by undisputed general usage must be accepted as good even if they go against the rules and analogy of the language” (p. 83; PRG 113). Lamy, in his rhetoric, echoes Vaugelas

in describing usage as “the master and arbitrary ruler of languages” and in holding that “no one may contest this rule which necessity has established and the general agreement of people has confirmed” (op. cit., p. 31). Du Marsais insists that “the philosophical grammarian must consider the particular language he is studying in relation to what this language is in itself and not in relation to another language”¹⁰² Philosophical grammar, then, was not characteristically attempting to refine or improve language, but to discover its underlying principles and to explain the particular phenomena that are observed.¹⁰³

The example which, for more than a century, was used to illustrate this difference between descriptive and explanatory grammar was provided by a rule of Vaugelas (pp. 385f.) regarding relative clauses, namely, the rule that a relative clause may not be added to a noun that has no articles or only the “article indefini” *de*. Thus one cannot say “Il a fait cela par avarice, qui est capable de tout” or “Il a fait cela par avarice, dont la soif ne se peut esteindre.” Similarly, one cannot say “Il a esté blessé d’un coup de fleche, qui estoit empoisonnée” (p. 385), although it is correct to say “Il a esté blessé de la fleche, qui estoit empoisonnée” or “Il a esté blessé d’une fleche qui estoit empoisonnée.”

In Chapter IX, the Port-Royal *Grammar* first notes a variety of exceptions to this rule and then proposes a general explanatory principle to account both for the examples that fall under the rule of Vaugelas and for the exceptions to his rule.¹⁰⁴ The explanation is, once again, based on the distinction between meaning and reference. In the case of a “common noun,” the meaning [*signification*] is fixed (except for ambiguity or metaphor), but the reference [*estendue*] varies, depending on the noun phrase in which the noun appears. A particular occurrence of a noun is called *indeterminate* “when there is nothing that indicates whether it must be taken generally or particularly and, if the latter, whether for a determinate or indeterminate particular” (p. 77; PRG 109); otherwise, it is *determinate*. Vaugelas’s rule is now restated in terms of *determination*: “in current French usage one may not put *qui* after a common noun unless it is determined by an article or some other thing that determines it no less than it would be determined by an article” (p. 77; PRG 109). A detailed analysis follows, attempting to show that the apparent counter-examples involve occurrences of nouns that are “determined” by some feature other than the article. In part, the analysis is based on assumptions about deep structure that are not without interest in themselves. The rule is also discussed by Du Marsais, Beauzée, and others at some length. We need not go into the details here. The point, in the present context, is that this was taken as a paradigm example of the necessity for supplementing descriptive statements with a rational explanation, if linguistics was to go beyond compilation of facts to true “science” – in the terminology of the day, if grammar was to become “philosophical.”

In connection with the rule of Vaugelas and several other cases, the explanations that are proposed, in universal grammar, have some substance and linguistic content. All too often, however, they are quite empty, and invoke assumptions about underlying mental reality in a quite mechanical and unrevealing way. In fact, it seems to me that in general the modern critique of “philosophical grammar” is quite misplaced. The error of this position is generally taken to be its excessive rationality and a priorism and its disregard for linguistic fact. But a more cogent criticism is that the tradition of philosophical grammar is too limited to mere description of fact – that it is insufficiently “raisonnée”; that is, it seems to me that the faults (or limitations) of this work are just the opposite of those which have been attributed to it by modern critics. The philosophical grammarians considered a wide realm of particular examples; they tried to show, for each example, what was the deep structure that underlies its surface form and expresses the relations among elements that determine its meaning. To this extent, their work is purely descriptive (just as modern linguistics is purely descriptive in pursuit of its more restricted goal of identifying the units that constitute the surface structure of particular utterances, their arrangement into phrases, and their formally marked relations). Reading this work, one is constantly struck by the *ad hoc* character of the analysis, even where it seems factually correct. A deep structure is proposed that does convey the semantic content, but the basis for its selection (beyond mere factual correctness) is generally unformulated. What is missing is a theory of linguistic structure that is articulated with sufficient precision and is sufficiently rich to bear the burden of justification. Although the examples of deep structure that are given in abundance often seem quite plausible, they are unsatisfying, just as modern linguistic descriptions, though often quite plausible in their analysis of particular utterances into phonemes, morphemes, words, and phrases, remain unsatisfying, and for the same reason. In neither case do we have an underlying hypothesis as to the general nature of language that is sufficiently strong as to indicate why just these and not other descriptions are selected by the child acquiring the language or the linguist describing it, on the basis of the data available to them.¹⁰⁵

What is more, there is little recognition in philosophical grammar of the intricacy of the mechanisms that relate deep to surface structure, and, beyond the general outlines sketched above, there is no detailed investigation of the character of the rules that appear in grammars or the formal conditions that they satisfy. Concomitantly, no clear distinction is made between the abstract structure underlying a sentence and the sentence itself. It is, by and large, assumed that the deep structure consists of actual sentences in a simpler or more natural organization and that the rules of inversion, ellipsis, and so on, that form the full range of actual sentences simply operate on these already formed simple

sentences. This point of view is explicit, for example, in Du Marsais's theory of construction and syntax, and it is undoubtedly the general view throughout.¹⁰⁶ The totally unwarranted assumption that a deep structure is nothing other than an arrangement of simple sentences can be traced to the Cartesian postulate that, quite generally, the principles that determine the nature of thought and perception must be accessible to introspection and can be brought to consciousness, with care and attention.

Despite these shortcomings, the insights into the organization of grammar that were achieved in Cartesian linguistics remain quite impressive, and a careful study of this work can hardly fail to prove rewarding to a linguist who approaches it without prejudice or preconceptions as to the a priori limitations on permitted linguistic investigation. Beyond these achievements, the universal grammarians of the seventeenth and eighteenth centuries have made a contribution of lasting value by the very fact that they posed so clearly the problem of changing the orientation of linguistics from "natural history" to "natural philosophy" and by stressing the importance of the search for universal principles and for rational explanation of linguistic fact, if progress is to be made toward this goal.

Acquisition and Use of Language

We have so far extracted from “Cartesian linguistics” certain characteristic and quite important doctrines regarding the nature of language and have, quite sketchily, traced their development during the period from Descartes to Humboldt. As a by-product of this study of *langue*, and against the background of rationalist theory of mind, certain views emerged as to how language is acquired and used. After a long interlude, these views are once again beginning to receive the attention that they deserve, although their appearance (like the reappearance of the central ideas of transformational grammar) was, in fact, a largely independent development.

The central doctrine of Cartesian linguistics is that the general features of grammatical structure are common to all languages and reflect certain fundamental properties of the mind. It is this assumption which led the philosophical grammarians to concentrate on “grammaire générale” rather than “grammaire particulière” and which expresses itself in Humboldt’s belief that deep analysis will show a common “form of language” underlying national and individual variety.¹⁰⁷ There are, then, certain language universals that set limits to the variety of human language.¹⁰⁸ The study of the universal conditions that prescribe the form of any human language is “grammaire générale.” Such universal conditions are not learned; rather, they provide the organizing principles that make language learning possible, that must exist if data are to lead to knowledge. By attributing such principles to the mind, as an innate property, it becomes possible to account for the quite obvious fact that the speaker of a language knows a great deal that he has not learned.

In approaching the question of language acquisition and linguistic universals in this way, Cartesian linguistics reflects the concern of seventeenth-century rationalistic psychology with the contribution of the mind to human knowledge. Perhaps the earliest exposition of what was to become a major theme, throughout most of this century, is Herbert of Cherbury’s *De Veritate* (1624),¹⁰⁹ in which he develops the view that there are certain “principles or notions implanted in the mind” that “we bring to objects from ourselves ... [as] ... a direct gift of Nature, a precept of natural instinct” (p. 133). Although these Common Notions “are stimulated by objects,” nevertheless, “no one, however wild his views, imagines that they are conveyed by objects themselves” (p. 126). Rather, they are essential to the identification of objects and the understanding of their properties and relations. Although the “intellectual truths” comprised among the Common Notions “seem to vanish in the absence of objects, yet they cannot

be wholly passive and idle seeing that they are essential to objects and objects to them ... It is only with their aid that the intellect, whether in familiar or new types of things, can be led to decide whether our subjective faculties have accurate knowledge of the facts" (p. 105). By application of these intellectual truths, which are "imprinted on the soul by the dictates of Nature itself," we can compare and combine individual sensations and interpret experience in terms of objects, their properties, and the events in which they participate. Evidently, these interpretive principles cannot be learned from experience in their entirety, and they may be independent of experience altogether. According to Herbert:

[They] are so far from being drawn from experience or observation that, without several of them, or at least one of them, we could have no experience at all nor be capable of observations. For if it had not been written in our soul that we should examine into the nature of things (and we do not derive this command from objects), and if we had not been endowed with Common Notions, to that end, we should never come to distinguish between things, or to grasp any general nature. Vacant forms, prodigies, and fearful images would pass meaninglessly and even dangerously before our minds, unless there existed within us, in the shape of notions imprinted in the mind, that analogous faculty by which we distinguish good from evil. From where else could we have received knowledge? In consequence, anyone who considers to what extent objects in their external relationship contribute to their correct perception; who seeks to estimate what is contributed by us, or to discover what is due to alien or accidental sources, or again to innate influences, or to factors arising from nature, will be led to refer to these principles. We listen to the voice of nature not only in our choice between what is good and evil, beneficial and harmful, but also in that external correspondence by which we distinguish truth from falsehood, we possess hidden faculties which when stimulated by objects quickly respond to them (pp. 105–106).

It is only by the use of these "inborn capacities or Common Notions" that the intellect can determine "whether our subjective faculties have exercised their perceptions well or ill" (p. 87). This "natural instinct" thus instructs us in the nature, manner, and scope of what is to be heard, hoped for, or desired" (p. 132).

Care must be taken in determining what are the Common Notions, the innate organizing principles and concepts that make experience possible. For Herbert, the "chief criterion of Natural Instinct" is "universal consent" (p. 139). But two qualifications are necessary. First, what is referred to is universal consent among "normal men" (p. 105). That is, we must put aside "persons who are out of their minds or mentally incapable" (p. 139) and those who are "headstrong,

foolish, weak-minded and imprudent" (p. 125). And although these faculties "may not ever be entirely absent," and "even in madmen, drunkards, and infants extraordinary internal powers may be detected which minister to their safety" (p. 125), still we can expect to find universal consent to Common Notions only among the normal, rational, and clearheaded. Second, appropriate experience is necessary to elicit or activate these innate principles; "it is the law or destiny of Common Notions and indeed of the other forms of knowledge to be inactive unless objects stimulate them" (p. 120). In this respect, the common notions are like the faculties of seeing, hearing, loving, hoping, etc., with which we are born and which "remain latent when their corresponding objects are not present, and even disappear and give no sign of their existence" (p. 132). But this fact must not blind us to the realization that "the Common Notions must be deemed not so much the outcome of experience as principles without which we should have no experience at all" and to the absurdity of the theory that "our mind is a clean sheet, as though we obtained our capacity for dealing with objects from objects themselves" (p. 132).

The common notions are "all intimately connected" and can be arranged into a system (p. 120); and although "an infinite number of faculties may be awakened in response to an infinite number of new objects, all the Common Notions which embrace this order of facts may be comprehended in a few propositions" (p. 106). This system of common notions is not to be identified with "reason." It simply forms "that part of knowledge with which we were endowed in the primal plan of Nature," and it is important to bear in mind that "it is the nature of natural instinct to fulfil itself irrationally, that is to say, without foresight." On the other hand, "reason is the process of applying Common Notions as far as it can" (pp. 120–121).

In focusing attention on the innate interpretive principles that are a precondition for experience and knowledge and in emphasizing that these are implicit and may require external stimulation in order to become active or available to introspection, Herbert expressed much of the psychological theory that underlies Cartesian linguistics, just as he emphasized those aspects of cognition that were developed by Descartes and, later, by the English Platonists, Leibniz, and Kant.¹¹⁰

The psychology that develops in this way is a kind of Platonism without pre-existence. Leibniz makes this explicit in many places. Thus he holds that "nothing can be taught us of which we have not already in our minds the idea," and he recalls Plato's "experiment" with the slave boy in the *Meno* as proving that "the soul virtually knows those things [i.e., truths of geometry, in this case], and needs only to be reminded (animadverted) to recognize the truths. Consequently, it possesses at least the idea upon which these truths depend. We may say even

that it already possesses those truths, if we consider them as the relations of the ideas" (§26).¹¹¹

Of course, what is latent in the mind in this sense may often require appropriate external stimulation before it becomes active, and many of the innate principles that determine the nature of thought and experience may well be applied quite unconsciously. This Leibniz emphasizes, in particular, throughout his *Nouveaux Essais*.

That the principles of language and natural logic are known unconsciously¹¹² and that they are in large measure a precondition for language acquisition rather than a matter of "institution" or "training" is the general presupposition of Cartesian linguistics.¹¹³ When Cordemoy, for example, considers language acquisition (op. cit., pp. 40ff.), he discusses the role of instruction and conditioning of a sort, but he also notices that much of what children know is acquired quite apart from any explicit instruction,¹¹⁴ and he concludes that language learning presupposes possession of "wholly developed reason [*la raison toute entiere*] for indeed this way of learning to speak is the result of discernment so great and reason so perfect that it is impossible to conceive of any more marvelous" (p. 59).

Rationalist conclusions reappear with some of the romantics as well. Thus A. W. Schlegel writes that "human reason may be compared to a substance which is infinitely combustible but does not burst into flame on its own: a spark must be thrown into the soul" ("De l'étymologie en général," p. 127). Communication with an already formed intellect is necessary for reason to awaken. But external stimulation is only required to set innate mechanisms to work; it does not determine the form of what is acquired. In fact, it is clear "that this acquisition [of language] through communication already presupposes the ability to invent language" (*Kunstlehre*, p. 234). In a certain sense, language is innate to man; namely, "in the truer philosophical sense in which everything that, according to the usual view, is innate to man, can only be brought forth through his own activity" (ibid., p. 235). While Schlegel's precise intentions, with many such remarks, might be debated, in Humboldt the Platonism with respect to language acquisition is quite clear. For Humboldt, "to learn is ...always merely to regenerate" (op. cit., p. 126). Despite superficial appearances, a language "cannot properly be taught but only awakened in the mind; it can only be given the threads by which it develops on its own account;" thus languages are, in a sense, "self-creations" [*Selbstschöpfungen*] of individuals (p. 50; Humboldt 1999, 43–4):

Language-learning of children is not an assignment of words, to be deposited in memory and rebabbled by rote through the lips, but a growth in linguistic capacity with age and practice. (p. 71))

That in children there is not a mechanical learning of language, but a

development of linguistic power, is also proven by the fact that since the major abilities of humans are allotted a certain period of life for their development, all children, under the most diverse conditions, speak and understand at about the same age, varying only within a brief time-span (p. 72; Humboldt 1999, 58).

In short, language acquisition is a matter of growth and maturation of relatively fixed capacities, under appropriate external conditions. The form of the language that is acquired is largely determined by internal factors; it is because of the fundamental correspondence of all human languages, because of the fact that “human beings are the same, wherever they may be” [*der Mensch überall Eins mit dem Menschen ist*], that a child can learn any language (73).¹⁵ The functioning of the language capacity is, furthermore, optimal at a certain “critical period” of intellectual development.

It is important to emphasize that seventeenth-century rationalism approaches the problem of learning—in particular, language learning—in a fundamentally nondogmatic fashion. It notes that knowledge arises on the basis of very scattered and inadequate data and that there are uniformities in what is learned that are in no way uniquely determined by the data itself (see note 114). Consequently, these properties are attributed to the mind, as preconditions for experience. This is essentially the line of reasoning that would be taken, today, by a scientist interested in the structure of some device for which he has only input-output data. In contrast, empiricist speculation, particularly in its modern versions, has characteristically adopted certain a priori assumptions regarding the nature of learning (that it must be based on association or reinforcement, or on inductive procedures of an elementary sort—e.g., the taxonomic procedures of modern linguistics, etc.) and has not considered the necessity for checking these assumptions against the observed uniformities of “output”—against what is known or believed after “learning” has taken place. Hence the charge of a priorism or dogmatism often leveled against rationalistic psychology and philosophy of mind seems clearly to be misdirected. (For further discussion, see the references of note 110.)

The strong assumptions about innate mental structure made by rationalistic psychology and philosophy of mind eliminated the necessity for any sharp distinction between a theory of perception and a theory of learning. In both cases, essentially the same processes are at work; a store of latent principles is brought to the interpretation of the data of sense. There is, to be sure, a difference between the initial “activation” of latent structure and the use of it once it has become readily available for the interpretation (more accurately, the determination) of experience. The confused ideas that are always latent in the mind may, in other words, become distinct (see n. 111), and at this point they can heighten

and enhance perception. Thus, for example, a

skilful and expert limner will observe many elegancies and curiosities of art, and be highly pleased with several strokes and shadows in a picture, where a common eye can discern nothing at all; and a musical artist hearing a consort of exact musicians playing some excellent composure of many parts, will be exceedingly ravished with many harmonical airs and touches, that a vulgar ear will be utterly insensible of. (Cudworth, op. cit., p. 446; Cudworth 1996, 109))

It is the “acquired skill” that makes the difference; “the artists of either kind have many inward anticipations of skill and art in their minds” that enable them to interpret the data of sense in a way that goes beyond the “mere noise and sound and clatter” provided by passive sense, just as the informed mind can interpret the “vital machine of the universe” in terms of “interior symmetry and harmony in the relations, proportions, aptitudes and correspondence of things to one another in the great mundane system” (ibid.). Similarly, in looking at and “judging of” a picture of a friend, one makes use of a “foreign and adventitious” but pre-existent idea (pp. 456–457; Cudworth 1996, 109). Once this distinction between learning and perception has been noted, however, the essential parallel between the cognitive processes that are involved outweighs the relatively superficial differences, from the point of view of this rationalist doctrine. For this reason, it is often unclear whether what is being discussed is the activity of the mind in perception or in acquisition—that is, in selecting an already distinct idea on the occasion of sense, or in making distinct what was before only confused and implicit.

Descartes’s theory of cognition is clearly summarized in his *Comments on a Certain Broadsheet* (1648):

...if we bear well in mind the scope of our senses and what it is exactly that reaches our faculty of thinking by way of them, we must admit that in no case are the ideas of things presented to us by the senses just as we form them in our thinking. So much so that there is nothing in our ideas which is not innate to the mind or the faculty of thinking, with the sole exception of those circumstances which relate to experience, such as the fact that we judge this or that idea which we now have immediately before our mind refers to a certain thing situated outside us. We make such a judgement not because these things transmit the ideas to our mind through the sense organs, but because they transmit something which, at exactly that moment, gives the mind occasion to form these ideas by means of the faculty innate to it. Nothing reaches our mind from external objects through the sense organs except certain corporeal

motions... But neither the motions themselves nor the figures arising from them are conceived by us exactly as they occur in the sense organs... Hence it follows that the very ideas of the motions themselves and of the figures are innate in us. The ideas of pain, colours, sounds, and the like must be all the more innate if, on the occasion of certain corporeal motions, our mind is to be capable of representing them to itself, for there is no similarity between these ideas and the corporeal motions. Is it possible to imagine anything more absurd than that all the common notions within our mind arise from such motions and cannot exist without them? I would like our author to tell me what the corporeal motion is that is capable of forming some common notion to the effect that 'things which are equal to a third thing are equal to each other', or any other he cares to take. For all such motions are particular, whereas the common notions are universal and bear no affinity with, or relation to, the motions. (CSM I, 304–305)

Rather similar ideas are developed at length by Cudworth.¹¹⁶ He distinguished the essentially passive faculty of sense from the active and innate “cognoscitive powers” whereby men (and men alone) “are enabled to understand or judge of what is received from without by sense.” This cognoscitive power is not a mere storehouse of ideas, but “a power of raising intelligible ideas and conceptions of things from within itself” (p. 425; Cudworth 1996, 75). The function of sense is “the offering or presenting of some object to the mind, to give it an occasion to exercise its own activity upon.” Thus, for example, when we look into the street and perceive men walking, we are relying, not merely on sense (which shows us at most surfaces—i.e., hats and clothes—and, in fact, not even objects), but on the exercise of the understanding, applied to the data of sense (pp. 409–410; Cudworth 1996, 57–59).¹¹⁷ The “intelligible forms by which things are understood or known, are not stamps or impressions passively printed upon the soul from without, but ideas vitally protended or actively exerted from within itself.” Thus prior knowledge and set play a large role in determining what we see (e.g., a familiar face in a crowd) (pp. 423–424; Cudworth 1996, 74). It is because we use intellectual ideas in perception “that those knowledges which are more abstract and remote from matter, are more accurate, intelligible and demonstrable,—than those which are conversant about concrete and material things,” as Aristotle has observed (p. 427; Cudworth 1996, 78).¹¹⁸ This claim is illustrated by a discussion of our conceptions of geometrical figures (pp. 455f.; Cudworth 1996, 103ff.). Obviously every sensed triangle is irregular, and if there were a physically perfect one, we could not detect this by sense; “and every irregular and imperfect triangle [is] as perfectly that which it is, as the most perfect triangle.” Our judgments regarding external objects in terms of regular figures,

our very notion of “regular figure” therefore have their source in the “rule, pattern and exemplar” which are generated by the mind as an “anticipation.” The concept of a triangle or of a “regular proportionate and symmetrical figure” is not taught but “springs originally from nature itself,” as does, in general, the human concept of “pulchritude and deformity in material objects”; nor can the a priori truths of geometry be derived from sense. And it is only by means of these “inward ideas” produced by its “innate cognoscitive power” that the mind is able to “know and understand all external individual things” (p. 482; Cudworth 1996, 101–128 passim).

Descartes had discussed the same question in very similar terms, in his *Reply to Objections V*:

Hence, when in our childhood we first happened to see a triangular figure drawn on paper, it cannot have been this figure that showed us how we should conceive of the true triangle studied by geometers, since the true triangle is contained in the figure only in the way in which a statue of Mercury is contained in a rough block of wood. But since the idea of the true triangle was already in us, and could be conceived by our mind more easily than the more composite figure of the triangle drawn on paper, when we saw the composite figure we did not apprehend the figure we saw, but rather the true triangle. (CSM II, 262)

For Cudworth, the interpretation of sensory data in terms of objects and their relations, in terms of cause and effect, the relations of whole and part, symmetry, proportion, the functions served by objects and the characteristic uses to which they are put (in the case of all “things artificial” or “compounded natural things”), moral judgments, etc., is the result of the organizing activity of the mind (pp. 433f.; Cudworth 1996, 83–100). The same is true of the unity of objects (or, for example, of a melody); sense is like a “narrow telescope” that provides only piecemeal and successive views, but only the mind can give “one comprehensive idea of the whole” with all its parts, relations, proportions, and Gestalt qualities. It is in this sense that we speak of the intelligible idea of an object as not “stamped or impressed upon the soul from without, but upon occasion of the sensible idea excited and exerted from the inward active and comprehensive power of the intellect itself” (p. 439; Cudworth 1996, 91).¹¹⁹

Ideas of this sort regarding perception were common in the seventeenth century but were then swept aside by the empiricist current, to be revived again by Kant and the romantics.¹²⁰ Consider, for example, Coleridge’s remarks on active processes in perception:

Instances in which a knowledge given to the mind quickens and invigorates the faculties by which such knowledge is attainable independently cannot have escaped the most ordinary observer, and this is equally true whether it be faculties of the mind or of the senses.... It is indeed wonderful both how small a likeness will suffice a full apprehension of sound or sight when the correspondent sound or object is foreknown and foreimagined and how small a deviation or imperfection will render the whole confused and indistinguishable or mistaken where no such previous intimation has been received. Hence all unknown languages appear to a foreigner to be spoken by the natives with extreme rapidity and to those who are but beginning to understand it with a distressing indistinction.¹²¹

Does nature present objects to us without exciting any act on our part, does she present them under all circumstances perfect and as it were ready made? Such may be the notion of the most unthinking...not only must we have some scheme or general outline of the object to which we could determine to direct our attention, were it only to have the power of recognizing it...¹²²

It is, once again, with Humboldt that these ideas are applied most clearly to the perception and interpretation of speech. He argues that there is a fundamental difference between the perception of speech and the perception of unarticulated sound (cf. note 38). For the latter, “an animal’s sensory capacity” would suffice. But human speech perception is not merely a matter of “mere mutual evocation of the sound and the object indicated” (*Verschiedenheit*, p. 70; Humboldt 1999, 57). For one thing, a word is not “an impression of the object in itself, but rather of its image, produced in the soul” (p. 74). But, furthermore, speech perception requires an analysis of the incoming signal in terms of the underlying elements that function in the essentially creative act of speech production, and therefore it requires the activation of the generative system that plays a role in production of speech as well, since it is only in terms of these fixed rules that the elements and their relations are defined. The underlying “rules of generation” must, therefore, function in speech perception. If it were not for its mastery of these, if it were not for its ability “to actualize every possibility” the mind would no more be able to deal with the mechanisms of articulated speech than a blind man is able to perceive colors. It follows, then, that both the perceptual mechanisms and the mechanisms of speech production must make use of the underlying system of generative rules. It is because of the virtual identity of this underlying system in speaker and hearer that communication can take place, the sharing of an underlying generative system being traceable, ultimately, to the uniformity of human nature (cf. pp. 97–98 above and note 115). In brief,

Acquisition and Use of Language

There can be nothing present in the soul, save by one's own activity, and understanding and speaking are but different effects of this power of speech. Conversing together is never comparable with a transfer of material. In the understander, as in the speaker, the same thing must be developed from the inner power of each; and what the former receives is merely the harmoniously attuning stimulus.... In this way language in its entirety resides in every human being, which means, however, nothing else but that everyone possesses an urge governed by a specifically modified, limiting and confining power, to bring forth gradually the whole of language from within himself, or when brought forth to understand it, as outer or inner occasion may determine.

But understanding could not, as we have just found, be based upon inner spontaneity, and communal speech would have to be something other than mere mutual arousal of the hearer's speech capacity, did not the diversity of individuals harbor the unity of human nature, fragmented only into separate individualities (p. 70; Humboldt 1999, 57 [with modifications]).

Even in the case of perception of a single word, an underlying system of generative rules must be activated. It would be inaccurate, Humboldt maintains, to suppose that speaker and hearer share a store of clear and totally formed concepts. Rather, the perceived sound incites the mind to generate a corresponding concept by its own means:

[People] do not understand one another by actually exchanging signs for things, nor by mutually occasioning one another to produce exactly and completely the same concept; they do it by touching in one another the same link in the chain of their sensory ideas and internal conceptualizations, by striking the same note on their mental instrument, whereupon matching but not identical concepts are engendered in each (p. 213; Humboldt 1999, 152).

In short, speech perception requires internal generation of a representation both of the signal and the associated semantic content.

Contemporary research in perception has returned to the investigation of the role of internally represented schemata or models¹²³ and has begun to elaborate the somewhat deeper insight that it is not merely a store of schemata that function in perception but rather a system of fixed rules for generating such schemata.¹²⁴ In this respect too, it would be quite accurate to describe current work as a continuation of the tradition of Cartesian linguistics and the psychology that underlies it.

Summary

Returning to the remark of Whitehead's that initiated this discussion, it seems that after a long interruption, linguistics and cognitive psychology are now turning their attention to approaches to the study of language structure and mental processes which in part originated and in part were revitalized in the "century of genius" and which were fruitfully developed until well into the nineteenth century. The creative aspect of language use is once again a central concern of linguistics, and the theories of universal grammar that were outlined in the seventeenth and eighteenth centuries have been revived and elaborated in the theory of transformational generative grammar. With this renewal of the study of universal formal conditions on the system of linguistic rules, it becomes possible to take up once again the search for deeper explanations for the phenomena found in particular languages and observed in actual performance. Contemporary work has finally begun to face some simple facts about language that have been long neglected, for example, the fact that the speaker of a language knows a great deal that he has not learned and that his normal linguistic behavior cannot possibly be accounted for in terms of "stimulus control," "conditioning," "generalization and analogy," "patterns" and "habit structures," or "dispositions to respond," in any reasonably clear sense of these much abused terms. As a result, a fresh look has been taken, not only at language structure, but at the preconditions for language acquisition and at the perceptual function of abstract systems of internalized rules. I have tried to indicate, in this summary of Cartesian linguistics and the theory of mind from which it arose, that much of what is coming to light in this work was foreshadowed or even explicitly formulated in earlier and now largely forgotten studies.

It is important to bear in mind that the survey that has been presented here is a very fragmentary and therefore in some ways a misleading one. Certain major figures—Kant, for example—have not been mentioned or have been inadequately discussed, and a certain distortion is introduced by the organization of this survey, as a projection backwards of certain ideas of contemporary interest rather than as a systematic presentation of the framework within which these ideas arose and found their place. Thus similarities have been stressed and divergences and conflicts overlooked. Still, even such a fragmentary survey as this does indicate, it seems to me, that the discontinuity of development in linguistic theory has been quite harmful to it and that a careful examination of classical linguistic theory, with its accompanying theory of mental processes, may prove to be an enterprise of considerable value.

Notes

1. M. Grammont, *Revue des langues Romanes* 60 (1915), p. 439. Quoted in G. Harnois, "Les théories du langage en France de 1660 à 1821," *Études Françaises* 17 (1929). Harnois in essence agrees, holding that earlier linguistics hardly merits the name "science" and that he is engaged in a "history of linguistics before there was a linguistics." Similar views have been widely voiced.
2. By a "generative grammar" I mean a description of the tacit competence of the speaker-hearer that underlies his actual performance in production and perception (understanding) of speech. A generative grammar, ideally, specifies a pairing of phonetic and semantic representations over an infinite range; it thus constitutes a hypothesis as to how the speaker-hearer interprets utterances, abstracting away from many factors that interweave with tacit competence to determine actual performance. For recent discussion, see Katz and Postal, *An Integrated Theory of Linguistic Descriptions* (Cambridge: M.I.T. Press, 1964); Chomsky, *Current Issues in Linguistic Theory* (The Hague: Mouton 1964); *Aspects of the Theory of Syntax* (Cambridge: M.I.T. Press, 1965). [Terminology related to "competence" includes "core grammar" (Chomsky, 1981). The distinction between competence and performance appears in the editor's introduction as a distinction between language and its use; it appears in Chomsky's work in various forms. The literature is enormous. Restricting the list to a few of Chomsky's representative works alone, see Chomsky 1975a, 1980, 1981, 1986, 1988, 1995, and 2000. Among these, 1975a, 1980, 1988, and 2000 are more accessible to general audiences than the others. For useful additional discussion, see Smith 1999.]
3. Nor should it be assumed that the various contributors to what I will call "Cartesian linguistics" necessarily regarded themselves as constituting a single "tradition." This is surely not true. With the construct "Cartesian linguistics," I want to characterize a constellation of ideas and interests that appear in the tradition of "universal" or "philosophical grammar," which develops from the Port-Royal *Grammaire générale et raisonnée* (1660); in the general linguistics that developed during the romantic period and its immediate aftermath; and in the rationalist philosophy of mind that in part forms a common background for the two. That universal grammar has Cartesian origins is a commonplace; Sainte-Beuve, for example, refers to the Port-Royal theory of grammar as "a branch of Cartesianism that Descartes himself had not developed" (*Port-Royal*, vol. III, 1888, p. 539). An association of the general linguistics of the romantic period to this complex is less immediately obvious, but I will try to

CARTESIAN LINGUISTICS

show, nevertheless, that some of its central features (and, furthermore, those which seem to me to constitute its most valuable contribution) can be related to Cartesian antecedents.

By discussing romantic theories of language and mind within this framework, I am forced to exclude other important and characteristic aspects of these theories; for example, the organicism that was (rightly or wrongly) taken to be a reaction against Cartesian mechanism. In general, it must be emphasized that my concern here is not with the transmission of certain ideas and doctrines, but with their content and, ultimately, their contemporary significance.

A study of this sort could profitably be developed as part of a more general investigation of Cartesian linguistics as contrasted with a set of doctrines and assumptions that might be referred to as “empiricist linguistics” and illustrated by modern structural and taxonomic linguistics as well as by parallel developments in modern psychology and philosophy. I will not attempt to develop this distinction any more fully or clearly here, however.

4. It should be borne in mind that we are dealing with a period that antedates the divergence of linguistics, philosophy, and psychology. The insistence of each of these disciplines on “emancipating itself” from any contamination by the others is a peculiarly modern phenomenon. Again, current work in generative grammar returns to an earlier point of view, in this case, with respect to the place of linguistics among other studies.
5. He leaves open, as beyond the limitations of human reason, the question whether the explanatory hypotheses that he proposes are the “correct” ones in any absolute sense, limiting himself to the claim that they are adequate, though obviously not uniquely so. Cf. *Principles of Philosophy*, pt. IV, art. CCIV.

The context of this discussion of the limits of mechanical explanation must be kept clearly in mind. The issue is not the existence of mind, as a substance whose essence is thinking. To Descartes, this is obvious from introspection – more easily demonstrated, in fact, than the existence of body. What is at stake is the existence of other minds. This can be established only through indirect evidence of the sort that Descartes and his followers cite. These attempts to prove the existence of other minds were not too convincing to contemporary opinion. Pierre Bayle, for example, characterizes the presumed inability of the Cartesians to prove the existence of other minds “as perhaps the weakest side of Cartesianism” (art. “Rorarius,” in Bayle’s *Dictionnaire Historique et Critique* (1697); *Historical and Critical Dictionary*, trans. R. Popkin (Indianapolis: Bobbs-Merrill, 1965), p. 231).

6. *Discourse on the Method*, part V. [In *The Philosophical Writings of Descartes*,

Notes

trans. J. Cottingham, R. Stoothoff and D. Murdoch, 2 vols. (Cambridge: Cambridge University Press 1984–85), abbreviated CSM I, CSM II.]

In general I will use English translations where these and the original are readily available and will cite the original otherwise, if available to me. In citing original sources, I will occasionally regularize spelling and punctuation slightly.

7. For some recent views and evidence on this question, see E. H. Lenneberg, “A Biological Perspective of Language,” in *New Directions in the Study of Language*, ed. E. H. Lenneberg (Cambridge: M.I.T. Press, 1964). [The literature is now massive. For a popular discussion of some issues, see Pinker 1995; Pinker and Chomsky do not, however, agree on the issue of the evolution of language. Jenkins 2000 has a clear and general but more technical discussion of some of Chomsky’s views on the topic. In a related vein, Chomsky often now refers to formal work on morphogenesis by Alan Turing and D’Arcy Thompson, and has suggested – speculatively at this stage – that perhaps language ‘evolved’ as a consequence of what happens to physical and biological processes when placed in a specific and complex form of organism. This is not evolution as popularly conceived, where it is supposed that evolution amounts to selection.]
8. Obviously, the properties of being unbounded and being stimulus-free are independent. An automaton may have only two responses that are produced randomly. A tape recorder or a person whose knowledge of a language extends only to the ability to take dictation has an unbounded output that is not stimulus-free in the intended sense. Animal behavior is typically regarded by the Cartesians as unbounded, but not stimulus-free, and hence not “creative” in the sense of human speech. Cf., for example, François Bayle, *The General System of the Cartesian Philosophy* (1669) (English translation 1670, p. 63): “And because there may be an infinite variety in the impressions made by the objects upon the senses, there may also be an innumerable variety in the determination of the Spirits to flow into the Muscles, and by consequence, an infinite variety in the Motions of Animals; and that the more, because there is a greater variety of parts, and more contrivance and art in the structure.” The unboundedness of human speech, as an expression of limitless thought, is an entirely different matter, because of the freedom from stimulus control and the appropriateness to new situations.

It is important to distinguish “appropriateness of behavior to situations” from “control of behavior by stimuli.” The latter is characteristic of automata; it is the former that is held to be beyond the bounds of mechanical explanation, in its full human variety.

Modern studies of animal communication so far offer no counterevidence

to the Cartesian assumption that human language is based on an entirely distinct principle. Each known animal communication system either consists of a fixed number of signals, each associated with a specific range of eliciting conditions or internal states, or a fixed number of “linguistic dimensions,” each associated with a nonlinguistic dimension in the sense that selection of a point along one indicates a corresponding point along the other. In neither case is there any significant similarity to human language. Human and animal communication fall together only at a level of generality that includes almost all other behavior as well. [Studies since 1966 continue to indicate that there is no counterevidence. Studies also show that unless humans are given at least a minimal amount of experience of the relevant kind (hearing or seeing language spoken or signed by others, for example) before a certain critical stage, they cannot acquire full linguistic competence. See, among others, the study of Genie, Curtiss 1976.)]

9. In general, then, “although machines can perform certain things as well as or perhaps better than any of us can do, they infallibly fall short in others, by the which means we may discover that they did not act from knowledge, but only from the disposition of their organs.” There are, then, two “very certain tests” by which we can determine whether a device is really human, the one provided by the creative aspect of language use, the other, by the diversity of human action. “It is virtually impossible (in the Haldane-Ross translation, “morally impossible”) that there should be sufficient diversity in any machine to allow it to act in all the events of life in the same way as our reason causes us to act.” In taking this position, Descartes expands on his conception of the “cognitive power” as a faculty which is not purely passive and which is properly called “native intelligence [*ingenium*]” when it “forms new ideas in the corporeal imagination, or concentrates on those already formed,” acting in a way that is not completely under the control of sense or imagination or memory (*Rules for the Direction of the Mind* (1628); CSM I, 42). Still earlier, Descartes remarks that “the high degree of perfection displayed in some of their actions makes us suspect that animals do not have free will” (“Olympian Matters” c.1620; CSM I, 5).

The idea that the “cognitive power” is properly called “mind” only when it is in some sense creative has earlier origins. One source that might well have been familiar to Descartes is Juan Huarte’s *Examen de Ingenios* (1575), which was widely translated and circulated (I quote from the English translation by Bellamy, 1698). Huarte understands the word *Ingenio* to have the root meaning “engender,” “generate” – he relates it to *gigno*, *genero*, *ingenero* (p. 2). Thus “one may discover two generative Powers in Man, one common with the Beasts and Plants, and the other Participating of Spiritual

Notes

Substances, God and the Angels” (p. 3). “Wit [*Ingenio*] is a generative power ... the Understanding is a Generative Faculty” (p. 3). As distinct from divine “Genius,” the human “rational soul” and “spiritual substances” do not have “sufficient Force and Power in their Generation to give real being to what they Ingender” but only “to produce an accident in the Memory,” “an Idea and Image of what we know and understand” that must be given concrete existence by work and art (pp. 4–5). Similarly the arts and sciences are “a sort of Images, and Figures, begotten by [men’s] Minds in their Memory, which represent to the Life the Posture and natural Composition of the Subject relating to the intended Science” (p. 6). One who learns some subject must “Engender within himself an entire and true Figure” that represents its principles and structure (p. 6). Truly active minds will be “such, that assisted by the subject only, [they will] without the help of any Body, produce a thousand Conceits they never heard spoke of” (p. 7). The empiricist maxim, “That there is nothing in the Understanding, but what has past through the Sense,” attributed to Aristotle, applies only to “docile wits” that lack this capacity. Although the “perfect wit” is only an ideal case, “yet it must be granted, we have observ’d many Persons approach very near it, inventing and saying such things as they never heard from their Masters, nor any Mouth” (p. 16). There is even a third kind of wit “by means of which, some have without Art or Study spoke such subtle and surprizing things, and yet true, that were never before seen, heard, or writ, no nor ever so much as thought of” and which may involve “a mixture of Madness” (p. 17); these three types of wit involve the memory, understanding, and imagination, respectively. In general, “all [man’s] Honour and Nobility, as *Cicero* observed, consists in his being favour’d with, and having an Eloquent Tongue: *As Wit is the Ornament of a Man, so Eloquence is the Light and Beauty of Wit*. In this alone he distinguishes himself from the Brutes, and approaches near to God, as being the greatest Glory which is possible to be obtained in Nature” (p. 22). The most severe “disability of wit,” under which men “differ not at all from Brute Beasts,” is the disability, which “very much resembles that of Eunuchs ... unable for Generation,” that prevents the rational faculty from arriving at “the first Principles of all Arts implanted in the Scholar’s Mind, before he begin to learn, for which the Wit can give no other proofs of itself, than to receive them as things already known; and if he be not able to form an Idea of them in his Mind, we may strongly conclude him wholly incapable of the Sciences.” In this case, “neither the Lash of the Rod, nor his Cries, nor Method, nor Examples, nor Time, nor Experience, nor any thing in Nature can sufficiently Excite him to bring forth any thing” (pp. 27–28).

See K. Gunderson, “Descartes, La Mettrie, Language and Machines,”

- Philosophy* 39 (1964), pp. 193–222, for an interesting discussion of Descartes's arguments as related to contemporary discussions of “intelligence” of automata. For general background on the development and critique of Descartes's theory of the extent and limits of mechanical explanation, see Rosenfield, *op. cit.*, and H. Kirkinen, “Les origines de la conception moderne de l'homme-machine,” *Annales Academiae Scientiarum Fennicae*, ser. B, vol. 22, Helsinki (1961).
10. Translated (in part) in H. A. P. Torrey, *The Philosophy of Descartes* (New York: Holt 1892), pp. 281–284. [The translation that appears here, and in all subsequent quotations from Descartes's correspondence, is from *The Philosophical Writings of Descartes*, vol. III The Correspondence, trans. J. Cottingham, R. Stoothoff, D. Murdoch and A. Kenny (Cambridge: Cambridge University Press, 1991) (abbreviated CSMK).]
 11. That is, by conditioning. When animals are taught “by art,” their actions are produced with reference to a passion, in the sense that this behavior is associated with the “stir of expectation of something to eat” or the “motions of their fear, their hope, or their joy” that constitute the original contingency for the teaching. Descartes is therefore pointing out that, just as in its normal use “verbal behavior” is free of identifiable external stimuli or internal physiological states, so it is evidently not developed in the individual by conditioning. He does not elaborate on this, regarding it perhaps as too obvious to merit discussion. It is noteworthy that modern behaviorist speculation about human learning denies these truisms. For some discussion, see Chomsky, “Review of Skinner, ‘Verbal Behavior,’” *Language* 35 (1935), pp. 26–58; *Aspects of the Theory of Syntax*, chap. 1, §8; J. Katz, *Philosophy of Language* (New York: Harper & Row, 1966); J. Fodor, “Could Meaning be an ‘r_m,’” *Journal of Verbal Learning and Verbal Behavior* 4 (1965), pp. 73–81. [For useful contemporary discussion of organisms' modular learning and its explanation, see Gallistel 1990, 2002. Chomsky has in recent years referred approvingly to Gallistel's work. For a fascinating study of linguistic modularity in a polyglot savant, see Smith and Tsimpli 1995.]
 12. The Descartes-More correspondence, in so far as it relates to animal automatism, is translated in full by L. C. Rosenfield (L. Cohen) in the *Annals of Science*. 1 (1936) [and in CSMK].
 13. Descartes goes on to explain that he does not deny to animals life or sensation or even feeling, in so far as it depends only on the bodily organs.
 14. *Discours Physique de la Parole* (1666). Page references are to the second edition, 1677. There is an English translation, dated 1668. Rosenfield remarks that Cordemoy develops Descartes's argument involving lack of true speech among animals so fully that after him “the point was given very little attention,

Notes

as if subsequent authors considered this the last word on the subject" (*From Beast-Machine to Man-Machine*, p. 40).

15. There is no problem, for Cordemoy (as for Descartes), in determining whether he himself possesses a soul, since it is evident to him, by introspection, "that certain thoughts always accompany in me most of the movements of my organs" (p. 3).
16. La Mettrie, *L'Homme Machine* (1747). A critical edition with notes and background material is *La Mettrie's L'homme machine: a study in the origins of an idea*, ed. A. Vartanian (Princeton: Princeton University Press, 1960). [The translations given here are from La Mettrie 1996, but reference is also given to the translation in *Man A Machine* (La Salle, Ill.: Open Court 1953) (abbreviated *MaM*), which contains the French text.]
17. Père G. H. Bougeant, *Amusement philosophique sur le langage des bestes* (1739).
18. This is not to deny that the method of explanation suggested by La Mettrie may be in principle correct. What concerns me here is not the adequacy of the proposed explanations of Descartes and others, but the observations on human language that elicited these attempts. [The prospect of being unable ever to scientifically explain the creative aspect of language use plays an important role in Chomsky's post-1966 discussions, where it illustrates general claims about the (biological) limitations of human intelligence. See the editor's introduction for discussion and references.]
19. G. Ryle, *The Concept of Mind* (London: Hutchinson, 1949). See J. Fodor, "Is Psychology Possible?" chap. 1 of *Psychological Explanation* (New York: Random House, 1968), for a critique of the views of Ryle and others regarding psychological explanation.
20. These are described in terms of "powers," "propensities," and "dispositions," which are characterized only through scattered examples. These constitute a new "myth" as mysterious and poorly understood as Descartes's "mental substance."
21. L. Bloomfield, *Language* (New York: Holt, 1933), p. 275. When a speaker produces speech forms that he has not heard, "we say that he utters them *on the analogy* of similar forms which he has heard." For Bloomfield, human language differs from animal communication systems in no fundamental way, but only by its "great differentiation." Otherwise, its function is similar. "Man utters many kinds of vocal noise and makes use of the variety: under certain types of stimuli he produces certain vocal sounds, and his fellows, hearing these same sounds, make the appropriate response" (p. 27). He holds that "language is a matter of training and habit" (p. 34) and that with careful statistical investigation "we should doubtless be able to foretell how many

times any given utterance ... would be spoken within a fixed number of days" (p. 37) (a conclusion that is certainly correct, since for almost all normal utterances the predicted number would be zero).

22. C. F. Hockett, *A Course in Modern Linguistics* (New York: Macmillan, 1958), §§36, p. 50. He remarks that "it has been said that whenever a person speaks, he is either mimicking or analogizing," and he accepts this view, stating that "when we hear a fairly long and involved utterance which is evidently not a direct quotation, we can be reasonably certain that analogy is at work" (p. 425). Among modern linguists, Hockett is unusual in that he has at least noticed that a problem exists.
 In discussing innovation, Hockett seems to imply that novel expressions can be understood only through reference to context (p. 303). In fact, failure to consider the linguistic mechanisms that determine the meaning of the ordinary, generally quite novel sentences of everyday life is typical of modern linguistics.
23. Modern discussions of the difference between human language and animal communication systems occasionally recapture some of the Cartesian insights. See, for example, L. Carmichael, "The Early Growth of Language Capacity in the Individual," in *New Directions in the Study of Language*, ed. Lenneberg .
24. J. G. Herder, *Abhandlung über den Ursprung der Sprache* (1772). This is now available in part, in *Herder's Sprachphilosophie*, ed. E. Heintel (Hamburg: Felix Meiner Verlag, 1960), pp. 1–87. Page references are to this volume. [Translations from this work are by Susan-Judith Hoffmann; references remain as they were in the original edition. There is a modern translation of the work in Herder 1966.]
25. This is true as well of the development of language in the individual. Study of the "origin of language" is essentially a study of the "essence of language," in this period, and the growth of language in the individual and its growth in the nation are often taken to be parallel in their general characteristics. Cf. A. W. Schlegel, *Die Kunstlehre* (1801) (Stuttgart: W. Kohlhammer Verlag, 1963), p. 234: in the discovery of language by children, "that which takes place in the invention of language by the human race in general finds itself ever repeated, albeit in fainter traces;" in general, "in the acquisition of language, we find the same ability at work, which is present in the invention of language, in a higher degree" (235). Under the influence of Humboldt, H. Steinthal goes even further and states, "There is no distinction between the primordial creation of language and its daily re-creation" (*Grammatik, Logik und Psychologie* [Berlin, 1855], 232).
26. *Discourse on the Method*, CSM I, 140.
27. Descartes does not restrict language to purely intellectual function in a

Notes

narrow sense. See, for example, *Principles of Philosophy*, pt. 4, art. 197 (CSM I, 284):

For we see that spoken or written words excite all sorts of thoughts and emotions in our minds. With the same paper, pen and ink, if the tip of the pen is pushed across the paper in a certain way it will form letters which excite in the mind of the reader thoughts of battles, storms and violence, and emotions of indignation and sorrow; but if the movements of the pen are just slightly different they will produce quite different thoughts of tranquillity, peace and pleasure, and quite opposite emotions of love and joy.

28. *Treatise the Third: Concerning Happiness, a Dialogue* (1741). In Harris's *Works*, ed the Earl of Malmesbury (London: F. Wingrove, 1801), vol. I, p. 94.
29. In this discussion, Harris appears to be making the gratuitous assumption, typical of the modern variants of this doctrine, that, since man is capable of "infinite directions," he is therefore completely plastic; that is, the assumption that innate factors govern his intellectual development only marginally, if at all. Obviously this further assumption has no connection to the observation regarding freedom from the control of instinct and drives and regarding the infinite range of potential skill and knowledge. With this independent assumption, Harris is, of course, very much outside of the framework of Cartesian thought.

Elsewhere, Harris expresses himself in a manner which is susceptible to a rather different interpretation. In discussing the interplay between creative genius and rule (*Philological Inquiries* (1780) in *Works*, vol. II), he rejects the view "that *Geniuses*, tho' *prior to Systems*, were *prior also to Rules* [e.g., the unities of time and place, in the theory of drama], because *RULES* from the beginning *existed in their own Minds*, and were a part of that *immutable Truth*, which is eternal and everywhere" (p. 409). Genius and rules are "so *reciprocally* connected, that 'tis *GENIUS* which discovers *Rules* [these being implicit in the mind]; and then *RULES*, which govern *Genius*."

30. One would not refer to an act as "creative" simply on the basis of its novelty and independence of identifiable drives or stimuli. Hence the term "creative aspect of language use" is not entirely appropriate, without qualification, as a designation for the property of ordinary language that concerned Descartes and Cordemoy.

It is interesting, in this connection, to note that Galileo described the discovery of a means to communicate one's "most secret thoughts to any other person ... with no greater difficulty than the various collocations of twenty-four little characters upon a paper" as the greatest of all human inventions, comparable with the creations of a Michelangelo, a Raphael, or a Titian (*Dialogue on the Great World Systems* (1630) (Chicago: University of

Chicago Press, 1953), pp. 116–117). I am indebted for this reference to E. H. Gombrich.

Compare the reference in the *Grammaire générale et raisonnée* to “this marvelous invention of composing from 25 or 30 sounds an infinite variety of words, which although not having any resemblance in themselves to that which passes through our minds, nevertheless do not fail to reveal all of the secrets of the mind, and to make intelligible to others who cannot penetrate into the mind all that we conceive and all of the diverse movements of our souls.” (p. 27; PRG, 65–66). [Translations of passages in the Port-Royal *Grammaire* here, and subsequently, are from Arnauld and Lancelot 1975 (abbreviated PRG).]

31. Cf. note 25. References are to pp. 233–234 of the edition cited there, which is vol. II of a collection of *Kritische Schriften und Briefe*. [Translations of Chomsky’s quotations from the works of A. W. Schlegel, and of one quotation from the work of F. Schlegel, are by Susan-Judith Hoffmann; references remain as they were in the original edition.]
32. *Briefe über Poesie, Silbenmass und Sprache* (1795). In *Sprache und Poetik*, vol. I of *Kritische Schriften und Briefe* (Stuttgart: W. Kohlhammer Verlag, 1962), 152.
33. “...the natural media of art are ways [*Handlungen*] for human beings to outwardly manifest what is inward.” (*Die Kunstlehre*, 230 – the only such means are “words, sounds, gestures”); therefore it is natural for Schlegel to conclude that language itself is a primordial art form and that it is, further, “from its inception onward the primordial substance of poetry” (232).
34. For Schlegel (*Die Kunstlehre*, 225), “Art’ is ‘a boundless thought’; ‘its purpose, that is, the direction of its striving can surely be indicated in general terms, but what it can and ought to achieve over the course of time no concept of the understanding can grasp because it is infinite’”. The passage that is paraphrased in the text then continues as follows:

In poetry the expressive potentiality that is found in the arts is found to an even higher degree since other arts do after all have in light of their restricted media or means of representation [*Darstellung*] a determinate sphere of activity that could allow itself to be circumscribed to some degree. The medium of poetry is precisely the medium through which the human spirit awakens to itself at all, and through which it fastens on to its presentations [*Vorstellungen*] in arbitrary associations and expressions – that is, language. Poetry is therefore not even bound to objects, it rather makes its own object for itself; it is the most comprehensive of all the arts and is, as it were, the omnipresent universal spirit in them. That which, in the representations of

Notes

the remaining arts raises us up out of everyday reality into a world of fantasy, is called their poetical element. Poetry therefore designates in this general sense artistic invention, the wondrous act whereby it enriches nature; as its name asserts, it is a true creation and bringing forth. Every outward material representation is preceded by an idea in the mind of the artist in which language always comes into play as the mediator of awareness; consequently one can say that they always emerge from the womb of poetry. Language is not a product of nature, rather it is an imprint [*Abdruck*] of the human mind which exhibits the emergence and connections of its presentations as well as the operating mechanism [of the human mind]. Thus in poetry what has already taken shape is given shape again, and its plasticity is just as limitless as spirit's ability to turn back on itself in reflections of ever-increasing potentialities.

35. For further discussion of the character, sources, and general development of romantic aesthetic theory, see M. H. Abrams, *The Mirror and the Lamp* (Oxford: Oxford University Press, 1953). There is some discussion of the philosophy of language of romanticism in the first volume of E. Cassirer, *Philosophie der symbolischen Formen* (1923), trans *The Philosophy of Symbolic Forms* (New Haven: Yale Univ. Press, 1953). See also E. Fiesel, *Die Sprachphilosophie der deutschen Romantik* (Tübingen: J. C. B. Mohr, 1927).
36. In particular, in his *Über die Verschiedenheit des Menschlichen Sprachbaues*, published posthumously in 1836. A facsimile edition appeared in 1960 (F. Bonn: Dümmlers Verlag. Page references here are to this edition. Parts are translated into English in M. Cowan, *Humanist without Portfolio*, Detroit Wayne State University Press (1963). A full translation and commentary are in preparation by J. Viertel. Backgrounds of Humboldt's linguistic theories are discussed in R. L. Brown, *Some Sources and Aspects of Wilhelm von Humboldt's Conception of Linguistic Relativity*, unpublished University of Illinois doctoral dissertation (1964). [Most of the translations in this edition are by Susan-Judith Hoffmann, but some are P. L. Heath's translations in Humboldt 1999.]

Bloomfield refers to Humboldt's treatise as "the first great book on general linguistics" (*Language*, p. 18). Considered against the background that we are surveying here, it seems to mark the terminal point of the development of Cartesian linguistics rather than the beginning of a new era of linguistic thought. See Chomsky, *Current Issues in Linguistic Theory*, for some discussion of Humboldtian general linguistics, its relation to the work of the following century, and its re-emergence in contemporary studies of language and cognition.

37. The German translations are Humboldt's. These concepts of Humboldt's do not seem to me to be entirely clear, and I will focus attention here on one aspect of them. That a single consistent interpretation of these notions is clearly determined by the text is not obvious. Despite this qualification, it seems safe to conclude that what will be outlined here is at least one of the central strands in Humboldt's thought. I am indebted to J. Viertel for many observations and suggestions regarding the interpretation of the text.
38. For Humboldt, to speak of a word in a language as "articulated" is to refer it to the system of underlying elements from which it is constructed, elements that could be used to form infinitely many other words according to definite intuitions and rules. It is in this sense that a word is an "articulated object," grasped, in perception, by the exercise of the "human power of speech" rather than by some process analogous simply to "animal sensory capacity" See p. 71:

But now what *articulation* adds to the mere evocation of its meaning [*Bedeutung*]... [i.e., of the meaning of a perceived word] ... is that it presents the word directly through its form as a part of an unbounded whole, a language. For even in single words, it is by means of this that we are given the possibility of constructing, from the elements of the language, a truly indefinite number of other words according to specific intuitions and rules, and thereby to establish among all words an affinity corresponding to the affinity of concepts (Humboldt 1999, 57–58 (with modifications)).

He then clarifies his meaning further, pointing out that it is only the generative processes that are grasped by the mind, and that language cannot be regarded

as a material that sits there, surveyable in its totality, or communicable little by little, but must be seen as something that eternally produces itself, where the laws of production are determined, but the scope and even to some extent the nature of the product remain totally unspecified (Humboldt 1999, 58).

Compare A. W. Schlegel's definition of "articulation" (*Kunstlehre*, p. 239):

The articulation (the articulated moments of discourse, as it were) consists in arbitrary deliberate movements of the organ and therefore corresponds to similar spiritual activities.

He points out that articulated language is different in kind from animal cries or expressions of emotion – that it cannot be approached by a series of "crude imitations" but requires a new principle.

See also note 30.

39. See pp. 58-9: "The constant and uniform element in this mental labor of elevating articulated sound to an expression of thought, when viewed in its

Notes

fullest possible comprehension and systematically presented constitutes the *form* of language” (Humboldt 1999, 50). It seems to me that Humboldt’s “form of language” is essentially what would in current terminology be called “the generative grammar” of a language, in the broadest sense in which this term has been used. See note 2 and pp. 77–78 below.

40. For example, the lingua franca of the Mediterranean coast; or, we may add, animal communication systems or “language games” of the sort referred to by Bougeant, Bloomfield, Wittgenstein, and many others and proposed by them as typical and paradigmatic – as the “primitive forms” of language.
41. In identifying a particular state of a language as an object of description with “psychological reality,” we depart from Humboldt, who is extremely unclear about the relation of synchronic to diachronic description.
42. In his *Hermes*, Harris perhaps comes closest to the Humboldtian conception of “form” in a citation from Ammonius, which relates motion to dance, timber to a door, and “the power of producing a vocal sound” (as the material basis for speech) to “that of explaining ourselves by Nouns, or Verbs” (as its form, which derives from man’s unique soul as the material basis derives from nature). Cf. Harris, *Works*, vol. I, p. 393, footnote.

Elsewhere, in another connection, Harris discusses a conception of “form” that is much richer, however. In his *Philosophical Arrangements* (1775; *Works*, vol. II) he develops the notion of “form” as “animating principle”: “the animating form of a natural body is neither its organization, nor its figure, nor any other of these inferior forms, which make up the system of its visible qualities; but ‘tis the power, which, not being that organization, nor that figure, nor those qualities, is yet able to produce, to preserve, and to employ them” (p. 59).

43. *Lectures on Dramatic Art and Literature* (1808), translated by John Black, p. 340 of the second edition, (London, George Bell and Sons, 1892).
44. “Lectures and Notes of 1818,” in T. Ashe (ed.), *Lectures and Notes on Shakespeare and other English Poets* (London: George Bell and Sons, 1893), p. 229. Some of Coleridge’s comments on the nature of mind foreshadow Humboldt’s observations on language in their emphasis on the diversity of creative potential within the bounds of finite rules. In the same lecture he denies that genius must be opposed to rule (again paraphrasing Schlegel – cf. also note 29) and argues that “no work of true genius dares want its appropriate [organic] form.” “As it must not, so genius cannot be lawless: for it is even this that constitutes its genius – the power of acting creatively under laws of its own origination.”

Elsewhere, he states that “the mind does not resemble an Aeolian harp, nor even a barrel-organ turned by a stream of water, conceive as many tunes

mechanized in it as you like, but rather as far as objects are concerned a violin or other instrument of few strings yet vast compass, played on by a musician of Genius" (quoted by R. Wellek, *Kant in England* (Princeton: Princeton University Press, 1931), p. 82). For much additional relevant material, see Abrams, *The Mirror and the Lamp*.

45. It should be noted that this topic does not seem to have been raised in any explicit way in the Schlegel-Humboldt correspondence. See A. Leitzmann (ed.), *Briefwechsel zwischen W. von Humboldt und A. W. Schlegel* (1908). This correspondence contains much discussion of "organic" and "mechanical" form but in a different connection, namely, with reference to the relation between inflection and agglutination as linguistic processes, a topic that is also developed at length in Humboldt's *Über die Verschiedenheit des menschlichen Sprachbaues*.

The question of how the form of language arises from and determines individual "creative" acts is a not uncommon one during this period. Cf., for example, Coleridge: "What a magnificent History of acts of individual minds, sanctioned by the collective Mind of the Country a Language is ... a chaos grinding itself into compatibility." Quoted in A. D. Snyder, *Coleridge on Logic and Learning* (New Haven: Yale University Press, 1929), p. 138.

46. The significance and origins of this notion are described in R. Berthelot, *Science et philosophie chez Goethe* (Paris: F. Alcan, 1932), and R. Magnus, *Goethe als Naturforscher* (Leipzig: Barth 1906), trans. by H. Norden, *Goethe as a Scientist* (New York, 1949). As is well known, the concept of organic form develops in biology, as well as in philosophy and criticism, during the period that we are now reviewing. Compare, for example, Schlegel's notion of organic form with Blumenbach's concept of "Bildungstrieb" in biology, namely, the concept of a living, generative, formative principle internal to an organism that determines its ontogenesis and leads it from germ to adult (cf. Berthelot, p. 42; he states that this influenced Kant's similar formulations in the *Critique of Judgment*). Berthelot characterizes Schelling's Naturphilosophie as conceiving of nature "as a dynamic qualitative transformation producing new forms irreducible to previous ones, by the action of a spontaneous, internal, primitively unconscious activity" (p. 40). Many other references might be given to illustrate the parallel and interplay. These matters are discussed in various places, e.g., A. O. Lovejoy, *The Great Chain of Being* (New York: Harper & Row 1936) and Abrams, *The Mirror and the Lamp*. For further background and many references, see E. Mendelsohn, "The Biological Sciences in the Nineteenth Century: Some Problems and Sources," *History of Science* 3 (1964), pp. 39–59.
47. Quoted in Magnus, *Goethe als Naturforscher*, p. 59. In *The Great Chain of Being*

Notes

Lovejoy traces the idea of a logical “Urbild” to J. B. Robinet’s *De la Nature* (1761–1768). He quotes Robinet (p. 279) as defining the notion “prototype” as “an intellectual principle that changes only in so far as it realizes itself in matter”; this notion Robinet then elaborated with respect to all animate and even inanimate nature.

48. The title of Humboldt’s major work should not lead one to assume that he would be sympathetic to the view that each language is a unique historical product that may, in principle, have any imaginable structure. This view, in one form or another, has been expressed by many post-Humboldtian linguists. To mention just the temporal extremes, it can be illustrated by W. D. Whitney’s critique of Humboldtian linguistics (“Steinthal and the Psychological Theory of Language,” *North American Review*, 1872; reprinted in *Oriental and Linguistic Studies* (New York: Scribner, Armstrong, 1874)), in which he concludes that “the infinite diversity of human speech ought alone to be a sufficient bar to the assertion that an understanding of the powers of the soul involves the explanation of speech” (*Oriental and Linguistic Studies*, p. 360) and that language is strictly a “historical product,” nothing other than “the sum of words and phrases by which any man expresses his thought” (p. 372); or M. Joos’ summary of what he calls the “Boasian” tradition of American linguistics as adopting the view “that languages could differ from each other without limit and in unpredictable ways” (M. Joos (ed.), *Readings in Linguistics* (Washington: American Council of Learned Societies, 1957), p. 96). Humboldt, in contrast, repeatedly expresses his opinion that, in their general structural features, languages are cast to the same mold. It seems to me that he is consistent in adopting the position that he expresses clearly in a letter to A. W. Schlegel (1822, cf. Leitzmann, *Briefwechsel zwischen W. von Humboldt und A. W. Schlegel*, p. 54): “That all languages, in terms of grammar, look quite similar to each other is indisputable, if one investigates their inner workings profoundly, rather than superficially.” Furthermore, this is clearly the only view compatible with his Platonistic theory of language acquisition (cf. p. 98 below).

See Chomsky, *Current Issues in Linguistic Theory*, for some further discussion of the historical importance of Whitney’s influential but (in my opinion) utterly wrong-headed and superficial critique.

49. As emphasized by H. Steinthal in his *Gedächtnissrede auf Humboldt an seinem hundertjährigen Geburtstage* (Berlin, 1867).
50. R. Rucker, *Nationalism and Culture*, trans. R. E. Chase (London: Freedom Press 1937). This judgment is based largely on Humboldt’s early essay *Ideen zu einem Versuch die Grenzen der Wirksamkeit des Staats zu bestimmen* (1792). Parts of this are translated in Cowan, *Humanist without Portfolio*, pp. 37–64.

51. The political meaning of a “natural rights” doctrine such as Humboldt’s depends very much on the exact way in which it is phrased and the social context in which it appears, and an evaluation of these questions, in the present case, raises many problems. The terms in which Humboldt frames this doctrine suggest a comparison with Marx’s *Economic and Philosophic Manuscripts* (1844; trans. T. B. Bottomore, in *Marx’s Concept of Man*, ed. E. Fromm (New York: Ungar, 1961), with their description of the “alienation of labor when work is *external* to the worker, ... not part of his nature ... [so that] ... he does not fulfill himself in his work but denies himself ... [and is] ... physically exhausted and mentally debased” (p. 98) and their definition of the “species-character” of human beings as “free, conscious activity” and “productive life” (p. 101), of which man is deprived by the alienated labor that “casts some of the workers back into a barbarous kind of work and turns others into machines” (p. 97), as well as with Marx’s well-known reference to a higher form of society in which “labor has become not only a means of life, but also the highest want in life” (*Critique of the Gotha Program*, 1875).

Humboldt’s remarks might be compared with Rousseau’s critique of modern social institutions in the *Discourse on the Origins and Foundations of Inequality among Men* (1755; translated in *The First and Second Discourses*, ed. R. D. Masters (New York: St Martin’s, 1964). Rousseau’s goal is “to set forth the origin and progress of inequality, the establishment and abuse of political societies, insofar as these things can be deduced from the nature of man by the light of reason alone, and independently of the sacred dogmas which give to sovereign authority the sanction of divine right” (p. 180). Along strictly Cartesian lines, he characterizes an animal as “only an ingenious machine to which nature has given senses in order to revitalize itself and guarantee itself, to a certain point, from all that tends to destroy or upset it.” “Every animal has ideas, since it has senses; it even combines its ideas up to a certain point, and in this regard man differs from a beast only in degree” (cf. note 13). What distinguishes man from beast in an absolute way is that man is a “free agent” and has “the consciousness of this freedom” (a further specific difference, perhaps reducible to man’s freedom, is his “faculty of self-perfection,” as an individual and a species). Although much in man’s nature can be attributed to properties of “the human machine,” still man’s behavior is uniquely beyond the bounds of physical explanation. “For physics explains in some way the mechanism of the senses and the formation of ideas; but in the power of willing, or rather of choosing, and in the sentiment of this power are found only spiritual acts about which the laws of mechanics explain nothing” (p. 113f.).

Notes

From this essentially Cartesian picture of human nature, Rousseau develops his theory and evaluation of modern society. Since freedom is “the most noble of man’s faculties,” one is “degrading one’s nature, putting oneself on the level of beasts enslaved by instinct” by renouncing freedom and subjecting oneself to the dictates of a “ferocious or insane master” (p. 167). The national state, modern social organization, and conventional law all originate in a kind of conspiracy by the rich and powerful to preserve and institutionalize power and property, a conspiracy that “gave new fetters to the weak and new forces to the rich, destroyed natural freedom for all time, established forever the law of property and inequality, changed a clever usurpation into an irrevocable right, and for the profit of a few ambitious men henceforth subjected the whole human race to work, servitude, and misery.” Finally, with the establishment of the national state, “the most decent men learned to consider it one of their duties to murder their fellow-men; at length men were seen to massacre each other by the thousands without knowing why” (pp. 160–161). In so far as society institutionalizes property rights, magistracy, and arbitrary power, it violates natural law (pp. 168ff.). It is contrary to natural right and against the law of nature that “a handful of men be glutted with superfluities while the starving multitude lacks necessities” (p. 181) or that “each man finds his profit in the misfortune of others” (p. 194); “and the jurists, who have gravely pronounced that the child of a slave would be born a slave, have decided in other terms that a man would not be born a man” (p. 168). Man has become mere “sociable man,” living “outside of himself” and “only in the opinion of others,” from whose judgment alone “he draws the sentiment of his existence” (p. 179). He can regain true humanity only by abolishing the status of rich and poor, powerful and weak, master and slave – by “new revolutions” that will “dissolve the government altogether or bring it closer to its legitimate institution” (p. 172); “the uprising that ends by strangling or dethroning a sultan is as lawful an act as those by which he disposed, the day before, of the lives and goods of his subjects” (p. 177). [Chomsky expands upon his discussion of Rousseau and Humboldt in “Language and Freedom” (originally published in 1970; an accessible reprint is found in Chomsky 1987).]

52. N. S. Troubetzkoy, “La phonologie actuelle,” *Psychologie de langage* (Paris, 1933), p. 245.
53. This notion seems to have developed in connection with the controversy over use of the vernacular to replace Latin. Cf. F. Brunot, *Histoire de la langue Française* (Paris: Librairie Armand Colin, 1924), vol. IV, pp. 1104f., and G. Sahlín, *César Chesneau du Marsais et son rôle dans l’évolution de la Grammaire*

générale (Paris: Presses-Universitaires, 1928), pp. 88–89, for some early references, including one to a 1669 source that goes so far in defense of the naturalness of French as to claim that “the Romans think in French before speaking in Latin.” Diderot is so convinced of the “naturalness” of French that he regards it as more suitable for science than for literature, the other European languages, “unnatural” in their word order, being more suited for literary expression (*Lettre sur les sourds et muets*, 1751). Englishmen tended to have a different view of the matter. Bentham, for example, held that “of all known languages, English is ... that in which, in the highest degree, taken in the aggregate, the most important of the properties desirable in every language are to be found” (*Works*, edited by J. Bowring (New York: Russell and Russell, 1962), vol. VIII, p. 342). Huarte, writing in the late sixteenth century, took for granted “the Analogy and Correspondence between the Latin Tongue, and the Rational Soul”: “*Latin* words, and the manner of speaking this Tongue, are so Rational, and so agreeably strike the Ear, that the Rational Soul meeting with the Temperament necessary to invent a very eloquent Language, immediately stumbles on the Latin” (*Examen de Ingenios*, op. cit., p. 122).

From the seventeenth century, there was much discussion of the possibility of inventing a “philosophical language” that would reflect “la vraie philosophie” and the principles of thought better than any actual human language. An interest in this problem is apparently at the roots of Leibniz’s interest in comparative grammar, which might reveal the “excellencies of language.” For discussion of these developments, see Couturat and Leau, *Histoire de la langue universelle* (Paris, 1903); Margaret M. C. McIntosh, *The Phonetic and Linguistic Theory of the Royal Society School, from Wallis to Cooper*, unpublished B.Litt. thesis, Oxford University (1956); Cassirer, *The Philosophy of Symbolic Forms*.

54. B. Lamy, *De l’Art de Parler* (1676). There are, however, stylistic reasons that may lead one to invert the “ordre naturel” in many languages; not, however, in French, which does not, he maintains, make use of such “figures de Grammaire,” since “it relishes cleanliness and simplicity; that is why it expresses things as much as it can in the simplest and most natural order” (p. 23). Cf. also pp. 26–27.
55. J. Wilkins, *An Essay towards a Real Character and a Philosophical Language* (1668).
56. The assumption of a “natural order,” however, has the advantage that it does not fly in the face of the facts quite so obviously as the belief that language can be described in terms of “habits” or “dispositions to respond” or that the syntactic structure of a language is some sort of list of patterns. It is,

Notes

- therefore, not excluded that the notion of “natural order” can be clarified and developed as a hypothesis of some significance regarding language structure.
57. Leibniz, *Nouveaux essais sur l'entendement humain*, book III, chap. VII; trans. *New Essays Concerning Human Understanding*, ed. A.G. Langley (La Salle: Open Court, 1949). He goes on to maintain that “an exact analysis of the signification of words would show us better than anything else the workings of the understanding” (p. 368 of the 1949 edition). For further discussion of Leibniz’s concern with language, see H. Aarslef, “Leibniz on Locke on Language,” *American Philosophical Quarterly* 1 (1964), pp. 1–24.
 58. F. Schlegel, *Geschichte der alten und neuen Literatur* (1812); cited by Fiesel, *Die Sprachphilosophie der deutschen Romantik*, p. 8. See also A. W. Schlegel, “De l’étymologie en général,” in *Oeuvres écrites en Français*, ed. E. Böcking (Leipzig, 1846), p. 133: “It was often said that grammar is logic at work; but there is more: it constitutes a profound analysis, a subtle metaphysics of thought.”
 59. Occasionally, from quite unexpected sources. For example, Proudhon’s scholarship application to the Besançon Academy, in 1837, announced his intention of developing a general grammar in which he hoped to “search for the psychology of new regions, the philosophy of new paths; study the nature and mechanism of the human mind with respect to the most striking and recognizable of its faculties, speech; determine, on the basis of the origin and working of language, the source and organization of human beliefs; apply, in one word, grammar to metaphysics and ethic, and achieve a thought over which profound geniuses fret...” (*Correspondance de P.-J. Proudhon*, ed. J.-A. Langlois (Paris: Librairie Internationale, 1875), vol. I, p. 31).
Cf. also J. S. Mill: “Grammar ... is the beginning of the analysis of the thinking process. The principles and rules of grammar are the means by which the forms of language are made to correspond with the universal forms of thought. The distinctions between the various parts of speech, between the cases of nouns, the moods and tenses of verbs, the functions of particles, are distinctions in thought, not merely in words... The structure of every sentence is a lesson in logic” (Rectorial Address at St. Andrews, 1867, cited with characteristic modern disapproval by Jespersen, *The Philosophy of Grammar*, (London: Allen and Unwin, 1924), p. 47).
Another and rather different development of the view that language (in its deeper structure) mirrors thought can be found in the work of Frege, Russell, and the early Wittgenstein. This is well known, and I will not discuss it further here. [For a discussion of some aspects of Chomsky’s view of Frege, see the second chapter of his 1996.]
 60. N. Beauzée, *Grammaire générale, ou exposition raisonnée des éléments nécessaire du langage* (1767). Page references here and below are to the revised and

corrected edition of 1819.

61. This of course leaves quite open the question of how creative thought is possible, and the discussion of this matter was no more satisfactory than any account that can be given today – that is, it is left as a complete mystery. Cordemoy, for example, attributes “new thoughts that come to us, without being able to find their cause in ourselves, or to attribute them to others” to “inspiration,” that is, to communication from disembodied spirits (op. cit., pp. 185–186). Many others of the period would agree that, in some way or other, “man possesses some analogy to the Divine attributes in his intellectual faculties” (Herbert of Cherbury, *De Veritate*, 1624, p. 167; page references here and below are to the translation by M. H. Carré, University of Bristol Studies No. 6, 1937). This invocation of the supernatural should be considered against the background of the revived neo-Platonism, with its interpretation of human creativity as an analogue of divine “emanation,” in aesthetic theory from the sixteenth century through romanticism. For discussion, see Lovejoy, *The Great Chain of Being*, and Abrams, *The Mirror and the Lamp*, and further references given there. [It is apparent from the examples that Chomsky is speaking here of causes or sources of creative thought. Later work (e.g., Chomsky 1972) seems to allow that one could give an account of how creative thought is possible: one could speak to the nature of the mind that would allow it. See the editor’s introduction and also McGilvray 2003.]
62. Recall that for La Mettrie the soul is not a separate substance; rather, “since all the soul’s faculties depend so much on the specific organization of the brain and of the whole body, that they are clearly nothing but that very organization itself: the machine is perfectly explained! ... Thus the soul is merely a vain term of which we have no idea and which a good mind should use only to refer to that part of us which thinks” (p. 26; *MaM*, p. 128). He admits forthrightly, regarding the “imaginative faculty” of the brain, that we know “as little about its nature as we do about its method of working” and that its products are “the wonderful and incomprehensible result of the organisation of the brain” (p. 15; *MaM*, p. 107). Later writers are much less diffident and describe the brain as secreting thought much as the liver secretes bile (Cabanis), and so on.
63. The Cartesians characteristically assumed that mental processes are common to all normal humans and that languages may therefore differ in the manner of expression but not in the thoughts expressed. Cordemoy, for example, in discussing language learning (op. cit., pp. 40ff.; cf. p. 97 below), describes the acquisition of a second language as merely a matter of assigning new linguistic expressions to the ideas that are already associated with expressions of the first language. It follows, then, that there should be no fundamental

Notes

- difficulty in translating from one language to another. This claim, of course, would be vigorously denied by the romantics, who think of language not just as a “mirror of the mind” but as a constitutive element in mental processes and as a reflection of cultural individuality (cf. Herder: “The best account of the history and the diverse characteristics of human understanding and sentiment would thus be a philosophical comparison of languages, for the understanding and character of a people are in every case stamped in their language.” *Ideen zur Philosophie der Geschichte der Menschheit*, 1784–1785, in Heintel, op. cit., p. 176).
64. We return to some of its concrete proposals directly.
65. Page references are to *Works*, vol. 1 (cf. note 28).
66. It follows, then, that the interrogative and indicative (in which the response is made) are closely related. “So near indeed is this Affinity, that in these two Modes alone the Verb retains the same Form, nor are they otherwise distinguished, than either by the Addition or Absence of some small particle, or by some minute change in the collocation of the words, or sometimes only by a change in the Tone, or Accent” (p. 299). More precisely, in the case of a “simple interrogative” (i.e., a simple yes-or-no question), the response is (except for possible ellipsis) made in almost the same words as the interrogative; “indefinite interrogatives,” however, “may be answered by infinite affirmatives, and infinite negatives. For instance – *Whose are these Verses?* We may answer affirmatively – *They are* Virgil’s, *They are* Horace’s, *They are* Ovid’s, etc. – or negatively – *They are not* Virgil’s, *They are not* Horace’s, *They are not* Ovid’s, and so one, either way, to infinity” (p. 300, footnote).
67. Apart from its Cartesian origins, the Port-Royal theory of language, with its distinction between deep and surface structure, can be traced to scholastic and renaissance grammar; in particular, to the theory of ellipsis and “ideal types” that reached its fullest development in Sanctius’s *Minerva* (1587). For some discussion, see Sahlin, op. cit., chap. 1 and pp. 89f. {As noted earlier, quotations from the Port-Royal *Grammar* – Lancelot and Arnauld’s *Grammaire Générale et Raisonnée* – use the translation in Arnauld and Lancelot 1975 (which is occasionally modified). Page references are given to both the first French edition (1660) and to Arnauld and Lancelot 1975 (abbreviated PRG).]
68. This transformation is not mentioned, but it is implicit in the examples that are given.
69. Arnauld, *La Logique, ou l’art de penser* (1662). Translated by J. Dickoff and P. James as *The Art of Thinking: Port-Royal Logic* (Indianapolis: Bobbs-Merrill, 1964). Page references are to this translation. {Also translated by J. V. Buroker in Arnauld and Nicole 1996 (abbreviated PRL), to which page references are

also given.] For some recent discussion of the linguistic significance of this work, see H. E. Brekle, "Semiotik und linguistische Semantik in Port-Royal," *Indogermanische Forschungen* 69 (1964), pp. 103–121

70. The notion "idea" in Cartesian thought is crucial but difficult. Several terms are used (e.g., "idea," "notion") apparently without a systematic distinction in sense, and the concept itself is not clearly characterized. In the *Meditations*, III, Descartes relates the term "idea" to "image," stating that "some of my thoughts are as it were the images of things, and it is only in these cases that the term 'idea' [Latin: *idea*] is strictly appropriate" (CSM II, 25; of course, these "images" may be derived by imagination or reflection, rather than received through sense). In his reply to Hobbes's *Objection* to this passage, Descartes clarifies his intentions (modifying his formulation in the process, so it appears) stating that "I am taking the word 'idea' to refer to whatever is immediately perceived by the mind. For example, when I want something, or am afraid of something, I simultaneously perceive that I want, or am afraid; and this is why I count volition and fear among my ideas" (CSM II, 127). The latter use of "idea" as, essentially, an object of thought, is the one that seems consistent with his general usage. For example, in the *Discourse on the Method* he speaks of "certain laws which God has so established in nature, and of which he has imprinted such notions in our minds" (CSM I, 131). Similarly, in the *Principles of Philosophy* (pt. I, art.13), no fundamental distinction is made between "the ideas of numbers and shapes" and "such common notions as: *If you add equals to equals the results will be equal*" (CSM I, 197). The latter usage of the term "idea," as anything that can be "conceived" (not merely "imagined"), is the one carried over to the Port-Royal *Logic*. In this sense, concepts of varied types, even propositions are ideas. This usage is widespread. Lamy (op. cit., p. 7), who makes no pretense to originality, describes ideas as "the objects of our perceptions" and asserts that "besides these ideas, which are excited by things that touch our body, we find others deep in our nature, which do not come into our mind through the senses – for example, those which represent primary truths like: You must return to someone what belongs to him; It is impossible for something to be and not to be at one and the same time, etc." In general, the discussion of simple and complex propositions throughout the Port-Royal *Grammar* and *Logic* suggests this concept of "idea," since propositions are described as formed by combining ideas, and complex ideas are described as based on underlying constituent propositions. In this sense, "idea" is a theoretical term of the theory of mental processes; the comprehension (i.e., intension or meaning) of an idea is the fundamental notion in semantic interpretation, and in so far

Notes

as the deep structure of language is regarded as a direct reflection of mental processes, it is the fundamental notion in the analysis of thought.

For further discussion see J. Veitch, *The Method, Meditations, and Selections from the Principles of Descartes* (Edinburgh: Blackwood and Sons, 1880), note II, pp. 276–285.

71. In the French original, the cited sentence is: “La doctrine qui met le souverain bien dans la volupté du corps, laquelle a été enseignée par Epicure, est indigne d’un Philosophe.” The Dickoff-James translation, which I have followed elsewhere, translates this as: “The doctrine which identifies the sovereign good with the sensual pleasure of the body and which was taught by Epicurus is unworthy of a philosopher.” But in this translation the explicative relative “which was taught by Epicurus” would naturally be taken as a determinative clause conjoined with the first determinative clause “which identifies...” in which case the point of the example is lost. [In Arnauld and Nicole 1996, the sentence is translated: “The doctrine that places the highest good in bodily pleasure, which was taught by Epicurus, is unworthy of a philosopher” (90).]
72. Notice, incidentally, that adjective-noun constructions in the surface structure may derive by grammatical transformations of the type proposed in the Port-Royal *Grammar* from either type of relative, as is evident from the examples given there and, more strikingly, in such ambiguous examples as Jespersen’s “The industrious Japanese will conquer in the long run” (op. cit., p. 112).
73. Notice that, in such cases, it is not true that each of the elementary abstract objects constituting the deep structure itself underlies a possible sentence; thus “je vous dis,” for example, is not a sentence in itself. In current terminology, it is not the case that each item generated by the underlying base (phrase structure) rules underlies a possible kernel sentence. Similarly, in all work in transformational generative grammar of the last ten years or more, it has been taken for granted that the phrase-structure rules can introduce “dummy symbols” that receive a representation in terms of morpheme strings only as a result of application of embedding rules of one sort or another (as, for example, in verb-complement constructions in English), and the elementary strings in which these dummy symbols appear will not underlie kernel sentences. Various related ideas that have been explored during this period are summarized and discussed in Chomsky, *Aspects of the Theory of Syntax*, chap. III. [See also the bracketed discussion and references for note 80.]
74. A rather different analysis of these structures is presented by Beauzée, op. cit. He regards them as based on relative clauses with the antecedent

transformationally deleted. Thus the sentences “L’état présent des Juifs prouve que notre religion est divine,” “Ich glaube dass ich liebe,” and “I think (that) I love,” derive, respectively, from “L’état présent des Juifs prouve une vérité qui est, notre religion est divine,” “Ich glaube ein Ding dass ist, ich liebe,” and “I think a thing that is, I love” (p. 405).

75. For further discussion, see Chomsky, *Aspects of the Theory of Syntax*. It is worth mentioning that the theory of transformational generative grammar has in many respects moved toward a point of view like that implicit in the Port-Royal theory, as new evidence and insights have accumulated during the few years in which it has, once again, become an object of fairly intensive investigation.
76. Some earlier notions are reviewed by Sahlin, *op. cit.*, pp. 97f. The idea that a sentence can be regarded simply as a sequence of words or word categories, with no further structure, is frequently expressed (whether or not it is actually believed) by many later writers.
77. Notice that this is referred to as the principal, not the unique role of verbs. They are also used “to indicate other movements of our minds, as in to desire, to ask, to command, etc.” (p. 90). These matters are taken up again in chap. XV, where the grammatical means by which these mental states and processes are realized in various languages are briefly discussed. See p. 79 above.
78. The *Grammar* goes on to observe that it would be a mistake to assume, with certain earlier grammarians, that verbs necessarily express actions or passions or something that is taking place, and it offers as counterexamples such verbs as “existit,” “quiescit,” “friget,” “alget,” “tepet,” “calet,” “albet,” “viret,” “claret” (p. 94).
79. As noted earlier (p. 117): “it is often necessary to transform such a sentence from the active to the passive voice in order to put the argument into its most natural form and to express explicitly that which is to be proved.”
80. It is hardly just to attribute this insight to twentieth-century British philosophy, as its “central and fundamental discovery” (cf. Flew, *Introduction to Logic and Language*, First series (Oxford: Blackwell, 1952), p. 7; or Wittgenstein, *Tractatus Logico-Philosophicus* (1922), 4.0031, where it is attributed to Russell). Nor is the observation that “grammatical resemblances and dissimilarities may be logically misleading” (Flew, p. 8) quite as novel an insight as Flew suggests. See, for example, p. 86 below.

The general assumption of Cartesian linguistics is that the surface organization of a sentence may not give a true and full representation of the grammatical relations that play a role in determining its semantic content, and, as we have noted, a theory of grammar is sketched in which actual

Notes

sentences are derived from underlying “deep structures” in which these relations are grammatically represented. The extent to which “logical form” is actually represented by the syntactically defined deep structures, in the technical modern sense or the related sense suggested in Cartesian linguistics, is a further and in many respects open question. See J. Katz, *The Philosophy of Language*, (New York: Harper & Row, 1966), for discussion.

[Chomsky entertained the view that ‘semantic interpretation’ takes place at deep structure in his 1965 *Aspects*. He was to abandon this idea soon after in favor of increasingly refined versions of a view he had adopted earlier in his *Logical Structure of Linguistic Theory* (published as Chomsky 1975b) and in *Syntactic Structures*, that semantic interpretation takes place at an ‘output’ level of a derivation, where “conceptual-intentional” systems use the product of a derivation as a “tool” (*Syntactic Structures*) for whatever operations they perform. By the 1970s, that output level of a derivation came to be called “LF” (for “logical form”) or, later in the 1990s, SEM (for “semantic interface”). Deep structure – but not as the ‘place’ where semantic interpretation takes place – remained until the early 1990s as the place where basic “thematic assignments” are made, but it was abandoned as the “minimalist program” developed and more and more of what used to be thought of as irreducible linguistic structure came to be seen as ‘epiphenomena’ of primitive operations. Very recently (2001), even LF is abandoned as a ‘level’ of a derivation, and SEM comes to indicate simply an “interface” with other mental/internal systems. For relevant – but quite often technical – reading, see *Syntactic Structures* and Chomsky 1975b, 1965, 1975, 1980, 1986, 1992, 1995b, 2000, 2001ms.

It is quite likely that Chomsky’s reading of the Cartesian linguists in the late 1950s and early 1960s influenced his decision to endorse – provisionally and temporarily – Katz and Postal’s suggestion that semantic interpretation takes place at deep structure, rather than at some ‘output’ level. For some comment on the influence of this reading from Chomsky, see his *Current Issues in Linguistic Theory* and *Aspects of the Theory of Syntax*, especially the latter.]

81. Referred to, typically, as the “natural order.” See p. 69 above.
82. Many of Du Marsais’s published and unpublished works on language are printed posthumously in *Logique et Principes de Grammaire* (1769). Page references here are to this volume. The correlation between freedom of word order and inflection is noted by many other writers, e.g., Adam Smith in his *Considerations concerning the First Formation of Languages*.
83. When Bloomfield (along with many others) criticizes premodern linguistics

for obscuring the structural difference between languages “by forcing their descriptions into the scheme of Latin grammar” (*Language*, p. 8), he is presumably referring to such claims as this, which he regards as having been disproven. If so, then it must be observed that his book contains no evidence to support either the conclusion that philosophical grammar was wedded to a Latin model, or the conclusion that its actual hypothesis concerning the uniformity of underlying grammatical relations has been brought into question by modern work.

In general, it should be noted that Bloomfield’s account of premodern linguistics is not reliable. His historical survey consists of a few haphazard remarks that, he asserts, summarize “what eighteenth century scholars knew about language.” These remarks are not always accurate (as, for example, his astonishing assertion that prior to the nineteenth century linguists “had not observed the sounds of speech, and confused them with the written symbols of the alphabet” or that the writers of general grammars regarded Latin as supreme in embodying the “universal canons of logic”); and, where accurate, they give little indication of the character of what was done in this period.

The manner in which the sounds of speech were analyzed in this period deserves a separate discussion; it is quite arbitrary to exclude this topic from the present survey, as I have done. Most of the works discussed here, and many others, contain discussions of phonetics, and the Aristotelian dictum that “spoken words are the symbols of mental experience and written words are the symbols of spoken words” (*De Interpretatione*, 1) is apparently accepted with no discussion. There are a few modern references to the phonetics of this period. For example, M Grammont comments on the phonetics in Cordemoy, *op. cit.*, in the following terms: “...the articulations of a certain number of French phonemes are described with remarkable clarity and precision” (*Traité de phonétique* (Paris: Librairie Delagrave, 1933), 4th ed.(1950), p. 13n.; he goes on to observe that: “These are the descriptions that Molière reproduced word for word in *Le Bourgeois gentilhomme*, acte II, scène 6 (1670)”). [Chomsky developed his views of phonology and phonetics during the late 1950s and early 1960s with his colleague Morris Halle; see their 1968. Like his view of ‘meanings’ (LFs or semantic representations), Chomsky’s view of linguistic sounds is that they are “in the head.” See in this regard his 2000, which is a collection of his more recent works on language and mind.]

84. *Op. cit.*, pp. 34of. Bentham suggests a similar analysis (*op. cit.*, p. 356).
85. A distinction between the “ideas principally expressed” by a linguistic form and the “accessory ideas” associated with it is developed in the Port-Royal *Logic*, chaps. 14, 15. The principal idea is what is stated by the “lexical definition,” which attempts to formulate in a precise way the “truth of usage.”

Notes

But the lexical definition cannot “reflect the whole impression the defined word makes on the mind,” and “it often happens that a word excites in our minds, besides the principal idea which we regard as the proper meaning of the word, other ideas – ideas which we may call accessory ideas and to which though we receive their impression we do not explicitly attend” (p. 90). For example, the principal meaning of *you lied* is that you knew that the opposite of what you said is true. “But in addition to this principal meaning, these words convey an idea of contempt and outrage which suggest that the speaker would not hesitate to harm you – a suggestion which renders his words both offensive and injurious.” Similarly, Virgil’s line *To die, is that such a wretched thing? (Usque adeone mori miserum est?)* has the same principal meaning as *It is not so very wretched to die (Non est usque adeo mori miserum)*, but the original “expresses not only the bare thought that death is not so bad a thing as one supposes but suggests as well the image of a man who challenges death and looks it fearless in the face” (pp. 91–92). Accessory ideas may be “permanently attached to words,” as in the cases just mentioned, or they may be attached only in a particular utterance, for example, by gesture or tone of voice (p. 90). The association may, in other words, be a matter either of *langue* or *parole*.

The distinction is rather like that of cognitive and emotive meaning. Also relevant to contemporary issues is the example (p. 91) of how certain grammatical processes may change the accessory ideas expressed, without modification of principal meaning; thus, so it is claimed, to accuse someone of ignorance or deceit is different from calling him ignorant and deceitful, since the adjectival forms “express, in addition to the idea of particular shortcomings, an idea of contempt, whereas the nouns mean only the particular lack with no accompanying condemnation.”

86. C. Buffier, *Grammaire française sur un plan nouveau* (1709), cited by Sahlin, op. cit., pp. 121–122, with typical modern disparagement based, once again, on the assumption that surface structure alone is a proper object of study. See J. Katz and P. Postal, *An Integrated Theory of Linguistic Descriptions*, §§4.2.3, 4.2.4, for development and justification of a very similar idea.
87. “De la construction grammaticale,” *Logique et Principes de Grammaire*, p. 229.
88. The Latin example suggests a variety of problems, however. For some remarks on the phenomenon of so-called “free word order,” within the present context, see Chomsky, *Aspects of the Theory of Syntax*, chap. 2, §4.4. [The phenomenon of “case marking” in different languages has proven to be a particularly interesting issue for the linguist constructing a Universal Grammar. See Chomsky, 1986, 1995, and references provided there.]

89. It is not entirely clear from the context whether these conditions on transformations are regarded as matters of *langue* or *parole*, as conditions on a grammar or on the usage of a grammar; nor is it clear whether, within the framework that Du Marsais accepts, this question can be sensibly raised.

The account of sentence interpretation given by Du Marsais can be profitably compared with that proposed by Katz, Fodor, and Postal in recent work. See Katz and Postal, *op. cit.*, and references cited there. [See also the references in the bracketed addition to Chomsky's note 80.]

90. The examples that I give here are cited by Sahlin as indicative of the ridiculous character of Du Marsais's theory, concerning which "it would be unjust to confront it with modern science so as to reveal the altogether obvious errors in it" (Sahlin, *op. cit.*, p. 84).
91. T. Reid, *Essays on the Intellectual Powers of Man* (1785). For some remarks and quotations, see Chomsky, *Aspects of the Theory of Syntax*, pp. 199–200.
92. Except to the extent indicated by the final example, the analysis of indefinite articles. Such attempts to go beyond surface form are tolerated by modern linguistic theory and have been the subject of much methodological discussion during the 1940s, particularly in the United States.
93. See Postal, *Constituent Structure* (The Hague: Mouton, 1964), for discussion of contemporary approaches to syntax that accept this limitation. Many modern methodological discussions actually imply, further, that linguistic investigation should be restricted to the surface structure of the given utterances of a fixed corpus; thus Sahlin reflects modern attitudes in criticizing Du Marsais (p. 36) for the "inexcusable fault on the part a grammarian" of using invented examples instead of restricting himself to utterances actually observed in living speech, as though a rational alternative were conceivable.

For further discussion of the problem of analyzing deep and surface structure see Chomsky, *Syntactic Structures* (The Hague: Mouton, 1957), *Current Issues in Linguistic Theory, Aspects of the Theory of Syntax*; Lees, *Grammar of English Nominalizations* (The Hague: Mouton, 1960); Postal, "Underlying and Superficial Linguistic Structures," *Harvard Educational Review* 34 (1964); Katz and Postal, *An Integrated Theory of Linguistic Descriptions*; Katz, *The Philosophy of Language*; and many other publications.

94. To mention just one example, consider Harnois's introductory statement in his discussion of "philosophical grammar" (*op. cit.*, p. 18; it should be emphasized that this discussion is unusual in that it at least pays attention to the actual doctrines that were held by philosophical grammarians, instead of attributing to them absurd beliefs that were completely counter to their actual work). He points out that participants in this work felt themselves to be contributing "a science which had already produced one fundamental

Notes

work [viz., the Port-Royal *Grammar*], namely by enriching an existing tradition and adding to the numerous results already attained. This opinion may appear ridiculous to a modern linguist, but it was really held.”

It should be mentioned that the modern disparagement of traditional linguistic theory develops, not only from the decision to restrict attention to surface structure, but also, quite often, from the uncritical acceptance of a “behaviorist” account of language use and acquisition, common in its essentials to several fields – an account that seems to me to be pure mythology.

95. *Véritables principes de la grammaire* (1729), quoted by Sahlin, op. cit., pp. 29–30. The dating of this is discussed by Sahlin in the Introduction, p. ix. Much earlier, Arnauld had pointed out that “one has not usually treated as matters of particular grammars what is common to every language” (1669, cited by Sainte-Beuve, op. cit., p. 538), and the distinction between general and particular grammar is implicit, though not expressed, in the Port-Royal *Grammar*. Wilkins also distinguishes between “natural” (that is, “philosophical,” “rational,” or “universal”) grammar, which deals with the “ground and rules as do necessarily belong to philosophy of letters and speech,” and “instituted” or “particular” grammar, which deals with the “rules which are particular to a given language” (op. cit., p. 297).
96. Beauzée, op. cit., Preface, pp. v–vi.
97. Quoted by Sahlin, op. cit., p. 21. Note that there is a difference in emphasis in the remarks of Beauzée and D’Alembert on the relation between particular facts and general principles. The two views, however, are not inconsistent.
98. Cf. Sainte-Beuve, op. cit., pp. 538f.; Harnois, op. cit., p. 20.
99. There is, to be sure, an implicit element of so-called “prescriptivism” in his choice of “cultivated usage” (that is, the usage of the best authors, but, particularly, “the usage of spoken language” in the Court) as the object of description.
100. Note that a restriction of linguistic study to description without explanation does not entail a corresponding restriction to the investigation of surface structure. The latter is a further and independent limitation. [Compare the restriction to “pure description” to Wittgenstein’s *Blue Book* and *Philosophical Investigations*. It is interesting that Chomsky, like Wittgenstein, holds that it is very likely impossible to construct a science (serious theory) of language use – and for parallel reasons having to do with language’s creative use (although Wittgenstein did not use this terminology). Chomsky, of course, unlike Wittgenstein, holds that it is possible to construct a science of language (Universal Grammar). For some discussion, see the editor’s introduction.]
101. Vaugelas is by no means the first to insist on the primacy of usage. A century

before, in one of the earliest French grammars, Meigret insists that “we must speak in the way that we do speak” and that one may not “make any law against the way French is usually pronounced” (quoted by Ch.-L. Livet, *La grammaire française et les grammairiens du XVI^e siècle*).

It is interesting to note that the reaction of the Cartesian linguists against pure descriptivism recapitulates the evolution of speculative grammar in the thirteenth century, as an attempt to provide rational explanation in place of a mere record of usage. Speculative grammar also distinguished universal from particular grammar; for example, Roger Bacon assumes that “with respect to its *substance* grammar is one and the same in all languages, although it does vary *accidentally* (*Grammatica Graeca*, ed. Charles, p. 278, cited in N. Kretzmann, “History of Semantics,” in *Encyclopedia of Philosophy*, ed. P. Edwards (New York: Macmillan, 1967)).

102. Quoted by Sahlin, *op. cit.*, p. 26, from the article “Datif” in the *Encyclopedia*. Sahlin also gives (p. 45) a much earlier quote from the *Véritables principes* (see note 95): “Grammar does not come before languages. There is no language that has been based on grammar; the rules [*observations*] of grammarians must be based on usage, and are not laws that have preceded usage.” This quote is followed by the comment that Du Marsais did not adhere to this principle, but, though there is much to criticize in his work, I find little evidence to support this charge.
103. This is, of course, consistent with Cartesian methodology, which insists on the necessity of observation and of crucial experiment for choice among competing explanations. See *Discourse on the Method*, part VI. The Cartesian origins of the concern for a “general (universal) grammar” [*grammaire générale*] (expressing what is a common human possession) and an “explanatory grammar” [*grammaire raisonnée*] (which will explain facts instead of merely listing them) are too obvious to require discussion. Similarly, it was the newly rediscovered Aristotelian concept of rational science that led to the speculative grammar of the thirteenth century. Cf. Kretzmann, *op. cit.*
104. This discussion is due to Arnauld and appears in his correspondence a year before the publication of the *Grammar*. Cf. Sainte-Beuve, *op. cit.*, pp. 536f.

The *Grammar* is, incidentally, not entirely fair to Vaugelas in tacitly implying that he was unaware of counterexamples. In fact, Vaugelas himself mentions one of the cited counterexamples (namely, the vocative, for which he proposes an understood, deleted article). Furthermore, Vaugelas does in fact offer a tentative explanation, rather apologetically, to be sure, for the rule as he formulates it.
105. For further discussion of the matter of explanation in linguistics, see

Notes

Chomsky, *Syntactic Structures*; “Explanatory Models in Linguistics,” in *Logic, Methodology and Philosophy of Science*, ed. E. Nagel, P. Suppes, A. Tarski (Stanford: Stanford University Press, 1962); *Current Issues in Linguistic Theory*; and J. Katz, “Mentalism in Linguistics,” *Language* 40 (1964), pp. 124–137. [See also Chomsky 1975a,b, 1980, 1981, 1986, 1988, 1992, 1995b, and 2000. In a sense, Chomsky’s most recent work has gone “beyond explanation” for – unlike the state of linguistics in 1966 – he can now plausibly hold that the issue of explanatory adequacy as he originally posed it in *Aspects* (in effect, solving “Plato’s problem”) has been sufficiently settled to move on to other matters. Now he focuses on other explanatory issues – matters of computational economy and biological embodiment. Incidentally, it is illuminating to compare Chomsky’s view on innateness with Humboldt’s.]

One of the most striking features of American descriptivism in the 1940s was its insistence on justification in terms of precisely specified procedures of analysis. The emphasis on precision and on the necessity for justification of descriptive statements in some language-independent terms constitutes a major contribution. But the requirements that were placed on justification (namely, that it be “procedural,” in the sense of the methodological discussions of the 1940s) were so strong as to make the enterprise unfeasible, and some of the reactions to this stringency (in particular, the view that any clearly specified procedure of analysis is as good as any other) detracted substantially from its potential significance.

106. Observe, however, that the discussion in the Port-Royal *Grammar*, if interpreted quite literally, does not identify the underlying structures with actual sentences. Cf. p. 78 above, and note 73. It is thus quite close, in conception, to transformational generative grammar of the sort developed in the references of note 93, which has also been based on the assumption that the structures to which transformational rules apply are abstract underlying forms, not actual sentences. Notice, incidentally, that the theory of transformations as originally developed by Harris, outside of the framework of generative grammar, does regard transformations as relations among actual sentences and is, in fact, much closer to the conception of Du Marsais and others, in this respect (see Z. S. Harris, “Co-occurrence and Transformation in Linguistic Structure,” *Language* 33 (1957), pp. 283–340, and many other references). See Chomsky, *Current Issues in Linguistic Theory*, p. 62n., for some discussion bearing on this point.
107. Humboldt’s picture was, however, a good bit more complex. Cf. pp. 62–69 above.
108. Notice that, when described in these terms, linguistic universals need not be

found in every language. Thus, for example, when a certain set of phonetic features is claimed to constitute a universal phonetics, it is not proposed that each of these features functions in every language, but rather that every language makes its particular choice from among this system of features. Cf. Beauzée, *op. cit.*, p. ix: “the necessary elements of language...are in fact present in all languages, and their necessity is indispensable for the analytic and metaphysical exposition of thought. But I do not intend to speak of an individual necessity, which does not leave anyone free to reject any idiom; I mean to indicate only a specific necessity [*une nécessité d'espèce*], which sets the limits of the choices that one can make.” [This view of a mind’s ‘choice’ among phonetic features anticipates Chomsky’s later (early 1980s) principles and parameters approach to the ‘choices’ a child’s mind makes in acquiring a language.]

109. Translated by M. H. Carré (1937), University of Bristol Studies, No. 6.
110. These developments are familiar except, perhaps, for seventeenth-century English Platonism. See A. O. Lovejoy, “Kant and the English Platonists,” in *Essays Philosophical and Psychological in Honor of William James* (New York: Longmans, Green, 1908), for some discussion of English Platonism, in particular, of its interest in the “ideas and categories which enter into every presentation of objects and make possible the unity and interconnectedness of rational experience.” Lovejoy’s account, in turn, is based heavily on G. Lyons, *L'idéalisme en Angleterre au XVIII^e siècle* (Paris, 1888). See also J. Passmore, *Ralph Cudworth* (Cambridge: Cambridge University Press, 1951); L. Gysi, *Platonism and Cartesianism in the Philosophy of Ralph Cudworth* (Bern: Herbert Lang, 1962). Some relevant quotes from Descartes, Leibniz, and others are given in Chomsky, *Aspects of the Theory of Syntax*, chap. 1, §8, where the relevance of this position to current issues is also briefly discussed. [Chomsky notes in *CL*’s conclusion (p. 104 below) that some figures have been omitted from his survey of ‘Cartesian linguists’, or have been inadequately discussed. He mentions Immanuel Kant in particular. It is perhaps significant that the Cambridge Platonists had more to say about the scientific issues of language acquisition that Chomsky discusses than Kant, who was primarily interested in epistemological issues and had little to say that could be seen as anticipating Chomsky’s ‘biologizing’ of language.]

See also Chomsky, *Explanatory Models in Linguistics*, and Katz, *Philosophy of Language*, for discussion of an essentially rationalist approach to the problem of language acquisition and of the inadequacy of empiricist alternatives. In the same connection, see Lenneberg, *op. cit.* and *Biological Foundations of Language* (New York: John Wiley, 1967), and SVI of *The Structure of Language: Readings in the Philosophy of Language*, ed. J. Fodor

Notes

and J. Katz (Englewood Cliffs: Prentice-Hall 1964). [See also Jenkins 1999 and several of the chapters of McGilvray 2003, plus references in both.]

111. Leibniz, *Discourse on Metaphysics*. The quotations here are from the English translation in *Leibniz: Discourse on Metaphysics and Correspondence with Arnauld*, trans. G. Montgomery (La Salle: Open Court 1902). With reference to Plato's theory, Leibniz insists only that it be "purged of the error of pre-existence." Similarly, Cudworth accepts the theory of reminiscence without the doctrine of preexistence that Plato suggests as an explanation for the facts he describes: "And this is the only true and allowable sense of that old assertion, that knowledge is reminiscence; not that it is the remembrance of something which the soul had some time before actually known in a pre-existent state, but because it is the mind's comprehending of things by some inward anticipations of its own, something native and domestic to it, or something actively exerted from within itself" (*Treatise concerning Eternal and Immutable Morality*, p. 424; page references, here and below, are to the first American edition of works of Cudworth, vol. II, T. Birch, ed., 1838). [The quotation is found on p. 74 of Sarah Hutton's recent edition of the *Treatise* (Cudworth 1996). References to this text have been added to Chomsky's references below and in the text.]

Leibniz's view (*Discourse on Metaphysics*, §26) that "the mind at every moment expresses all its future thoughts and already thinks confusedly of all that of which it will ever think distinctly" might be regarded as suggesting the fundamental insight regarding language (and thought) that we discussed in §2.

112. Cf. Beauzée, op. cit., pp. xv–xvi. He defines "grammatical metaphysics" [*la Métaphysique grammaticale*] as being nothing but "the nature of language brought into the open, established in its own terms, and reduced to general notions":

The fine points that this metaphysics discovers in language...come from eternal reason, which unconsciously directs us... It would be vain to claim that those who speak the best are not aware of these delicate principles. How could they put them into practice so well unless they were somehow aware of them? I admit that they would perhaps not be ready to use all the rules in their reasoning, because they have not studied them systematically [*l'ensemble et le système*]; but in the end, since they apply these principles, they are conscious of them within themselves; they cannot escape from the imprints of this natural logic which, covertly but irresistibly, directs honest minds in all their operations. But general grammar is simply the rational exposition of the procedures of this natural logic.

113. But cf. p. 92 above. The typical Cartesian view would apparently have been

that, although these principles may function unconsciously, they can be brought to consciousness by introspection.

114. But whatever trouble we take to teach them certain things, we often find that they know the names of a thousand others that we did not intend to show them; and, what is more surprising, we see that when they are two or three years old they are capable, through the mere force of their attention, to distinguish the name we give to a thing in all the constructions we use in speaking about it. (pp. 47–48)

He also points out that children learn their native language more easily than an adult can learn a new language.

It is interesting to compare these quite commonplace but perfectly correct observations with the picture of language learning that one generally finds among many modern writers, whose conclusions are, in fact, based not on observation but on a priori assumptions about what they believe must take place. Cf., e.g., the speculation on how all language “habits” are built up by training, instruction, conditioning, and reinforcement in Bloomfield, *op. cit.*, pp. 29–31; Wittgenstein, *Blue Book* (Oxford: Blackwell, 1958), pp. 1, 12–13, 77; Skinner, *Verbal Behavior* (New York: Appleton-Century-Crofts, 1957); Quine, *Word and Object* (Cambridge and New York: M.I.T. Press and John Wiley, 1960); etc. [See also the editor’s introduction.]

Occasionally, modern discussions invoke some process of “generalization” or “abstraction” that functions along with association and conditioning, but it must be emphasized that there is no known process of this sort that will begin to overcome the inadequacy of empiricist accounts of language acquisition. For discussion, see the references of note 110. In considering this problem, one must, in particular, bear in mind the criticism advanced by Cudworth (*op. cit.*, p. 462; Cudworth 1996, 114–116) against the attempt to show how general ideas might arise from sensory images (phantasms) by “abstraction” and thus require no postulation of innate mental structure. As he points out, the *intellectus agens* either “doth know what he is to do with these phantasms beforehand, what he is to make of them, and unto what shape to bring them,” in which case the question is begged, an “intelligible idea” being presupposed; or, if he has no such plan, “he must needs be a bungling workman,” that is, the act of “abstracting” can lead to any arbitrary and absurd result.

In short, reference to “generalization” does not eliminate the necessity to provide a precise account of the basis on which acquisition of beliefs and knowledge proceeds. We may, if we like, refer to the processes involved in language acquisition as processes of generalization or abstraction. But

Notes

we will then apparently be forced to conclude that “generalization” or “abstraction,” in this new sense, has no recognizable relation to what is called “generalization” or “abstraction” in any technical or well-defined usage of philosophy, psychology, or linguistics.

115. Cf. Steinthal, *Gedächtnissrede*, p. 17. He holds that Humboldt’s fundamental insight was to see “how nothing external could ever find its way into the human being if it were not originally in them already and how all external influence is only a stimulus for the bursting forth of the inwardness. In the depth of this inwardness lies the unitary source of all genuine poetry and genuine philosophy, the source of all ideas and all great human creations, and from this source, language too flows.”

Humboldt’s views on education, incidentally, illustrate the same concern for the creative role of the individual. In his early essay against state absolutism (see pp.66f. above), he argues that “sound instruction undoubtedly consists of spreading out before the person to be instructed various solutions, and then preparing him to choose the most appropriate, or even better, to invent his own solution by simply arranging before him all the difficulties to be conquered.” This method of instruction is, he maintains, not available to the state, which is limited to coercive and authoritarian means. (Cf. Cowan, op. cit., p. 43.) Elsewhere he holds that “all educational development has its sole origin in the inner psychological constitution of human beings, and can only be stimulated, never produced by external institutions” (Cowan, p. 126). “Man’s understanding, like all his other energies, is cultivated only by each human being’s own activity, his own inventiveness, or his own utilization of the inventions of others” (Cowan, pp. 42–43). Cf. also Cowan, pp. 132ff.

It is interesting to compare Harris’s observation in his *Hermes* that there is “nothing more absurd than the common notion of Instruction, as if Science were to be poured into the Mind like water into a cistern, that passively waits to receive all that comes. The growth of knowledge ... [rather resembles] ... the growth of Fruit; however external causes may in some degree cooperate, it is the internal vigour, and virtue of the tree, that must ripen the juices to their just maturity” (*Works*, p. 209). Here the ideal is apparently Socratic method; as Cudworth describes it (op. cit., p. 427; Cudworth 1996, 78), the belief that “knowledge was not to be poured into the soul like liquor, but rather to be invited and gently drawn forth from it; nor the mind so much to be filled therewith from without, like a vessel, as to be kindled and awaked.”

116. On the relation between Cudworth and Descartes, see Passmore, op. cit.; Gysi, op. cit.; and, for more general background, S. P. Lamprecht, “The Role of Descartes in Seventeenth-century England,” *Studies in the History*

- of Ideas*, vol. III, (New York: Columbia University Press, 1935), pp. 181–242. Passmore concludes (op. cit., p. 8) that, despite some divergence, “it is still not misleading to call Cudworth a Cartesian, so great was their agreement on so many vital issues.”
117. Cf. Descartes, Meditation II, CSM, 21: we know what it is that we see not “from what the eye sees” but “from the scrutiny of the mind alone.”
- But then if I look out of the window and see men crossing the square...I normally say that I see the men themselves... Yet do I see any more than hats and coats which could conceal automatons? I judge that they are men. And so something which I thought I was seeing with my eyes is in fact grasped solely by the faculty of judgement which is in my mind“
118. However, “the cogitations that we have of corporeal things [are] usually both noematic and phantasmatical together.” This accounts for the fact that geometricians will rely on diagrams and that “in speech, metaphors and allegories do so exceedingly please” (pp. 430, 468; Cudworth 1996, 81 (for quotations), 121 (for geometrician reference)).
119. In a similar way, Cudworth arrives at the typical rationalist conclusion that our knowledge is organized as a kind of “deductive system” by which we arrive at “a descending comprehension of a thing from the universal ideas of the mind, and not an ascending perception of them from individuals by sense” (p. 467; Cudworth 1996, 120, cf 113-14).
120. See Abrams, op. cit., for discussion of the importance of this theory of cognitive processes in romantic aesthetics, and of its origins in earlier thought, particularly, that of Plotinus, who “explicitly rejected the concept of sensations as ‘imprints’ or ‘seal-impressions’ made on a passive mind, and substituted the view of the mind as an act and a power which ‘gives a radiance out of its own store’ to the objects of sense” (Abrams, p. 59). Parallels between Kant and seventeenth-century English philosophy are discussed by Lovejoy, *Kant and the English Platonists*.
121. Quoted in A. D. Snyder, *Coleridge on Logic and Learning* (New Haven: Yale University Press, 1929), pp. 133–134.
122. Quoted in Snyder, op. cit., p. 116.
123. See, for example, D. M. MacKay, “Mindlike Behavior in Artefacts,” *British Journal for Philosophy of Science* 2 (1951), pp. 105–121. J. S. Bruner, “On Perceptual Readiness,” *Psychological Review* 64 (1957), pp. 123–152, “Neural Mechanisms in Perception,” *Psychological Review*, 64 (1957), pp. 340–358. For a review of many of the findings relating to central processes in perception, see H. L. Teuber, “Perception,” in the *Handbook of Physiology, Neurophysiology*, ed. J. Field, H. W. Magoun, V. E. Hall (Washington: American Physiological Society, 1960), vol III, chap. LXV. [Scientific research on perception since

Notes

- 1966 continues this theme; the literature is now massive. Chomsky sometimes refers to Marr 1981.]
124. For discussion and references in the areas of phonology and syntax respectively, see M. Halle and K. N. Stevens, "Speech Recognition: A Model and a Program for Research," in Fodor and Katz (eds.), *op. cit.*; and G. A. Miller and N. Chomsky, "Finitary Models of Language Users," part 2, in *Handbook of Mathematical Psychology*, ed. R. D. Luce, R. Bush, and E. Galanter (New York: John Wiley, 1963), vol. II..

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Index of Persons

- Aarslef, H., 123 (n.57),
Abrams, M. H., 115 (n.35), 118 (n.44),
118 (n.46), 124 (n.61), 140 (n.120)
Ammonius, 117 (n.42)
Aristotle, 30, 69, 100, 109 (n.9)
Arnould, A., 17, 82, 114 (n.30), 125
(n.67), 125 (n.69), 127 (n.71), 133
(n.95), 134 (n.104), 137 (n.111)
Ashe, T., 117 (n.44)
- Bacon, R., 134 (n.101)
Baker, M. C., 29
Bayle, F., 107 (n.8)
Bayle, P., 106 (n.5)
Beauzée, N., 17, 70, 83, 88, 91, 124
(n.60), 128 (n.74), 133 (n.96), 133
(n.97), 136 (n.108), 137 (n.112)
Bellamy, 108 (n.9)
Bentham, J., 122 (n.53), 131 (n.84)
Berthelot, R., 118 (n.46)
Black, J., 117 (n.43)
Bloomfield, L., 33, 41 (n.7), 57, 90,
111 (n.21), 115 (n.36), 117 (n.40),
130 (n.83), 138 (n.114)
Blumenbach, 118 (n.46)
Böcking, E., 123 (n.58)
Bottiglia, W., 47
Bottomore, T. B., 120 (n.51)
Bougeant, G. H., 56, 57, 58, 111 (n.17),
117 (n.40),
Bowring, J., 122 (n.53)
Brekke, H. E., 126 (n.69)
Brown, R. L., 115 (n.36)
Bruner, J. S., 140 (n.123)
- Brunot, F., 121 (n.53)
Buffier, C., 131 (n.86)
Buroker, J. V., 126 (n.69)
Bush, R., 141 (n.124)
- Cambridge Platonists, 33, 96, 136
(n.110), 140 (n.120)
Carmichael, L., 112 (n.23)
Carré, M. H., 124 (n.61), 136 (n.109)
Cassirer, E., 115 (n.35), 122 (n.53)
Chase, R. E., 119 (n.50)
Cherbury, Lord Herbert of, 18, 32, 33,
94, 95, 96, 124 (n.61)
Cicero, 109 (n.9)
Coleridge, S. T., 9, 18, 33, 65, 101, 117
(n.44), 118 (n.45), 140 (n.121)
Cordemoy, G. de, 13, 53, 54, 55, 57, 58,
73, 97, 110 (n.14), 111 (n.15), 113
(n.30), 124 (n.61), 124 (n.63), 130
(n.83)
Couturat, L., 122 (n.53)
Cowan, M., 66, 115 (n.36), 120 (n.50),
139 (n.115)
Cowie, F., 38–39
Cudworth, R., 18, 30, 31, 33, 43 (n.16),
99, 100, 101, 136 (n.110), 137
(n.111), 138 (n.114), 139 (n.115),
140 (n.116), 140 (n.119)
Curtiss, S., 108 (n.8)
Cuvier, G., 66
- D'Alembert, J., 89, 133 (n.97)
Darwin, C., 42 (n.12)
Descartes, R., 8–10, 12, 13, 14, 15, 16,

CARTESIAN LINGUISTICS

- 18, 23, 24, 28, 33, 36, 40 (n.4),
43–44 (n.18), 50, 51, 52, 53, 55,
57, 58, 59, 61, 94, 96, 99, 101, 105
(n.3), 106 (n.5), 107 (n.6), 108
(n.9), 110 (n.10), 110 (n.11), 110
(n.12), 110 (n.13), 110 (n.14), 111
(n.15), 111 (n.18), 111 (n.20), 113
(n.27), 113 (n.30), 126 (n.70), 136
(n.110), 140 (n.116), 140 (n.117)
- Dickoff, J., 125 (n.69), 127 (n.71)
- Diderot, D., 122 (n.53)
- Du Marsais, C. C., 17, 43 (n.14), 82,
83, 86, 88, 89, 91, 93, 122 (n.53),
129 (n.82), 132 (n.89), 132 (n.90),
132 (n.93), 134 (n.102), 135 (n.106)
- Edwards, P., 134 (n.101)
- Epicurus, 77, 127 (n.71)
- Field, J., 141 (n.123)
- Fiesel, E., 115 (n.35), 123 (n.58)
- Flew, A., 128 (n.80)
- Fodor, J., 20, 30, 110 (n.11), 111 (n.19),
132 (n.89), 137 (n.110), 141 (n.124)
- Frege, G., 123 (n.59)
- Fromm, E., 120 (n.51)
- Galanter, E., 141 (n.124)
- Galileo, G., 113 (n.30)
- Gallistel, C.R., 110 (n.11)
- Goethe, J. W. von, 66, 118 (n.46), 119
(n.47)
- Gombrich, E. H., 114 (n.30)
- Goodman, N., 33
- Grammont, M., 105 (n.1), 130 (n.83)
- Gunderson, K., 110 (n.9)
- Gysi, L., 136 (n.110), 140 (n.116)
- Halle, M., 40 (n.2), 46, 47, 130
(n.83), 141 (n.124)
- Harnois, G., 105 (n.1), 132 (n.94), 133
(n.98)
- Harris, J., 10, 33, 36, 41 (n.7), 59, 60,
64, 65, 72, 113 (n.28), 113 (n.29),
117 (n.42), 135 (n.106), 139 (n.115)
- Harris, Z. S., 33, 135 (n.106)
- Heath, P.L., 115 (n.36)
- Heintel, E., 112 (n.24), 125 (n.63)
- Herder, J. G., 33, 40, 58, 59, 61, 66, 112
(n.24), 125 (n.63)
- Hitler, A., 41 (n.7)
- Hobbes, T., 126 (n.70)
- Hockett, C. F., 33, 37, 38, 58, 112
(n.22)
- Hoffmann, S.-J., 7, 112 (n.24), 114
(n.31), 115 (n.36)
- Horace, 125 (n.66)
- Huarte, J., 8, 12, 62, 108 (n.9), 122
(n.53)
- Humboldt, W. von, 8, 9, 11, 17, 24,
31, 33, 39, 40, 50, 62, 63, 64, 65,
66, 67, 68, 70, 71, 94, 97, 98,
102, 103, 112 (n.25), 115 (n.36), 116
(n.37), 116 (n.38), 117 (n.39), 117
(n.41), 117 (n.44), 118 (n.45), 119
(n.48), 119 (n.49), 119 (n.50), 120
(n.51), 135 (n.105), 136 (n.107),
139 (n.115)
- Hutton, S., 43 (n.16), 137 (n.111)
- Huyghens, C., 55
- Jakobson, R., 47
- James, P., 126 (n.69), 127 (n.71)
- James, W., 136 (n.110)
- Jenkins, 107 (n.7), 137 (n.110)
- Jespersen, O., 33, 58, 90, 123 (n.59),
127 (n.72)

Index of Persons

- Joos, M., 33, 119 (n.48)
Jourdain, M. 61
- Kampf, L., 47
Kant, I., 21, 96, 101, 104, 118 (n.44),
118 (n.46), 136 (n.110), 140
(n.120)
Katz, J. J., 47, 105 (n.2), 110 (n.11), 129
(n.80), 131 (n.86), 132 (n.89), 132
(n.93), 135 (n.105), 137 (n.110),
141 (n.124)
Kenny, A., 110 (n.10)
Kirkinen, H., 110 (n.9)
Kretzmann, N., 134 (n.101), 134
(n.103)
- La Mettrie, J. O. de, 33, 55, 57, 58,
59, 70, 110 (n.9), 111 (n.16), 111
(n.18), 124 (n.62)
Lamprecht, S. P., 140 (n.116)
Lamy, B., 69, 73, 82, 90, 122 (n.54),
126 (n.70)
Lancelot, C., 17, 114 (n.30), 125 (n.67)
Langley, A. G., 123 (n.57)
Langlois, J.-A., 123 (n.59)
Leau, L., 122 (n.53)
Leibniz, G. W., 33, 96, 97, 122 (n.53),
123 (n.57), 136 (n.110), 137 (n.111)
Leitzmann, A., 118 (n.45), 119 (n.48)
Lenneberg, E. H., 107 (n.7), 112
(n.23), 137 (n.110)
Leroy, J., 55
Linnaeus, C. von, 66
Locke, J., 123 (n.57)
Lovejoy, A. O., 118 (n.46), 119 (n.47),
124 (n.61), 136 (n.110), 140
(n.120)
Luce, R. D., 141 (n.124)
Lyons, G., 136 (n.110)
- MacKay, D. M., 140 (n.123)
Magnus, R., 66, 118 (n.46), 119 (n.47)
Magoun, H. W., 141 (n.123)
Malmesbury, Earl of, 113 (n.28)
Marr, D., 18, 141 (n.124)
Marx, K., 120 (n.51)
Masters, R. D., 120 (n.51)
McIntosh, M. M. C., 122 (n.53)
McKay, S., 7, 41 (n.3)
Mead, M., 34–35
Meigret, L., 134 (n.101)
Mendelsohn, E., 118 (n.46)
Michelangelo, 114 (n.30)
Mill, J. S., 123 (n.59)
Miller, A., 141 (n.124)
Molière, 61, 130 (n.83)
Montgomery, G., 137 (n.111)
More, H., 53, 110 (n.12)
Murdoch, D. R., 107 (n.6), 110 (n.10)
- Nagel, E., 135 (n.105)
Newcastle, Marquis of, 52
Newton, I., 16
Nicole, P., 126 (n.69), 127 (n.71)
Norden, H., 118 (n.46)
- Ovid, 125 (n.66)
- Passmore, J., 136 (n.110), 140 (n.116)
Paul, H., 58
Piaget, J., 33
Pinker, S., 34, 107 (n.7)
Plato, 26, 27, 29, 30, 96, 135 (n.105),
137 (n.111)
Plotinus, 140 (n.120)
Popkin, R., 106 (n.5)
Postal, P., 105 (n.2), 129 (n.80), 131
(n.86), 132 (n.89), 132 (n.93)

CARTESIAN LINGUISTICS

- Priestley, J., 16
Proudhon, P.-J., 123 (n.59)
- Quine, W. V. O., 138 (n.114)
- Raphael, 114 (n.30)
Reid, T., 86, 132 (n.91)
Robinet, J. B., 119 (n.47)
Rocker, R., 119 (n.50)
Rosenfield, L. C., 110 (n.9), 110 (n.12),
110 (n.14)
Rousseau, J.-J., 33, 61, 120 (n.51)
Russell, B., 123 (n.59), 128 (n.80)
Ryle, G., 57, 58, 111 (n.19)
- Sahlin, G., 82, 86, 122 (n.53), 125
(n.67), 128 (n.76), 131 (n.86), 132
(n.90), 132 (n.93), 133 (n.95), 133
(n.97), 134 (n.102)
Sainte-Beuve, Ch.-A., 105 (n.3), 133
(n.95), 133 (n.98), 134 (n.104)
Sanctius, 8, 125 (n.67)
Saussure, F. de, 33, 58, 90
Schelling, F. W. J. von, 118 (n.46)
Schlegel, A. W., 9, 18, 33, 60, 61, 62,
65, 97, 41 (n.9), 112 (n.25), 114
(n.31), 114 (n.33), 114 (n.34), 116
(n.38), 117 (n.44), 118 (n.45), 118
(n.46), 119 (n.48), 123 (n.58)
Schlegel, F., 70, 114 (n.31), 123 (n.58)
Shakespeare, 117 (n.44)
Skinner, B. F., 17, 40 (n.1), 110 (n.11),
138 (n.114)
Smith, A., 130 (n.82)
- Smith, N., 42 (n.13), 105 (n.2), 110
(n.11)
Snyder, A. D., 118 (n.45)
Socrates, 26
Steinthal, H., 112 (n.25), 119 (n.48),
119 (n.49), 139 (n.115)
Stoothoff, R., 7
Suppes, P., 135 (n.105)
- Tarski, A., 135 (n.105)
Teuber, H. L., 141 (n.123)
Thompson, D'Arcy, 107 (n.7)
Torrey, A. P., 110 (n.10)
Troubetzkoy, N. S., 121 (n.52)
Tsimpli, I.-M., 42 (n.13), 110 (n.11)
Turing, A., 13, 42 (n.12), 107 (n.7)
- Vartanian, A, 111 (n.16)
Vaugelas, C. F. de, 11, 33, 41 (n.7), 42
(n.11), 90, 91, 92, 134 (n.101), 134
(n.104)
Veitch, J., 127 (n.70)
Viertel, J., 47, 115 (n.36), 116 (n.37)
Virgil, 125 (n.66), 131 (n.85)
- Watson, J., 34–35
Wellek, R., 118 (n.44)
Whitehead, A. N., 49, 104
Whitney, W. D., 119 (n.48)
Wilkins, J., 69, 122 (n.55), 133 (n.95)
Wittgenstein, L., 15, 23, 56, 117 (n.40),
123 (n.59), 128 (n.80), 133 (n.100),
138 (n.114)

Index of Subjects

- abstraction, 138 (n.114); *see also*
 generalized learning procedures
acquisition
 of concepts, 9–10, 20, 25–27,
 30–32, 35, 38, 43 (n.15)
 of language, 10, 25–32, 35, 38, 40,
 41 (n.2), 43 (n.15), 45, 55, 63,
 94–103, 104, 112 (n.25), 119
 (n.48) 124 (n.63), 133 (n.94),
 135 (n.105) 136 (n.110), 138
 (n.114)
adequacy, *see* descriptive adequacy,
 explanatory adequacy
analogy, 37–38, 58, 90, 104, 111 (n.21)
 112 (n.22), 122 (n.53), 124 (n.61)
animal, 13, 37, 51–59, 62, 64, 67, 70,
 102, 107 (n.8), 107 (n.9), 110
 (n.11), 110 (n.12), 110 (n.13), 110
 (n.14), 111 (n.21), 112 (n.23), 116
 (n.38), 117 (n.40), 120 (n.51)
 communication, 52, 55–57, 62,
 70, 108 (n.8), 110 (n.14), 111
 (n.21) 112 (n.23), 116 (n.38),
 117 (n.40)
appropriateness of language use,
 11, 13–15, 19, 20–24, 42 (n.10),
 52–54, 107 (n.8); *see also* creative
 aspect of language use
art, 9, 32, 42 (n.9), 46, 61, 99, 114
 (n.33), 114 (n.34)
artistic creativity, *see* creativity
association, 33, 55, 65, 85, 98, 138
 (n.114); *see also* generalized
 learning procedures
automaton, 13, 51–59, 62, 67, 107
 (n.8), 108 (n.9), 110 (n.9), 111
 (n.14), 111 (n.16), 120 (n.51), 124
 (n.62) 140 (n.117)
base rules, *see* rules
behaviorism, 17, 23, 33–34, 40 (n.1),
 110 (n.11), 133 (n.94); *see also*
 conditioning
biological limits of human
 intelligence, *see* limits of human
 intelligence
biological system, language as, 11–12,
 18, 21–22, 24, 27–30, 35–39
biology, 22, 32, 66, 118 (n.46), 136
 (n.110)
boundlessness of language, 12–15, 18,
 20, 37–38, 41 (n.4), 43 (n.10),
 52, 59, 61–64, 107 (n.8), 112
 (n.22); *see also* creative aspect of
 language use
Cartesian linguistics, *see* linguistics
case
 marking, 132 (n.88)
 system, 82
central processor hypothesis, 20, 24,
 37
character of language (Humboldt), 68
common notions (Herbert of
 Cherbury), 32, 94–96
common sense, 12, 16, 18–19, 22–23
 43 (n.18)
comparative grammar, *see* grammar
competence (opposed to
 performance), 19, 25–26, 45, 69,
 105 (n.2), 108 (n.8)
computer, 42 (n.4), 41 (n.10), 140

CARTESIAN LINGUISTICS

- (n.123); *see also* automaton
- concept, 9–12, 18–40, 42 (n.14), 43 (n.15), 63, 68, 70, 72, 95, 101, 103, 116 (n.38), 126 (n.70); *see also* innate idea/concept/machinery
- conceptual-intentional system, 21–22, 30, 36, 129 (n.80)
- conditioning, 10, 32–34, 38, 55, 58, 69, 97, 98, 104, 110 (n.11), 138 (n.114); *see also* general learning procedures, behaviorism, empiricism, standard social science model
- core grammar, *see* grammar
- creative aspect of language use, 8–25, 31–40, 42 (n.9), 43 (n.18), 51–72, 87, 90, 102, 104, 108 (n.9), 111 (n.18), 113 (n.29), 113 (n.30), 117 (n.44), 118 (n.45), 124 (n.61), 134 (n.100), 139 (n.115)
- creativity
 artistic, 12, 61, 65, 114 (n.34)
 ordinary, *see* creative aspect of language use
 scientific, 11, 44 (n.18)
- critical period hypothesis for language acquisition, 98
- deep structure, 29, 73–87, 88–93, 125 (n.67), 127 (n.70), 127 (n.73), 129 (n.80), 132 (n.93)
- derivation, 30, 83, 129 (n.80); *see also* transformational grammar
- Descartes' problem, *see* creative aspect of language use
- descriptive adequacy, 27, 90, 42 (n.11)
- descriptive grammar, *see* grammar
- descriptivism, *see* linguistics
- diversity of human language, 25–29, 119 (n.48), 125 (n.63)
- education, 9, 11, 18, 27, 39–40, 67, 139 (n.115)
- empiricism, 7, 9–11, 17, 31–39, 40, 41 (n.6), 86, 98, 101, 107 (n.7) 109 (n.9), 137 (n.110), 138 (n.114)
- empiricist linguistics, *see* linguistics, empiricism
- English, 29, 122 (n.53)
- evolution, 22, 42 (n.12), 107 (n.7)
- explanatory adequacy, 26–27, 42 (n.11) 135 (n.105)
- explanatory grammar, *see* grammar
- expression (sound-meaning pair), 12, 17–21, 24, 37
- externalism, 10, 33
- faculty, 9, 16, 17, 20–24, 32, 43 (n.14), 43 (n.15), 59–61, 95, 99, 100, 109 (n.9), 120 (n.51), 124 (n.62), 140 (n.117)
- folk science, 16. *see also* common sense
- form of language (Humboldt), 17, 62–69, 94, 117 (n.39), 117 (n.42) 117 (n.44), 118 (n.45)
- free will, 9, 15, 16, 18, 22, 23, 36, 66, 108 (n.9)
- free word order, 129 (n.82), 132 (n.88)
- freedom, social and political, 8, 11, 22, 23–24, 33, 39, 59, 66, 67, 120 (n.51)
- French, 29, 74, 78, 79, 82, 85, 86, 91 122 (n.53), 122 (n.54), 130 (n.83) 134 (n.101)
- functionalism, 23, 34, 39
- general grammar, *see* grammar

Index of Subjects

- general linguistics, *see* linguistics
generalization, 58, 69, 98, 104, 138
 (n.114); *see also* generalized
 learning procedures
generalized learning procedures, 10,
 32–39, 98. *see also* conditioning,
 empiricism, standard social
 science model, behaviorism
generative grammar, *see* grammar
generative principles, 20, 63–66; *see*
 also rules
German, 17, 33, 66, 116 (n.37), 126
 (n.69)
Germany, 66
government, *see* state
grammar
 comparative, 122 (n.53)
 core, 105 (n.2)
 descriptive, 88, 91
 explanatory, 91, 134 (n.103)
 general, 69, 88–89, 94, 105 (n.3),
 114 (n.30), 122 (n.53), 123
 (n.59), 125 (n.67), 130 (n.83),
 133 (n.95), 134 (n.103), 138
 (n.112)
 generative, 49, 68–70, 102, 105
 (n.2), 106 (n.4), 117 (n.39),
 135 (n.106)
 particular, 68, 88–89, 94, 133
 (n.95), 134 (n.101)
 philosophical, 17, 89–92, 105 (n.3),
 130 (n.83), 132 (n.94) 133
 (n.95)
 Port-Royal, 17, 29, 33, 72–83, 86,
 90, 91, 105 (n.3), 114 (n.30),
 125 (n.67), 126 (n.69), 126
 (n.70), 127 (n.72), 128 (n.75),
 131 (n.85), 133 (n.94), 133
 (n.95), 135 (n.106)
 speculative, 134 (n.101)
 transformational generative, 29,
 77–87, 94, 127 (n.73), 128
 (n.75), 135 (n.106)
 universal, 17, 19, 27–31, 72, 92,
 104, 105 (n.3), 132 (n.88), 134
 (n.100), 134 (n.103)
 grammatical transformation, 74–87
habit, language as, 10, 33, 58, 69,
 104, 111 (n.21), 123 (n.56), 138
 (n.114); *see also* conditioning *and*
 behaviorism
Hebrew, 17
head-first language, 29
head-last language, 29
history of linguistics, *see* linguistics
human nature, 11, 34, 40, 59, 66, 67,
 102, 103, 120 (n.51)
idea (Descartes), 126 (n.70)
I-language, 19, 20, 25, 27
inflectional devices, 82
innate idea/concept/mental
 machinery, 9–12, 17–18, 24–39,
 41 (n.5), 41–42 (n.9), 43–44
 (n.14), 43 (n.18), 45, 59, 65,
 94–101, 104, 113 (n.29), 138
 (n.114), 135 (n.105), 138 (n.114),
 139 (n.115)
instinct, 10, 34, 36, 53, 58, 59, 60, 63,
 94, 95, 96, 113 (n.29), 121 (n.51)
intension, *see* semantics
interface level, 19–20, 21–22, 30, 37,
 129 (n.80); *see also* LF, SEM,
 phonetic form, phonetic
 interpretation
internalism, 10, 33–34, 130 (n.83)

CARTESIAN LINGUISTICS

- Japanese, 29
- judgment, 32, 72–79, 100, 101
- language faculty, 20–22, 59, 42 (n.14)
43 (n.15), 59; *see also* universal
grammar
- language game (Wittgenstein), 117
(n.40)
- language, function of, 15, 52, 58, 62,
64, 72.
- langue* (Saussure), 131 (n.85), 132
(n.89)
- Latin, 74, 78, 79, 81, 85, 121 (n.53), 130
(n.83), 131 (n.88)
- lexical item, 17, 19, 20, 22, 25, 26, 27,
43 (n.15), 90, 131 (n.85); *see also*
concept
- lexicon, 63, 68
- LF, 129 (n.80), 130 (n.83); *see also*
logical form, SEM, semantic
interface
- liberalism, 39
- libertarianism, 39–40
- limits of human intelligence, 8, 16,
20, 23, 25, 35, 37, 111 (n.18)
- linguistic universals, 27, 28, 29, 92,
94, 136 (n.108); *see also* innate
idea, concept, machinery
- linguistics
Cartesian, 49, 50, 62, 64, 69, 70,
72, 73, 87, 88, 90, 93, 94, 96,
97, 103, 104, 105 (n.3), 115
(n.36), 129 (n.80), 134 (n.101)
descriptivism in, 90, 134 (n.101) 135
(n.105)
empiricist, 41 (n.6) 106 (n.3); *see*
also empiricism
general, 62
history of, 49, 105 (n.1)
minimalism in, 129 (n.80)
modern, 45, 49, 57, 67–68, 90, 92,
98, 132 (n.92), 132 (n.93)
pre-modern/traditional, 130 (n.83),
133 (n.94)
prescriptivism in, 133 (n.96)
principles and parameters in, 29,
136 (n.108); *see also* parameters
standard theory of, 17, 29
structuralism in, 67, 68, 90, 106
(n.3)
taxonomic, 106 (n.3)
logical form, 82, 129 (n.80); *see also*
LF, SEM
- machine, *see* automaton
- meaning, *see* semantics
- mechanism and mechanical
explanation, 8, 12–13, 15–16,
51–55, 65, 106 (n.3), 106 (n.5),
107 (n.8) 120 (n.51), 124 (n.62)
- mechanical form (Romantics), 65, 118
(n.45)
- methodological dualism, 32
- mind-body
distinction, 15–16, 28, 73
problem, 16, 28
- Miskito, 29
- modularity of the mind, 19–24, 35, 36
37, 110 (n.11)
- morality, 39, 101, 137 (n.111)
- morpheme, 92, 127 (n.73)
- morphogenesis, 42 (n.12), 107 (n.7)
- mystery, 11, 25, 124 (n. 61), *see also*
limits of human intelligence,
creative aspect of language use
- nativism, 10, 24–34, 94–101, 104; *see*
also innate idea/concept/mental
machinery
- natural history, 93
- natural philosophy, *see* philosophy

Index of Subjects

- natural rights, 66, 120 (n.51)
neoliberalism, 39
- organic form (Romantics), 65, 68, 117
(n.44), 118 (n.45), 118 (n.46)
other minds, problem of, 53–54, 106
(n.5)
output level, *see* interface level
- parameters, 20, 27, 29–30, 136
(n.108). *see also* principles and
parameters
parole (Saussure), 131 (n.85), 132 (n.89)
particular grammar, *see* grammar
perception, 22, 31–32, 46, 63, 66, 72,
84, 85, 86, 93, 98–103, 104, 105
(n.2), 105 (n.3), 116 (n.38), 141
(n.123)
performance, opposed to competence,
15, 21, 24, 55, 69, 104, 105 (n.2)
perspectives (provided by language
faculty), 15, 21, 22, 37
philosophical grammar, *see* grammar
philosophy, 33, 68, 93, 41 (n.6), 106
(n.3), 106 (n.4), 118 (n.46), 123
(n.59), 128 (n.80), 133 (n.95), 139
(n.114), 139 (n.115), 140 (n.120)
of language, 62, 115 (n.35)
of mind, 31, 46, 98, 105 (n.3)
phoneme, *see* phonetics
phonetic form/interpretation, *see*
phonetics *and* surface structure
phonetics, 92, 136 (n.108)
phonetic form, 88
phonetic interpretation, 29, 73, 77
phonology, 28, 46, 43 (n.15), 121
(n.52), 141 (n.124)
phonological system, 68
phrase structure, 80, 127 (n.73); *see*
also deep structure
- physics, 51
physiology, 51
plasticity of the mind, 32–36, 40, 113
(n.29), 115 (n.34)
Platonism, 33, 96, 124 (n.61), 136
(n.110), 140 (n.120)
Plato's problem, *see* poverty of
stimulus facts
poetry, 46, 61, 68, 41 (n.9), 114 (n.33)
114 (n.34), 139 (n.115)
politics, *see* state
Port-Royal grammar, *see* grammar
postmodernism, 32
poverty of stimulus facts, 24–28,
30–31, 35, 38, 39, 43 (n.16), 98,
135 (n.105)
premodern linguistics, *see* linguistics
prescriptivism, *see* linguistics
principles and parameters, *see*
linguistics
prototype, 119 (n.47)
psychological reality, 117 (n.41)
psychology, 45, 46, 51, 53, 96,
106 (n.3), 106 (n.4), 111 (n.19)
psychological explanation, 111 (n.19)
- rationalism, 9, 10, 15, 30–33, 36–40,
41 (n.6), 41 (n.7), 50, 94, 97–99,
105 (n.3), 137 (n.110), 140 (n.119)
rationality, 59, 60
recursion, 80
reference, *see* semantics
reminiscence theory (of Plato), 26–27,
137 (n.111)
representation, 21, 63, 80, 85, 103, 42
(n.14), 127 (n.73), 129 (n.80), 130
(n.83)
romanticism, 9–11, 17–18, 24, 27, 30–
33, 38–40, 41 (n.7), 50, 60–71,
97, 101, 105 (n.3), 115 (n.35) 124

CARTESIAN LINGUISTICS

- (n.61), 125 (n.63), 140 (n.120)
- rules
 base, 80
 transformational, 75, 78–80
- schemata, 103
- science, 91, 133 (n.100), 134 (n.103)
 of behavior, 8, 16, 20, 22–23, 24, 25, 35
 of language, 11–12, 15–18, 20–21, 26, 38–39, 134 (n.100); *see also* grammar *and* linguistics
 of mind, 11, 16–17, 21, 24, 25–26, 42 (n.11)
- scientific creativity, *see* creativity
- second language acquisition, 124 (n.63), 138 (n.114)
- semantics
 intension, 127 (n.70)
 meaning, 20, 43 (n.15), 75, 77, 79, 84, 86, 90, 91, 127 (n.70), 130 (n.83), 131 (n.85)
 reference, 75, 91
 SEM, 129 (n.80)
 semantic content, 75, 88, 92, 103, 129 (n.80)
 semantic interface, 21, 22, 30, 129 (n.80)
 semantic interpretation, 29, 73, 77, 127 (n.70), 129 (n.80)
 semantic representation, 130 (n.83)
- signification, 123 (n.57)
- sign language, 21, 25, 46
- simplicity, 82, 42 (n.11)
- species specificity of traits, 19, 32, 45, 51, 52, 116 (n.38), 120 (n.51)
- speech organs, 52, 53, 56, 58, 62, 84
- standard social science model, 34–39
- standard theory of linguistics, *see* linguistics
- state (political), 8, 11, 17, 39–40, 66, 67, 121 (n.51), 139 (n.115)
- stimulus freedom, 13–15, 18–19, 23–24, 41 (n.5), 42 (n.10), 52, 58–61, 107 (n.8), 113 (n.29), 113 (n.30); *see also* creative aspect of language use
- structuralism, *see* linguistics
- surface structure, 73–80, 84–87, 88–92, 127 (n.72), 129 (n.80), 131 (n.86), 132 (n.92), 132 (n.93), 133 (n.94). *see also* phonetic form, phonetic interpretation
- syntactic structure, *see* deep structure
- syntactic theory, *see* syntax
- syntax, 28, 46, 68, 69, 72, 80–85, 93, 132 (n.93), 141 (n.124)
- taxonomic linguistics, *see* linguistics
- thematic assignment, 129 (n.80)
- theory of language, 17–18, 49, 80, 43 (n.15), 119 (n.48), 125 (n.67), 133 (n.100); *see also* grammar, linguistics, science of language
- theory of mind, 50, 94, 104; *see also* science of mind
- training, language acquisition as, *see* conditioning, standard social science model, general learning procedures
- transformational rules, *see* rules
- transformational generative grammar, *see* grammar
- translation, 125 (n.63)
- trigger/triggering 10, 12, 25, 27–29, 31, 33, 38, 96.
- Turing test, 13–14 ; *see also* computer.
- universal grammar (UG), *see* grammar
- Urform (Goethe), 66.

Index of Subjects

use of language, 10, 15, 18, 45, 94, 132
(n.89), 133 (n.94), 133 (n.100)

vision, theory of, 18, 19–20, 24, 30, 33,
35, 42 (n.14)

will, *see* free will.