THE ECONOMY OF THE EARTH

Philosophy, Law, and the Environment

SECOND EDITION

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The Economy of the Earth, Second Edition

Mark Sagoff draws on the last twenty years of debate over the foundations of environmentalism in this comprehensive revision of *The Economy of the Earth*. Posing questions pertinent to consumption, cost-benefit analysis, the normative implications of neo-Darwinism, the role of natural history, and the centrality of the concept of place in environmental ethics, he analyzes social policy in relation to the environment, pollution, the workplace, and public safety and health. Sagoff distinguishes ethical from economic questions and explains which kinds of concepts, arguments, and processes are appropriate to each. He offers a critique of "preference" and "willingness to pay" as measures of value in environmental economics and defends political, cultural, aesthetic, and ethical reasons to protect the natural environment.

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For my father
who gave me my first copy of Thoreau's Walden

Contents

Acknowledgments

The second edition of this book represents a total overhaul and complete revision of the first. Only Chapters 2, 3, and 8 bear any resemblance to text found in the earlier edition; the other chapters were written in recent years. Although this is essentially a new book, many of the acknowledgments remain the same. I wrote the second edition as I did the first while at the Institute for Philosophy and Public Policy in the School of Public Policy at the University of Maryland, College Park. There is little in this essay that did not arise out of discussion with my colleagues at the Institute and the School, or from some thought suggested by their work, or in response to their sympathetic criticism, or to the ideas they offered me. No research center other than the Institute for Philosophy and Public Policy, as far as I know, provides a similar opportunity for philosophers to pursue politically informed conceptual analysis on a sustained basis. Each page of this book acknowledges implicitly, as I do explicitly here, the help I received from my colleagues at the Institute over the years – editors Claudia Mills, Arthur Evenchik, and Verna Gehring and researchers (past and present) David Crocker, Robert Fullinwider, William Galston, Peter Levine, Xiaorong Li, Judith Lichtenberg, David Luban, Douglas MacLean, Henry Shue, Robert Wachbroit, and David Wasserman. I am particularly grateful to two colleagues at the School of Public Policy, with offices neighboring mine on the same floor, Robert H. Nelson and Herman E. Daly, for their patience, kindness, and direction. Bob Nelson labored over an earlier draft to alert me to many errors I would have otherwise committed, and he suggested many arguments I could not have otherwise made. I should also like to thank the Institute administrator, Carroll Linkins, and our graduate assistant, Jillien Dube, who dealt cheerfully and patiently with the secretarial problems I created in writing and revising this manuscript.

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In writing this book I have borrowed, built on, revised, or otherwise worked from several essays published previously. A shorter version of Chapter 1 appeared in *Philosophy & Public Policy Quarterly* 27 (Winter/Spring 2007): 2–7. Chapter 2 borrows from the *Arizona Law Review* 23 (1981): 1281–1298; Chapter 3 draws upon "We Have Met the Enemy and He Is Us *or* Conflict and Contradiction in Environmental Law," *Environmental Law* 12 (1982): 283–315; Chapter 4 takes passages from an article that appeared in *Ethics* 96 (1986): 301–316 and includes material from "An Aggregate Measure of What? A Reply to Zerbe, Bauman, and Finkle," *Ecological Economics* 60 (1) (November 2006): 9–13; Chapter 5 draws largely on two publications: "On the Economic Value of Nature's Services," *Environmental Values* 17 (1) (February 2008); and "Locke Was Right: Nature Has Little Economic Value," *Philosophy*

and Public Policy Quarterly 25 (3) (Summer 2005): 2–11. Chapter 6 revises "Do We Consume Too Much?" *The Atlantic Monthly* 279 (6) (June 1997): 80–96; an earlier version of Chapter 7 appeared as "On the Compatibility of a Conservation Ethic with Biological Science," *Conservation Biology* 21 (2) (April 2007): 337–345; Chapter 8 relies on material that appeared in "On Preserving the Natural Environment," *Yale Law Journal* 84 (1974): 205–267; and Chapter 9 contains material from "Settling America *or* The Concept of Place in Environmental Ethics," *Journal of Energy, Natural Resources & Environmental Law* 12 (2) (1992): 351–418. A short version of Chapter 10 appeared in *Philosophy & Public Policy Quarterly* 27 (Summer/Fall 2007): 2–9. I am grateful to the editors of these journals for permission to build on these essays.

Chapter 1

Introduction

A *New Yorker* cartoon depicts a pair of Puritans in stiff collars, doublets, and cloaks leaning over the rail of the *Arbella* as it made landfall in the New World. One says, "My immediate goal is to worship God and celebrate His Creation, but long-term, I plan to get into real estate."

The cartoon presents two visions of the natural world. On the one hand, we may regard nature as sacred, as having a value in itself, a history, autonomy, and diversity that command our appreciation and respect. On the other hand, we can regard the natural world as a storehouse of economically fungible resources to be developed for human benefit. With these two visions of nature come two conceptions of salvation. The first is personal; if one learns to commune with Nature and to study its meanings and messages, one may become more secure and decent in one's soul.[1] The second is collective. If humanity develops natural resources efficiently over the long term, it can maximize wealth and well-being. With the advance of science and technology, humanity may escape from scarcity, and where there is no want (as the philosopher David Hume argued) there is no injustice.[2] An efficient economy can bring Heaven to Earth.[3]

F. Scott Fitzgerald wrote, "The test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function."[4] This book argues that an intelligent society can hold these two opposed ideas of nature or salvation in mind, balancing them as well as it may, without reducing or collapsing either into the other.

ENVIRONMENTAL GOALS: ETHICAL OR ECONOMIC?

The *New Yorker* cartoon points to an opposition or inconsistency between two ways of regarding nature – one as a source of religious inspiration, the other as an object of economic exploitation. For more than a century, environmentalism has lived within this contradiction. Historians often set the preservationist tradition of John Muir, who compared forests to cathedrals, against the Progressive tradition of Gifford Pinchot, who saw forests as sources of wood and water needed by the economy over the long run. Muir called on biblical images. "God began the reservation system in Eden," he wrote, "and this first reserve included only one tree. Yet even so moderate a reserve was attacked."[5] For Pinchot, in contrast, "The first great fact about conservation is that it stands for development."[6] He added, "Conservation demands the welfare of this generation first, and afterward the welfare of the generations to follow."[7]

This book elaborates the distinction between these two conceptions of the value of the natural environment. The first regards the intrinsic properties of nature as sources of reverence and obligation.[8] Society has a duty to preserve the wonders of nature for what they are in themselves, that is, for the properties through which they appeal to moral intuitions and aesthetic judgments. Biodiversity – the variety of living things – provides the standard illustration of the glories of nature that move us to feelings of curiosity and respect. As the philosopher Ronald Dworkin points out, many of us believe that we have an obligation to protect species that goes beyond our own well-being; we "think we should admire and protect them because they are important in themselves, and not just if or because we or others want or enjoy them."[9]

No shortages of timber loom; huge tree plantations in the Southern Hemisphere as well as enormous boreal forests in Canada and Eastern Europe assure a more-than-adequate supply.[10] As economist Amartya Sen has written, we may nevertheless wish to protect old-growth forests and creatures native to them for their own qualities, not for any benefit they offer us. There would be no contradiction if a person were to say: "Our living standards are largely – or completely – unaffected by the presence or absence of spotted owls, but I strongly believe that we should not let them become extinct, for reasons that have nothing much to do with human living standards."[11]

People tend to express their affection for nature in religious terms. In a survey, Americans by large majorities agreed with the statement, "Because God created the natural world, it is wrong to abuse it." Many

of the respondents who answered this way said that they did not profess a religious faith. The anthropologists who ran this survey found that "divine creation is the closest concept American culture provides to express the sacredness of nature."[12]

The economic goals we pursue as a society (as should be no surprise) concern the performance of the economy. The performance of an economy is usually assessed by criteria such as employment (absence of involuntary unemployment), price stability (low inflation), competitiveness, the production of more, better, and less expensive goods as technology advances, and a more equitable distribution of income.[13] When I was a child, I remember seeing in trolley cars in Boston an advertisement in which a secretarial school promised "gd jbs w hi pa" to those who enrolled in its speedwriting classes. I have since then associated the performance of the economy with the idea of "gd jbs w hi pa." In Chapter 4, I shall refer to a large literature in social psychology that demonstrates that people are happier in places where there is less or no involuntary unemployment, where prices are stable, and where the overall economy performs well.

The following sections of this introductory chapter will explore how society has kept in mind two contrasting conceptions of the value of nature – one intrinsic, the other instrumental. Of course, these two ways of "valuing" the natural world may conflict. They conflict in theory or in logic. It is one thing to be committed to protect an object of nature "for its own sake"; it is another thing to judge its worth in terms of its economic consequences. These two ways of "valuing" nature sometimes – but not always – conflict in practice. Whether they conflict depends on the economic importance of what is at stake. Draconian reductions of greenhouse gas emissions may be needed to protect the natural environment but they could slow the economy. On the other hand, President G. W. Bush protected 140,000 square miles of oceanic habitat northwest of Hawaii, by far the largest marine protected area in the world. The effects on the economy, if any, were inconsequential.

This book will argue that as a matter of practice or policy, society should strive to balance these two ways of construing the value of nature, and I shall provide examples and suggestions. In many circumstances, as I shall argue, we can enjoy "gd jbs w hi pa" and still respect the sacredness of nature.[14] On the other hand, we can engage each other in fruitless and futile debate about which way to care about Creation is "correct." These ways to "value" the natural world will stymie and bollix each other if we try to place them within the same normative and

conceptual framework – in other words, if we lack the intelligence "to hold two opposed ideas in the mind at the same time, and still retain the ability to function."

ENVIRONMENTAL PROTECTION AND ECONOMIC GROWTH

Economists question the once-conventional wisdom "that environmental regulations impose significant costs, slow productivity growth, and thereby hinder the ability of U.S. firms to compete in international markets."[15] Many economists have observed that the economy has grown nicely during periods, particularly starting with Earth Day 1970, when efforts to protect the natural environment have been greatest. The idea that policies protecting the environment hinder economic growth – that they reduce the number of "gd jbs w hi pa" – came under attack particularly in the 1990s, when prominent economists saw environmental regulations as "not only benign in their impacts on international competitiveness, but actually as a net positive force driving private firms and the economy as a whole to become more competitive in international markets."[16] Michael Porter and Claas van der Linde wrote, "By stimulating innovation, strict environmental regulations can actually enhance competitiveness. . . . Efforts to reduce pollution and [efforts to] maximize profits share the same basic principles, including the efficient use of inputs, substitution of less expensive materials and the minimization of unneeded activities."[17]

I cannot review here the vast literature that considers the extent to which the preservation of natural areas (such as old-growth forests) and the reduction of pollution help or hamper economic growth, and vice versa.[18] It is fair, however, to draw four general conclusions from this literature. First, the stringency of environmental regulation, particularly with respect to pollution, often has little effect on competitiveness as long as the regulated industries are given "the ability to use new, innovative, and low-cost ways to meet discharge standards."[19] Second, the effects of environmental regulation on the economy are generally so small – while some jobs are lost, others are created – that they seem to be too inconsiderable either way to matter in terms of standard measures of economic growth. As Robert Repetto has written, "Economists who have reviewed research on the subject . . . find scant evidence that environmental regulation has had adverse effects by any of these measures."[20] Third, wealthier countries can afford – and thus generally possess – cleaner environments than impoverished ones. A huge

literature surrounds the idea of an "environmental Kuznets Curve," which supposes that environmental concern and therefore environmental quality increase after a point as a society becomes more affluent.[21]

Fourth, air and water quality have improved remarkably during the past three decades even as the economy has grown. Rivers no longer stink or catch fire; one can drink the water in most parts of the Great Lakes. Gross domestic product (GDP) increased in the United States by 187 percent between 1970 and 2004; vehicle miles traveled increased by 171 percent; energy consumption went up by 47 percent; and population grew by 40 percent. During the same period, according to an Environmental Protection Agency (EPA) report, "total emissions of the six principal air pollutants dropped by 54 percent." These emissions include nitrogen and sulfur dioxide, ozone, particulates, carbon monoxide, and lead. Between 1990 and 1999, emissions of eighty-nine other toxic substances declined on average by 30 percent.[22] On these measures, air pollution has fallen to the lowest level ever recorded in the United States.[23] Environmentalists came into power with the Clinton administration; coincidentally technological advances fueled the economy. Productivity increased and pollution per dollar of GDP fell by every measure.

I hardly mean to suggest that environmental protection coincides with economic growth; these goals may often conflict. John Muir and Gifford Pinchot battled over a plan to dam the magnificent Hetch Hetchy Valley in California to provide water for San Francisco – essential for its economic growth. Eventually society "halved the difference" by damming Hetch Hetchy but preserving the Yosemite Valley. Today the same kind of political battle rages over a desolate tract of tundra in the Arctic National Wildlife Refuge (ANWR). According to my colleague Robert Nelson, what makes the "1002 area" at ANWR valuable to environmentalists is not the few herds of caribou that frequent it – many ecologically superior places could be identified and preserved instead – but the sacrifice that is required to protect it. Ancient tribes sacrificed their best goats and sheep to their gods. In Medieval times, societies made enormous sacrifices to build cathedrals, such as Notre Dame in Paris. To protect ANWR at the cost of hundreds of billions of gallons of oil "would show the willingness of society to commit vast resources in order to construct a multi-billion dollar cathedral, a religious edifice requiring such a large sacrifice that it would stand as one of the greatest (certainly most expensive) testimonies ever made to the glory of the faith."[24]

The environmental faithful believe that ANWR should be protected against exploitation as a way to cleanse our souls from earthly pursuits.

The economic faithful favor drilling because economic growth is the way to bring Heaven to Earth. A path to "halve the difference" might be to drill the oil surgically and use much of the money to invest in energy efficiency or to preserve ecologically more significant and sensitive areas elsewhere – such as rainforests. Such a compromise would indicate we are intelligent enough to function while keeping two opposed ideas in mind.

POLLUTION – TRANSGRESSION OR TRANSACTION?

The regulation of pollution draws simultaneously on two opposed philosophical beliefs. Many environmentalists among others believe that pollution represents a form of coercion – an assault upon persons and a trespass upon property. As philosopher Tibor Machan points out, the morally appropriate approach to controlling pollution "requires that pollution be punished as a legal offense that violates individual rights."[25]

For centuries, common law courts have followed this principle by protecting individuals as a matter of right from injuries of the sorts associated with pollution. As an English court found in 1705, if the wastes from a person's privy percolate through his wall and into his neighbor's cellar, for example, common law will require the polluter to cease and repair the nuisance, because he is "bound of common right to keep his wall so as his filth might not damnify his neighbor."[26] Similarly, one might suppose that factories are likewise bound by common right to maintain their walls, scrubbers, filters, liners, drums, or stacks so that their emissions and effluents do not damnify their neighbors. Their neighbors can sue not just for compensating damage awards but also for injunctive relief. The plaintiff should be able to compel the defendant to cease the nuisance, not simply to pay whatever costs or damages a court may assess.[27]

On the other hand, many environmental economists regard pollution not as an invasion or trespass but as a diseconomy, that is, a social or external cost of production which may be offset by benefits. As Larry Ruff, then an economist at EPA, argued, pollution is "an economic problem, which must be understood in economic terms."[28] From this economic perspective, pollution is to be managed as a misallocation of resources – a failure of the market to allocate them to those who are willing to pay the most for them and thus (tautologically) a failure to maximize welfare. There is "a very simple way," Ruff explained, to

bring private costs in line with social costs. "Put a price on pollution."[29] A Pollution Control Board (PCB) should place a tax on emissions. "Under such a system, anyone could emit any amount of pollution so long as he pays the price the PCB sets to approximate the marginal social cost of pollution."[30]

Law professors often use the case of *Boomer vs. Atlantic Cement Company* (1970) to illustrate the conflict that arises between the belief that pollution represents (1) an invasion of person and property that should be enjoined as a matter of common right or (2) a social or external cost of production acceptable if it creates compensating benefits.[31] The named plaintiff, a small-scale farmer, enjoyed the tranquillity of his rural estate near Albany, New York. When an immense cement plant located nearby, he and some neighbors sued to enjoin it "from emitting dust and raw materials" that reached their land.[32] To the extent that the cement plant, by covering the surrounding farms with fumes and dust, made them uninhabitable, this case is structurally similar to the one involving the percolating privy in England. In England, the court required the polluter to stop the nuisance. In New York, the court called for damages instead. Why should comity between neighbors be treated any differently in America than in England?

The New York Court of Appeals noted "the large disparity in economic consequences of the nuisance and of the injunction." The nuisance consisted in the inability of a few small landowners to enjoy the peace and tranquillity of their rural estates. An injunction would require the closure of Atlantic Cement Company, which represented a $450 million investment, employed 300 people, and was the most important contributor to the tax base of the county, supporting its schools, social services, and so on. The judge found, moreover, that no technological fix would relieve the conflict between the property rights of the plaintiffs and the economic needs of the community. He wrote that "techniques to eliminate dust and other annoying by-products of cement making are unlikely to be developed by any research the defendant can undertake." The case confronted two squarely opposed social principles or goals: first, the enforcement of property rights against invasion and, second, the economic well-being of the community.

These two ideas are logically opposed; one cannot claim fully to honor one in principle except by breaching the other. If the courts always granted injunctive relief against pollution, then few industries could operate. Nearly every industrial activity produces some emission or effluent; therefore society could not prohibit all pollution without

bringing the economy to a screeching halt. On the other hand, if an industrial polluter had only to pay damages in nuisance cases, it could take possession of any property it wanted simply by making it uninhabitable and compensating the property owner at whatever pittance a court-appointed appraiser says it is worth. As a dissenting judge complained, "It is the same as saying to the cement company, you may continue to do harm to your neighbors so long as you pay a fee for it."[33]

To give injunctive relief in nuisance cases may be to forfeit wealth for the sake of principle. To deny injunctive relief, however, is to give private entities the power of eminent domain. The trick is to keep both goals (protecting rights and promoting prosperity) in mind without collapsing them or reducing one to the other. Society can function – it can be intelligent – if it is able to act case by case in ways that acknowledge the separate legitimacy of each of these opposing ideas.

THE ROLE OF PUBLIC LAW IN CONTROLLING POLLUTION

On Earth Day in 1970, environmentalism emerged in part as a populist movement which enlisted lower-middle-class mothers concerned for the health of their children.[34] Stories about hazardous wastes buried in urban neighborhoods, rivers that caught fire, a blowout of an oil well off the coast of Santa Barbara, accidents in chemical production facilities, and other incidents excited populist resentments that erupted in understandable moral outrage. Rachel Carson's *Silent Spring* (1962), among many other studies, described the destruction of wildlife by pesticides and demonstrated how negligent the nation had become in protecting its natural and ecological heritage. Americans agonized over cities filling with smog, species becoming extinct, wildlife disappearing, oil spills, fish kills, detergents foaming in rivers and lakes, beach closings, and any number of horrors which led them to regard pollution as a menace gone out of control.

When the astronauts returned from the moon with pictures showing North America covered with clouds of pollution, Americans felt ashamed as well as afraid. The political response to the poisoning of neighborhoods, the destruction of wildlife, and the fouling of the water and air did not depend on a calculation of how these moral failures affected the economy. Rather, Congress acted to reduce environmental pollution and degradation in the same spirit it acted to end child labor; establish civil rights; improve unconscionable conditions in sweatshops, company towns, and mines; set a maximum workday and a minimum

wage; relieve the suffering of the very poor; provide some form of public health care; combat discrimination; and establish other programs to vindicate the nation's claim to being a caring, compassionate, law-abiding community.

Boomer vs. Atlantic Cement Company played in the New York courts from 1967 to 1970, at the time Congress was considering major amendments to the Clean Air Act. Those who testified at congressional hearings looked over their shoulders at the *Boomer* courts and noted the role of pollution control technology in defining property rights. One witness said:

> The [*Boomer* Appeals] Court discussed the state of the art and said they could not foresee any improvement in the future. I think this is a step in the wrong direction. I think the courts and the legislators have to provide inducements to industry to see that there will be improvements in the state of technology and such inducements have to be written into the law.[35]

Between 1969 and 1978, Congress enacted eight major pollution control statutes as part of a wave of environmental legislation that responded to the moral aspirations of American society. These aspirations centered on four normative issues. The first responds to popular sympathy for or empathy with the victim of pollution: the worker, neighbor, homemaker, or child who is injured or dies as a result of exposure to a toxic substance in the workplace or in the environment. The second concerns the protection of rights. Traditional forms of private law – that is, remedies for tort including nuisance – remain the first-line defense against pollution. Since it is often hard to match plaintiffs with defendants in cases of mass torts, public law has to supplement private law. A statute regulating pollution can be understood as a socially efficient way to control the kind of assault or trespass that traditionally finds its remedy in common law.

Third, Americans are concerned about pollution for cultural and patriotic reasons quite apart from the dangers that, from a scientific point of view, pollutants may pose to individuals. Americans are committed to the idea that America is and ought to remain beautiful. Smog-filled air, polluted rivers, dead lakes, and fouled land offend our cultural values and sense of national dignity and pride. Fourth, while markets may help consumers to form and to satisfy personal preferences, democratic political institutions allow citizens to deliberate together to choose common goals and aspirations that they could not achieve or even conceive alone.

Society regards and should regard pollution in the typical case as a social evil to be minimized, not as a social cost to be optimized. Like any trespass, pollution has to be understood primarily as a moral failure, not as a market failure. Pollution is to be treated as an ethical problem and not primarily as an economic one. At the same time, if society were oblivious to the economic costs of pollution control, it could cause industry to cease; jobs would become scarce and inflation rampant.

In 1970, Congress amended the Clean Air Act to set standards for air pollutants to assure an "adequate margin of safety" to protect the public health. With respect to "hazardous" pollutants, Congress required an "ample" margin of safety. The moral basis of pollution control law is so obvious, as Maureen Cropper and Wallace Oates observe, that "the cornerstones of federal environmental policy in the United States," such as the Clean Air and Clean Water Acts, "explicitly prohibited the weighing of benefits against costs in the setting of environmental standards."[36]

Even if statutory law explicitly prohibits the weighing of benefits against costs, it cannot become cost-oblivious because at some point society must recognize the law of diminishing returns. Policies undertaken to eliminate small risks, moreover, often create greater risks of other kinds. Commentators on all sides asked "how safe is safe enough?" This question implicitly inquires how we can function as a society while keeping in mind two goals – the right of individuals to be free of coercion and the need of the community to secure the advantages of overall economic growth.

HOW SAFE IS SAFE ENOUGH?

If pollution-control law were to pursue only moral and not economic objectives – if it intended purely to prohibit trespass and to protect public safety and health – agency actions could become "cost-oblivious."[37] If regulations are oblivious to costs, they may slow or impair the growth of the economy on which social well-being or the standard of living primarily depends. Everyone will suffer on balance as a result. Accordingly, it is important to identify "resting points" or "stopping points" – levels of pollution that are acceptable given the costs of further reductions and the burden of those costs on the overall economy.

How has environmental regulation managed to keep two opposed ideas in mind at the same time, that is, both to reduce coercion and at the same time to accommodate growth? Environmental policy at its best (which may not be typical) has recognized that even if pollution is

an evil to be minimized – rather than a cost to be optimized – it is to some extent a necessary evil, since economic production requires some emissions and effluents. Accordingly, society has developed a number of ethical tests and standards that it applies to set allowable levels of pollution, to determine at least for a time how safe is safe enough, clean is clean enough, and so on. These resting points, as I shall argue in later chapters, rely on ethical principles and moral intuitions that help society strike a balance between contradictory ideas, in this case, a principled abhorrence of pollution as coercion and an equally principled belief that economic growth is essential to social progress and welfare.

One well-known principle is the idea of *de minimis* risk. The law does not have to regulate risks that are so small they are hardly detectable. Governmental agencies such as EPA generally regard as *de minimis* a "1 in a million" increased risk of a bad outcome to a person exposed to a hazard over a seventy-year lifetime in a large population. We all take greater risks all the time without thinking about them. In this context, one may quote Lord Rothschild: "There is no point in getting into a panic about the risks of life until you have compared the risks which worry you with those that don't, but perhaps should."[38]

Another concept useful to strike a balance between pollution control and economic growth has to do with "benchmark" and "best method" standards for various industries. If the idea is to maximize through regulation the number of lives saved (or deaths or injuries avoided), moreover, then economists advise that we will do best if we equalize the marginal cost per life saved or injury avoided across programs. We need a benchmark amount – say $6 million – to test different regulations to see if they require society to spend more or less than that amount for each statistical life saved or death avoided. If there are significant cost differences, these have to be defended by some moral argument or reason, which often can be done, since some risks are more odious than others to society. A benchmark figure, a sort of average number, is needed, however, to assess regulations to make sure cost differences can be justified and explained.[39]

After the Union Carbide chemical disaster in Bhopal, India, killed thousands of people, Congress enacted a statute that required firms to collect and disclose to the public data on the releases and transfers of various toxic chemicals from industrial facilities. In the Toxic Release Inventory, EPA provides an enormous database that allows members of the public to discover who is releasing what into the environment – and on that basis help to control, perhaps by shaming, industrial polluters.

Lawyers may use this database to seek clients with diseases or injuries possibly attributable to an industrial polluter. This sort of liability, which every polluter must fear, remains the first-line defense of the nation against industrial hazards. Legal decisions in nuisance and injury cases respond to expectations about what kinds of technology industry is morally as well as legally obliged to adopt to reduce whatever emissions and effluents it may produce. The nature and extent of property rights are defined in legal decisions in tort – decisions determining who is liable for what and who must cease a nuisance entirely.[40]

In many contexts, technology-forcing regulation can allow morally acceptable amounts of pollution. In many industries, initial gains to the environment are inexpensive; eventually the cost of controlling the "next" or "incremental" unit of pollution increases. At some given state of technology, one can often find an inflection point or "knee of the curve" – a point at which the cost of controlling the next or marginal unit of pollution increases very rapidly, and returns to the environment rapidly diminish per dollar spent. One morally acceptable way to allow some pollution (for example, through "cap-and-trade" markets for pollution allowances) is continually to encourage or prod industry to improve its processes and technologies to move the knee of the curve – the point at which costs may go asymptotic – ever farther out along the pollution-control axis. To the extent the government can encourage industries, through incentives and threats, to invent environment-friendly technology it can assure environmental progress while allowing at a given stage of technology the minimum amount of pollution necessary for economic growth.

THE THESIS OF THIS BOOK

The argument I have presented so far is not original. It is commonplace to observe that environmentalists – including many ecologists and conservation biologists – care about the preservation of nature and the control of pollution for ethical, aesthetic, and spiritual reasons. These environmentalists rightly profess that society has an obligation to preserve nature as an end in itself and for its own sake and to control pollution as a matter of protecting rights of person and property against harm and intrusion. It is also commonplace to observe that another group of environmentalists – including many welfare and environmental economists – believe that natural resources possess instrumental rather than intrinsic value. They rightly assert that natural resources should never

be wasted but should be used or developed in ways that promote the prosperity of society. They argue that the growth of the economy is worth pursuing for the sake of the social well-being and prosperity it creates.

This book will argue in a more controversial vein that the theory of environmental policy fails because these two groups of environmentalists – let us say conservation biologists and ecological economists on the one side and environmental economists on the other – are unable to keep two opposed ideas in mind and still function. It fails because those ecologists and conservation biologists who should instruct society about the moral, aesthetic, and spiritual value of nature as an end-in-itself – who should help us understand the history and with it the meaning of particular places – represent their concerns as economic, for example, as resting on willingness to pay (WTP) for this species or that vista. Rather than confront society with aesthetic judgments and ethical obligations concerning nature, these environmentalists tout the economic benefits associated with abstractions of their own theory, such as "ecosystem services." As one commentator correctly observes:

> Probably the most important trend in conservation science at the moment is "ecosystem services," typically seen as economic benefits provided by natural ecosystems. They form the basis of most market-oriented mechanisms for conservation. The underlying assumption is that if scientists can identify ecosystem services, quantify their economic value, and ultimately bring conservation more in synchrony with market ideologies, then the decisionmakers will recognize the folly of environmental destruction and work to safeguard nature.[41]

At the same time, environmental economists likewise act like cobblers who have abandoned their lasts. Economists should show society how to promote the performance of its economy. Instead, environmental economists for the past forty years have tried to estimate WTP for the spiritual, ethical, and aesthetic qualities of nature. They have become preoccupied with WTP because they have defined economic "utility" or "benefit" in terms of it. Environmental economists have applied this criterion to measure the "value" of everything – including the control of pollution, the preservation of natural wonders, and every moral, spiritual, or aesthetic belief, commitment, or judgment.[42] Environmental economics has become entangled in WTP as an intrinsic value – a sort of philosopher's stone that can measure the "benefit" of all things. In their zeal to measure WTP, environmental economists, it seems, have all but forgotten the economic goals they could help society to achieve, such as

high employment, price stability, and a more equitable distribution of wealth.

In the past decades, it seems, the entire discussion of environmental policy – at least in expert and academic circles – has been cast in terms of economic utility, in particular, in terms of methods for attaching welfare or WTP equivalents to environmental public goods. It is unclear whether this kind of effort, in which both ecological conservationists and mainstream environmental economists are joined, has anything to do with the two normative ideas we should keep in mind – the idea of preserving the natural world or the idea of improving the performance of the economy.

A few years ago, I watched a televised debate about the teaching of evolution in the public schools. Creationists espousing "Intelligent Design" opposed biologists who argued that evolution represents not "just" a theory but an established fact. What was remarkable about this program was that a group of scientists – at least they had academic appointments in various departments of biology – argued for "Intelligent Design" while a group of clergy in clerical dress defended the Darwinian point of view. Each side tried to co-opt the other by adopting its vocabulary, its appearance, its intellectual garb. The Creationists made their argument sound scientific; the Darwinists talked about faith. The result was funny.

The academic discussion of environmental policy today creates the same confusion or double take: conservation biologists and ecologists whom one might expect to defend the intrinsic value of natural history or of the beauty of the natural world instead argue for environmental protection on instrumental or on economic grounds. They contend that society must greatly reduce consumption and preserve nature as a matter of long-run economic efficiency or what they call "sustainability." You might expect that conservation biologists would try to convince society that a kind of butterfly is worth protecting because of its beauty, its behavior, its history, or its expressive significance. Instead, a prominent ecologist has advised, "The way our decisions are made today is based almost entirely on economic values. We have to completely rethink how we deal with the environment, and we should put a price on it."[43]

Economists and ecologists are all-too-eager to accommodate each other by assigning WTP or welfare measures to the spiritual and aesthetic commitments that once gave moral authority to the environmental movement. Economists feel the pain of environmentalists and seek

funding to develop methodologies to "price" it. Conservationists appear all too willing to have economists co-opt them – to measure the intrinsic value of nature as the WTP of environmentalists – hoping to turn the straw of "prices" into the gold of persuasion.

Environmentalists have entered a Faustian bargain with economists. They have sold their political agency, ethical belief, and aesthetic judgment for numbers used to make decisions "based almost entirely on economic values." If environmentalism is dead, this is one reason. It was not murder but suicide.

The problem, as I shall describe it, is this. Conservation biologists and environmental economists seem unable to keep in mind two important but different and separate ideas – the intrinsic value of nature and the performance of the economy. Instead, conservation biologists, ecological economists, and other preservationists, who should tell us about the intrinsic value of nature, talk about its instrumental value instead. (In later chapters I question the economic arguments these environmentalists offer, for example, that "ecosystem services" are not appropriately "priced"). On the other hand, economists, who should tell us about the performance of the economy – jobs, inflation, and so on – talk instead about "existence," "non-use," and other "fragile" values or "soft" variables. The two sides engage each other in a useless and jejune debate about WTP and logically equivalent ideas, such as "consumer surplus" and "the area under the demand curve." As each side tries to outdo the other in estimating WTP for this species or that vista, the result is not funny. It is a normative and conceptual mess.

This book will offend conservation biologists, including ecological economists, and environmental economists alike. It will offend the "ecological" side by arguing that the economic reasons it offers to protect nature are plainly pretextual. The book will equally offend the "economic" side by arguing that WTP, by which it is transfixed, is not a measure of value. I shall show that WTP correlates with only WTP; any notion of "benefit" or "value" or "well-being" it pretends to measure it merely postulates. "The method of 'postulating' what we want has many advantages; they are the same as the advantages of theft over honest toil."[44]

The book contends that each cobbler should stick to his or her last. Conservation biologists and other preservationists should urge society to preserve the beauty, integrity, history, and diversity of nature, aspects of which are valuable in themselves or as objects of aesthetic judgment, moral obligation, and spiritual affection. Environmental economists

should think in terms of macroeconomic goals, such as "gd jbs w hi pa"; they should interpret the role competitive markets, incentives, political interventions, and legal principles play in encouraging environmental protection and economic growth. These economists can help society achieve its spiritual, aesthetic, and ethical goals in cost-effective ways. Biologists should help society appreciate and respect the intrinsic value of nature and its history. Economists should assist society in maintaining or improving the performance of its economy. Society would then be offered the intelligence it needs to function while holding two distinct ideas in mind.

THE 800-POUND GORILLA

For over thirty years, Americans engaged in making environmental policy primarily – though not exclusively – through what might be called the pattern of "legislate and litigate." Having the advantage of an outpouring of aspirational environmental statutes enacted in the 1970s, environmental organizations sued governmental agencies to force them to apply these laws. Environmental organizations staffed up with economists, scientists, lawyers, and policy analysts to represent before Congress, agencies, and the courts whatever interests those groups defined as "environmental" and therefore as their own. An academic establishment of environmental experts and analysts now seeks to wring the last drops from the quasi-scientific controversies of the 1970s concerning the value of nature and the control of pollution. This *nomenklatura* of environmental experts – primarily ecologists and economists – consider themselves representative as long as they are interdisciplinary. After playing on the political stage for thirty years, however, the zero-sum, winner-take-all, ideologically driven "legislate and litigate" strategy has run out of steam, albeit having accomplished many popular and principled gains.

In 2005, Michael Shellenberger and Ted Nordhaus, two highly respected consultants to environmental organizations, published an influential and compelling essay titled, "The Death of Environmentalism: Global Warming Politics in a Post-Environmental World."[45] The essay observes that a meaningful and intense national and international conversation has arisen concerning the problem of energy use and global climate change. The debate over what to do about energy – how to (1) find alternatives to oil, coal, and other carbon-based fuels, (2) burn

them far more cleanly and efficiently, and (3) still offer the aspiration of prosperity to people everywhere – seeks to do two things at the same time, namely, to protect atmospheric systems and still allow economies to expand. This is not a conversation that can be framed in terms of pollution, that is, the traditional problem of reducing or controlling the kinds of emissions and effluents that violate personal and property rights and that cause the kinds of harms that ground civil actions in common law. Rather, it is a different conversation that contemplates investment, which is already happening, that can create a postindustrial economy, investment in technologies that can continue the economic growth the world is experiencing while responding to the challenge of climate change.

Shellenberger and Nordhaus identify the reasons that the environmental community has failed significantly to enter, direct, or influence this conversation – the reasons "that modern environmentalism is no longer capable of dealing with the world's most serious ecological crisis." According to these authors, environmentalists have engaged in a branding exercise to capture the problem of energy as "environmental" – thus framing it as their special interest requiring their scientific expertise. "The environmental community's belief that their power derives from defining themselves as defenders of 'the environment' has prevented us from winning major legislation on global warming at the national level." These commentators argue that the environmental leadership defeats itself by seeking foundation and government support to craft techniques, such as cap-and-trade strategies, mileage standards, carbon sequestration, and ecosystem "valuation," and sell them "to legislators through a variety of tactics, such as lobbying, third-party allies, research reports, advertising, and public relations." According to this critique, environmentalists defeat themselves by thinking always in terms of limits, reductions, and restrictions. Thus, "environmental leaders are like generals fighting the last war – in particular the war they fought and won for basic environmental protections more than 30 years ago."

Shellenberger and Nordhaus argue that the environmental movement makes itself irrelevant by seizing on climate change as a narrowly environmental problem – branding it as its own professional bailiwick – instead of joining with many other constituencies who understand that it is also or that it is primarily a geopolitical problem, a trade problem, a problem of industrial and transportation policy, and a military or a strategic problem insofar as nuclear energy can lead to nuclear weapons

and oil fields become battlegrounds. "The carbon threat from China and other developing countries drives home the point that a whole series of major policies not traditionally defined as 'environmental,' from industrial policy to trade policy, will be needed to deal with global warming."

The problem of global climate change cannot be approached as one of measuring and balancing values, that is, as a traditional problem of cost-benefit analysis. Unfortunately, conservation biologists and ecological and environmental economists are so enmeshed in methodologies to measure WTP for this or that environmental good, the necessary conversation about global climate change eludes them and passes them by. The interesting long-term research has moved away from academic departments of environmental studies, economics, and conservation biology and toward more recently created centers for the study of energy policy and climate change. These centers are not populated by ecologists, conservation biologists, or environmental or ecological economists. They are mostly staffed by physicists and engineers.

The conceptual framework of environmentalism, which draws largely from the vocabularies of economics and ecology, produced many successes over the last thirty years. It is now exhausted. The closet of "valuation" – which brings together ecologists and economists to speculate about the "benefits" of environmental protection – has become particularly suffocating. Lost in surveys of WTP and in conjectures about the economic value of nature's services are the reasons one might honestly care about the protection of biodiversity, the reduction of toxic pollutants, the preservation of natural and historic places, and the stability of the atmosphere. These reasons do not depend on methods to measure willingness to pay. They have to do with religious or spiritual beliefs and affections, aesthetic and moral judgments, economic prosperity, homeland security, geopolictal strategy, and personal and property rights. As Bill McKibben has written, the problem of climate change is creating a politics that is no longer environmentalism but that is forcing environmentalism to become something else. "If it has success, it won't be environmentalism anymore. It will be something much more important."[46]

The following chapters apply philosophical analysis to environmental policy. One role of applied philosophy is to give defunct theories a proper burial.[47] This clears the field for new theories, new vocabularies. As Hegel said, "the Owl of Minerva takes flight only when the shades of night are falling." When philosophy paints its gray in gray, you know a form of life has died.[48]

A LOOK AHEAD

Here is a road map to the chapters that follow. The next one describes a meeting I attended in a town near Buffalo, New York, where residents felt threatened by nuclear wastes. The chapter discusses relationships in power between (1) those who engage in cost-benefit analysis to evaluate social policy and (2) those whom social policy affects. It analogizes the relation between welfare economists and the public they serve to the lawyer-client relationship and especially to the therapist-patient relationship. It criticizes the "value neutrality" of the cost-benefit analyst as a pretext by which a professional class (a *nomenklatura*) justifies its collectivization and manipulation of society.

Chapter 3 argues that we play two different roles – as consumers and as citizens – in affecting social outcomes and that we should not try to reduce or explain one in terms of the other. Individuals may help determine social outcomes first as economic actors in markets and second as citizens participating in political institutions and processes. The chapter contends that these roles or these *personae* are really different. The goal of economic activity – this is a thesis I defend throughout this book – is to provide lots of jobs at good wages and to increase the quantity and variety while lowering or at least stabilizing the prices of products people want to buy. The government has a responsibility, of course, to help secure the conditions in which the economy will perform well, for example, by defining and enforcing property rights, reducing transaction costs through legal and institutional reform, and securing equality of opportunity.

Through political activity, however, citizens can support many social goals that are justified in themselves – as expressions of the intrinsic values of the community – and not simply or primarily because of their effects on the performance of the economy. These goals include the flourishing of the sciences and the arts, the support of education, the protection and improvement of public health, and the pursuit and preservation of a common cultural and natural heritage.

Chapter 4 argues that WTP fails to provide a normative basis for environmental economics. Any statement that connects WTP to a conception of value – such as "benefit," "well-offness," or "welfare" – is merely a stipulation, that is, an arbitrary definition or tautology. To say that the economic value of a good is measured by someone's WTP for it is only to say that someone's WTP for a good is measured by his or her WTP for it. Having a preference (or WTP for something) may give the individual

a motive to try to satisfy it; that in general he or she should be free to do so in ways that respect the same freedom of others is a piety I do not question. Society has reason to help with certain kinds of preferences – those for basic goods (according to a theory of justice), security (according to any political theory), and merit goods (if it wishes). There is no nontautological argument that shows, however, that society has anything to gain by seeking to maximize the satisfaction of preference per se, measured by WTP, and taken as it comes. In the context of valuation, WTP measures nothing but itself.

While I deny that maximum or aggregate WTP has any normative significance, I recognize the importance of competitive market prices – the minimums people must pay for what they want to buy. By leading consumers to bargains and entrepreneurs to profits, price signals guide economic actors as by an "Invisible Hand" to make the kinds of decisions that promote general prosperity and social peace. In this chapter, I defend the classical concepts of the "Economic Man" and the "Invisible Hand" as they were developed by Adam Smith to understand how markets can lead people spontaneously to organize themselves for their mutual advantage. At the same time, I deplore two contemporary or neoclassical theoretical constructs – "WTP Man" and "Kaldor-Hicks Efficiency" – which have no relation, as I shall argue, with anything of normative significance either to the individual or to society in general.

In Chapter 5 I criticize attempts to attribute high market valuations ("shadow" prices) to ecological services. This chapter maintains, first, that large-scale biospheric supporting systems, such as those that regulate the planetary climate, are what economists call "lumpy" goods; they cannot be "priced" or traded in marginal units. Regulatory markets for pollution allowances do not represent voluntary exchanges between willing market players. The problem of creating a regulatory market is like the challenge the mice in Aesop's fable confronted when they decided to bell the cat. A political authority has to do the heavy lifting by limiting total emissions and then by setting and distributing initial allowances to be traded under that limit.

Second, many of the products or goods associated with nature – arable land, fish, trees, drinking water, and the like – do trade in markets and thus receive competitive prices. The productive services of nature, such as the ability of fertile soil to grow crops, receive low market prices not because markets fail or because a resource such as fertile soil is a "public good" but because the resource, in this example good cropland, is quite

abundant relative to effective demand. This is the case generally. The chapter argues that environmental or ecological services are either too lumpy to price "at the margin," already priced competitively, or too cheap to meter. The chapter ends by considering objections.

Chapter 6 argues that, in general, price signals work well with respect to the production and consumption of economic goods. I take a fairly optimistic view – one so far borne out by experience – of the power of technology to substitute plentiful for scarce resources, to do more with less, and under pressure from market competition to improve standards of living. The chapter argues that the problem of famine is not one of production but distribution – famine is always a local disaster brought about by oppression and civil war, and never a global problem brought about by a worldwide shortage of productive capacity. This chapter touches on the emerging competition between comestibles (food) and combustibles (fuel) for arable land. It also contends that the problem of population is becoming less one of numbers than of ages; the problem is no longer Malthus but Methuselah. Have environmentalists an exit strategy – an idea of how long people should live, not just how few should be born? Chapter 6 concludes by introducing the theme that occupies the rest of the book, namely, the aesthetic, moral, cultural, and historical reasons to protect the natural world. It urges readers to think of nature not just as a resource for economic activity but also as a refuge from it.

Chapter 7 takes up the question of whether an environmental ethic based on a conception of intrinsic value – the view this book preaches – is even possible in view of the findings of biological science. According to neo-Darwinian biology, no plant or animal has a purpose – all were created simply by accident or as a result of sheer contingency in the form of random mutation and natural selection. If value entails purpose, it follows that natural objects (e.g., endangered species) lack value and thus cannot be worth protecting except for a purpose they may serve – either the end for which God created the world (according to natural theology) or some use to which human beings may put them (according to a consequentialist or utilitarian ethic). If value requires purpose, the refutation of natural theology after Darwin implies that humanity has no obligation to respect or preserve the natural world except as doing so serves our economic goals – which, as I argue in this book, is rarely the case.

Drawing on the distinction between explanation and communication found in Calvinist theology, I argue that value does not entail purpose.

The expressive, aesthetic, or communicative aspects of nature may be valuable or endow natural objects with value apart from any use or purpose these objects may serve. The crucial distinction between explanation and communication – one scientific, the other aesthetic – offers a rationale for an obligation to protect the natural world that may appeal to members of faith communities and to biologists and other scientists. This approach also helps resolve the "lurking inconsistency" some scholars see in the relationship between a "value-neutral" biological science and a conservationist ethic.

Chapter 8 takes up the ethical (including spiritual, cultural, and aesthetic) reasons to preserve nature, which, as earlier chapters will have suggested, have to do with the historical and expressive aspects of places. It attempts to explain the concept of place in terms of the memories that fill particular environments. I work through a series of examples to illustrate what I think of as the appropriate conception of "sustainability," which has to do with the functioning of institutions – the maintenance or development of fair, open, free, and secure economic and political processes. From an environmental as distinct from an economic point of view, what has to be sustained is shared memory rooted in places people know and love.

Chapter 9 seeks to explain the cultural memories that define an environmental ethic in the United States. This chapter tells the story – which has been told a thousand times before – of the migration of peoples of many cultures and ethnicities to and across a continent. I give a mainstream account of America's covenant with the natural world – an account full of references to the likes of Governor John Winthrop, Jonathan Edwards, Henry David Thoreau, Ralph Waldo Emerson, Walt Whitman, William Faulkner, and F. Scott Fitzgerald. Chapter 9 rounds up all the usual suspects – it is not intended to break new ground – to present in a short homily the ethos of nature in the United States. Students of American history and literature will find nothing new here; those less familiar with this history will find a short and I hope useful introduction to it.

The final chapter presents a blistering critique of the current state of the environmental movement – a critique along the same lines as the essay by Shellenberger and Nordhaus mentioned earlier. I argue that in the 1970s, environmentalism drew on religious affections and on populist resentments. Religious groups actively cared for Creation. Hunters, hikers, and fishermen fought to preserve places they knew and visited. Today, environmentalists appear embarrassed by the theological,

aesthetic, ethical, and cultural commitments that inspired their movement decades ago. They play "science says"; they think they are representative as long as they are interdisciplinary. They couch their arguments in terms that sound technical, such as "ecological communities," "ecosystem services," "biodiversity," "invasive species," "existence values," "sustainability," and "ecological health." These terms are in fact thoroughly normative; they are ideologically driven and conceptually amorphous. Arguments about the definitions of these theoretical constructs – which scientize ethical and political disputes – have transformed environmentalism from a moral and political cause into an academic research program. Environmentalists can regroup, however, around spiritual, ethical, and aesthetic ideals that have always motivated them, as long as they advocate these values openly rather than hide them behind a smokescreen of scientism.

Chapter 2

At the Shrine of Our Lady of Fatima *or* Why Political Questions Are Not All Economic

Lewiston, New York, a well-to-do community near Buffalo, is the site of the Lake Ontario Ordinance Works, where the federal government, years ago, disposed of residues from the Manhattan Project. These radioactive wastes are buried but not forgotten by the residents, who say that when the wind is southerly, radon gas blows through the town. Several parents at a conference I attended described their terror on learning that cases of leukemia had been found among area children. They feared for their own lives as well. At the other side of the table, officials from New York State and local corporations said these fears were unfounded. Those who smoke take greater risks than those who live near waste disposal sites. An official said that rational decisions depended on measuring the costs and benefits of alternatives in terms of the amounts people would pay to obtain them or demand to accept them. This increased the parents' resentment and frustration.

The official told the townspeople that risks they casually accept – for example, by drinking alcohol or by crossing the street – were greater than the risks associated with the buried radioactive residues. He argued that the waste facility brought enough income and employment into the town to compensate for any hazards the residents might face. They remained unimpressed by his estimate of their "willingness to pay" for safety; his risk-benefit analysis left them cold. They did not see what economic theory had to do with the ethical questions they raised. They wanted to talk about the manipulation of information and the distribution of power in our society. They did not care to be lectured about willingness to pay, costs, and benefits.

POWER AND DECADENCE

If you take the Military Highway (as I did) from Buffalo to Lewiston, you will pass through a formidable wasteland. Landfills stretch in all directions where enormous trucks – tiny in that landscape – incessantly deposit sludge, which great bulldozers, like yellow ants, then push into the ground. These machines are the only signs of life, for in the miasma that hangs in the air, no birds, not even scavengers, are seen. Along colossal power lines that crisscross this dismal land, the dynamos at Niagara push electric power south, where factories have fled, leaving their remains to decay. To drive along this road is to feel the awe and sense of mystery one experiences in the presence of so much power and so much decadence.

Henry Adams responded in a similar way to the dynamos displayed at the Paris Exposition of 1900. To him the dynamo became a "symbol of infinity" and functioned as the modern counterpart to the Virgin – that is, as the center and focus of power: "Before the end, one began to pray to it; inherited instinct taught the natural expression of man before silent and infinite force."[1]

Adams asks in his essay "The Dynamo and the Virgin" how the products of modern industrial civilization will be compared with those of the religious culture of the Middle Ages. If he could see the landfills and hazardous-waste facilities bordering the power stations and honeymoon hotels of Niagara Falls, he would know the answer. He would understand what happens when efficiency replaces infinity as the central conception of value. The dynamos at Niagara will not produce another Mont-Saint-Michel. "All the steam in the world," Adams writes, "could not, like the Virgin, build Chartres."[2]

At the Shrine of Our Lady of Fatima, on a plateau north of the Military Highway, a larger-than-life sculpture of Mary looks into the chemical air. The original of this shrine stands in central Portugal, where in May 1917 three children said they saw a lady, brighter than the sun, raised on a cloud in an evergreen tree.[3] Five months later, on a wet and cold October day, the lady again appeared, this time before a large crowd. Some in the crowd reported that "the sun appeared and seemed to tremble, rotate violently and fall, dancing over the heads of the throng."[4]

The shrine was empty when I visited it. The cult of Our Lady of Fatima, I imagine, has few devotees. The cult of welfare economics,

however, has many. Where some people see only environmental devastation, its devotees perceive utility, willingness-to-pay, welfare, or some such theoretical construct. They see the satisfaction of wants. They balance benefits and costs.

As I looked from the shrine over the smudged and ruined terrain, I thought of all the wants and preferences that are satisfied in a landscape full of honeymoon cottages, commercial strips, and dumps for hazardous waste. I hoped that Our Lady of Fatima, worker of miracles, might serve, at least for the moment, as the patroness of cost-benefit analysis. The prospect, however, looked only darker in that light.

WHO WE ARE AND WHAT WE WANT

Public policy for the environment, workplace safety, and public health is and ought to be grounded in what Richard Andrews calls the "philosophy of normative constraints." He explains:

> In this conceptual framework, government is not simply a corrective instrument at the margins of economic markets but [a] central arena in which the members of society choose and legitimize . . . their collective values. The principal purposes of legislative action are to weigh and affirm social values and to define and enforce the rights and duties of members of the society, through representative democracy. The purpose of administrative action is to put into effect these affirmations by the legislature, not to rebalance them by the criteria of economic theory.[5]

In this paragraph, Andrews distinguishes between two kinds of criteria by which we may formulate and assess environmental policy. The first approach attempts to "weigh and affirm social values and to define the rights and duties of members of the society." The second approach applies "the criteria of economic theory." In the introductory chapter, I argued that if "the criteria of economic theory" are construed in terms of economic performance – for example, "gd jbs w hi pa" – each of these two approaches is legitimate. The challenge for society lies in being able to function while it keeps both of these separate ideas in mind.

Our environmental goals rest on views or beliefs that find their way, as ethical principles and intuitions, into legislation and common-law adjudication. These goals – cleaner air and water, the preservation of wilderness and wildlife, and the like – should not be construed as personal wants or preferences to be "valued" by the criteria of economic

theory. These goals represent not goods we choose but values we recognize – not what we want but who we are.

To some extent environmental statutes – particularly laws that control pollution and minimize risk – express a broad moral consensus about the rights of person and property. In other matters, for example, the maintenance of "natural" objects and areas, society establishes councils, stakeholder groups, representative regional authorities, zoning boards, and other committees in which citizens with a variety of values and beliefs can share information and work out their differences in peaceful ways.[6] To resolve disagreements over social commitments, standards, and values, we rely on deliberative processes that are associated with representative democracy, through which society enacts rules that reflect its identity and establish its aspirations. In this democratic process, society takes economic factors into account, of course, since to will a particular outcome one must also will the means to achieve it. Economic analysis may also help society achieve most effectively and at the lowest cost whatever goals it sets.

We debate social policies on the basis of their moral qualities and objective merits; it is not a question of personal benefit, although we take economic factors into account. Consumers who have to pay higher prices as a result, for example, may nevertheless favor safety regulations in the workplace as a matter of national pride and collective self-respect, not self-interest. Environmental goals derive less from self-interest than from national purpose and from a memory even newcomers adopt of our long historical relationship to a magnificent natural heritage. In a later chapter, I shall try to describe that heritage. When people support these goals they are not trying to improve the economy but to protect the environment.

The possibility that people act politically to protect the environment (rather than just individually to satisfy their preferences) presupposes the reality of public values we can recognize together, values that are discussed as shared intentions and are not to be confused with personal wants or satisfactions. Through public conversation we are able to assess goals we attribute to ourselves as a community – as opposed to preferences we might pursue privately. Our system of political representation may be the best available device for deciding on shared values, for "filtering the persuasive from the unpersuasive, the right from wrong, and the good from bad."[7] Political decisions constitute compromises formed by give-and-take and by persuasion, by deliberation, and by the force of the better argument.

TWO FRAMEWORKS OF GOVERNANCE

In viewing environmental policy in this way – as the expression of public values rather than as the satisfaction of subjective preferences – I am endorsing a Kantian or "deontological" rather than a welfare-economic approach to governance. At the same time, I recognize and appreciate – at least I wish I could attain personally – the blessings of a "gd jb w hi pa," that is, a standard of living associated with economic prosperity.

The Kantian or deontological approach to valuation does not try to measure subjective preferences to assign a "value" to environmental goods. As a general rule, a Kantian approach lets markets price goods competitively in the belief that an economy that responds to price signals generally performs better in terms of employment, productivity, inflation, and so on, than a society in which scientific managers allocate resources in terms of their own conception of "value" – that is, the conception of the good defined by their social theory. In other words, the Kantian believes that insofar as the goal is economic – that is, the overall performance of the economy – decentralized or diffused activity based on competitive prices and well-defined property rights works better than centralized planning based on expert estimates of "benefit," "utility," or "welfare."

In this book I contrast the welfare-economic with the Kantian approach to governance. The two frameworks for decision making differ in the way they conceive the decision maker. In the welfarist perspective, the decision maker is the individual conceived as an ordered set of preferences. These preferences are assumed to reflect judgments the individual makes about what is good for her or him. Individuals are expected to know the maximums they would bid to possess or the minimums they would ask to relinquish all sorts of goods or possible outcomes. These amounts – willingness to pay (WTP) and willingness to accept (WTA) – are thought to measure the "value" or "benefit" of any good or social state to any individual.

The Kantian approach agrees that public policy should respond to the values individuals profess. These comprise moral principles and aesthetic judgments, not simply consumer preferences. People assign all the values, in other words, but one should not confuse (1) values that represent what the individual believes to be good or right for the community with (2) preferences the individual entertains about his or her consumption opportunities.[8] People defend beliefs about a good

society in social and political institutions while they pursue consumer preferences in competitive markets. These are different frameworks for pursuing different kinds of ends.

In political institutions and processes, individuals must defend what they believe with reasons that will persuade others; in markets, individuals pay the competitive price for goods they want to buy. The views and arguments citizens present about what they believe society ought to do should be considered in a different context from goods people purchase to benefit themselves. A Kantian distinguishes the opposition of ideas (which has to be settled by argument) from differences of interest (which could be settled by monetary exchange).

Both the Kantian and the welfare-economic approaches provide frameworks for rational choice – one by appealing to principles and procedures appropriate to the identity of the decision maker in a given situation, the other by emphasizing consequences for preferences. The first framework asks the political and ethical question: What do we stand for as a society? Which conception of the common will or the public interest is correct? Which rules should we follow with respect to problems such as pollution, the extinction of species, or wilderness preservation, given our history, culture, and sense of shared identity? The second framework asks the question posed by welfare economics: Which outcome will maximize net social welfare defined or measured in terms of the aggregate satisfaction of preferences ranked by WTP and taken as they come?

James G. March, who teaches political science at Stanford University, provides a theoretical understanding of these two alternative approaches to decision making. When decision makers adopt the economic approach, March explains, they choose among given alternatives "by evaluating their consequences in terms of prior preferences." When they adopt the principle-based or Kantian framework, decision makers "pursue a logic of appropriateness, fulfilling identities or roles by recognizing situations and following rules that match appropriate behavior to the situations they encounter." As members of a society, individuals determine who they are and what they stand for as a community. Institutions, political arrangements, and processes of public conversation become central. The duties of deliberation take precedence over the algorithms of aggregation. We ask who we are, not just what we want. In this framework, according to March, the reasoning process "is one of establishing identities and matching rules to recognized situations."[9]

WILLINGNESS TO PAY

This chapter examines the economic decisions as well as the political and social decisions we make about the environment. Some analysts have suggested that, ideally, these should be the same – that every environmental problem should be understood as an economic one. William Baxter, for example, writes, "All our environmental problems are, in essence, specific instances of a problem of great familiarity: How can we arrange our society so as to make the most effective use of our resources?"[10] In spite of this statement, Baxter does not refer to the performance of the macroeconomy – for example, jobs and inflation. Rather, he is concerned with a different matter, that is, WTP as a measure of "human satisfaction." He writes that to assert that there is

> a pollution problem or an environmental problem is to assert, at least implicitly, that one or more resources is not being used so as to maximize human satisfactions. In this respect at least environmental problems are economics problems, and better insight can be gained by the application of economic analysis.[11]

On this view, there is really only one objective: to maximize "welfare" defined in terms of preference or willingness to pay.[12] Any contradiction in public opinion – whether old-growth forest should be preserved, for example – is construed as a conflict of preference. Environmental problems exist, then, only if environmental resources could be reallocated to those who are willing to pay more for them. "To the economist," Arthur Okun writes, "efficiency means getting the most out of a given input." According to Okun, "more" translates into "better." He explains: "This concept of efficiency implies that more is better, insofar as the 'more' consists of items people want to buy."[13]

Environmental economists generally define "efficiency" as the "maximum consumption of goods and services given the available amount of resources."[14] In this approach to environmental policy, "the benefit of any good or service is simply its value to a consumer."[15] This "value" or "benefit" is measured or defined in terms of the most the individual is willing to pay for the good in question. According to this view, "total willingness to pay . . . represents the total value or total benefit associated," for example, with environmental improvements.[16] "In principle, the ultimate measure of environmental quality," one text assures us, "is the value people place on these services . . . or their *willingness to pay*."[17]

Willingness to pay. What is wrong with that? There are at least two problems. First, no meaningful connection holds between WTP and any

normative concept – any concept of the good – not trivially defined in terms of it. I shall return to this thought in later chapters. Why is something *valuable* or *good* from a societal point of view because or insofar as an individual is willing to pay for it? Having a preference may give that individual a reason to try to satisfy it – but not necessarily society. Individuals may pursue their own interests on their own; they should be free to do so. It does not follow, however, that the preferences of individuals taken in the aggregate provide the appropriate basis for social policies, values, or judgments.

Why would anyone believe that whatever a person happens to want – anything for which he or she is willing to pay – is to that extent valuable from a societal perspective? A social welfare function – a method to aggregate the preferences of all individuals into a "social" preference – even if it were possible, expresses the moral theory of a two-year-old: "I want it; therefore, it is good." Who believes this? If you contribute to the Ku Klux Klan, does that make the KKK better? It only makes you worse.

Economists may argue that they have no means to distinguish better from worse, right from wrong; accordingly, their scientific approach compels them to use WTP as a neutral measure of the social importance of any preference. That economists are limited in this way, however, does not show that society should be neutral among moral or aesthetic judgments – that it cannot distinguish better from worse. Indeed, to act as a citizen is to act within and on behalf of institutions to make collective moral, social, and political decisions. The insistence of welfare-economic science that it remain "neutral" among preferences is in itself enough to make it irrelevant to the normative questions that seize, inform, and justify social policy.

Second, not all of us think of ourselves primarily as consumers. Many of us regard ourselves as citizens as well. As consumers, we act to acquire what we want for ourselves individually; each of us follows his or her conception of the good life. As citizens, however, we act through and on behalf of social institutions. We may deliberate over and then seek to achieve together a conception of the good society. Our beliefs, moral convictions, and goals as citizens – indeed, as moral beings – may have and probably should have little relationship to what we believe benefits us personally. This cuts any actual link that might erroneously be thought to exist between WTP and benefit.

Those who believe that endangered species ought to be protected, wilderness preserved, pollution reduced, "greenhouse" gases controlled, open areas maintained, workplaces made safer, and so on present

views about public policy that possibly contradict the idea that goods should be allocated according to maximum WTP or to the highest bidders. It seems that environmental economists regard these reasoned, principled, and morally based views about policy as if they expressed an individual's preferences based on expectations of personal benefit. These policy "preferences," then, would be only as good as the individual's WTP for them. No one asks environmental economists how much they are willing to pay for their views or beliefs about social policy. Why should economists refer to WTP to assess the beliefs of others?

WHAT IS COST-BENEFIT ANALYSIS?

Cost-benefit analysis originated in the United States in the context of major water projects the Corps of Engineers undertook early in the last century. The River and Harbor Act created a Board of Engineers which it required to weigh the commercial benefits of a water project – such as irrigation and hydroelectric power – against its costs. Cost-benefit analysis in this sense depends on the same intuitive and pre-theoretical knowledge as would characterize a child's lemonade stand. Will the product sell at a profit in view of the cost of labor and materials? In this sense, cost-benefit analysis envisions the government as if it were a firm engaged in profit-making activity. This kind of cost-benefit analysis, which can be useful and appropriate, served as "an administrative device owing nothing to economic theory."[18]

After the 1970s, economic theory completely transformed cost-benefit analysis so that it had less to do with price and profit and more with preference and willingness to pay. The highly theorized cost-benefit analysis that emerged in the 1970s was developed to attribute economic value to aesthetic and moral judgments, such as the beliefs many people share that a more natural, less polluted environment is one that is better than the burning rivers and dying wildlife they saw or read about at the time. Economists sought to measure scientifically what these moral and political convictions were "worth" by finding WTP equivalents for them. Economists thus put themselves in the business of characterizing political beliefs and judgments (other than their own) as "non-use" or "existence" values they claimed the expertise to measure. This made their services attractive not only to public agencies and officials but also to foundations that supported environmental causes and funded economists to "green" their science.

The theory behind today's conception of cost-benefit analysis starts with the concept of an ideal market. As Allen Kneese explains this notion, an ideal or perfect market meets certain conditions. "All participants in the market" first "are fully informed as to the quantitative and qualitative characteristics of goods and services and the terms of exchange among them."[19] All valuable assets in the economic system are fully owned, managed, and exchanged in competitive circumstances, which is to say, no individual or firm "can influence any market price significantly by decreasing or increasing the supply of goods and services" it offers.[20] For environmental policy, two corollary conditions are especially important. First, "individual ownership of all assets plus competition implies that all costs of production and consumption are borne by the producers and consumers directly involved in economic exchanges." Second, "a closely related requirement is that there must be markets for all possible claims."[21]

As Kneese notes, the "connection between such a market exchange and the real working economy has always been tenuous at best." As Kneese and other environmental economists see the situation, "the main source of our environmental problems is the inability of market exchange as it is presently structured to allocate environmental resources efficiently."[22] Because the actual economy is seen or perceived as *not* like the ideal market, economists argue that they must direct resources scientifically. The measurement of WTP or WTA provides welfare economists a method both to identify and to correct "market failure." Since markets ubiquitously and pervasively "fail" to meet the ideal model, environmental economists empower themselves by offering their services in developing methodologies to assign "valuations" based on WTP for what they identify as given or available resources.[23]

In fact, a free market has many attractive characteristics or advantages, even if any outcome it reaches can be construed as "failing" to meet one ideal condition or another. First, the consensual aspect of market outcomes is important. If a person regrets a choice – an investment goes south, for example – the person does not blame the government. This supports social stability. Second, in an actual market, entrepreneurs who have good ideas can increase the resource base by improving technology. In other words, the actual market is dynamic, not static. Rather than allocating a "given" bundle of resources, the market through innovation leads to the creation of many new bundles of resources – such as the Internet – often unlike any of those known before.

Third, a competitive market generates and follows fluctuating price signals that coordinate an incredible amount of information. The competitive behavior of individuals by influencing and responding to price adjustments generates new resources as entrepreneurs apply knowledge to knowledge in creative ways. An economy that provides "gd jbs w hi pa," increases productivity and trade, and keeps prices stable is a well-functioning economy. It is then up to society to use its wealth to pursue aesthetic, moral, cultural, or spiritual goals, such as the protection of the natural environment.

Cost-benefit analysis – or the economic theory that now supports it – abandons the virtues of a free and competitive market. It supposes a zero-sum game in which resources are fixed and thus takes the problem to be not innovation but "allocation" or "distribution." It abandons the notion of consent, as I shall explain in a later chapter, by imposing a "hypothetical compensation" test. It disposes of the idea of competitive market prices by defining maximum WTP (a.k.a. "consumer surplus," "benefit," or "the area under the demand curve") as a kind of intrinsic value. Once one defines economic value as an intrinsic quantity (whether in terms of the surplus labor theory of Marxist economics or in terms of the consumer surplus theory of welfare economics) one gets to direct the economy. What becomes important is maximum WTP, the demand curve, and other constructs that welfare economists posit as indicators of value and not coincidentally that they are paid to measure. Economists empower themselves by defining aggregate WTP as good – as "benefit" – and they hope with sufficient funding to develop methodologies to measure it, at least someday, in experimentally replicable and therefore respectable ways.

Market prices do not appear to matter much, if at all, in the contemporary theory of environmental economics or in its way of doing cost-benefit analysis. The model of price competition has the spectral aspect of a *deus absconditus* in environmental economics – or perhaps the aspect of the Garden of Eden from which we are forever excluded because of innate market failure. The extensive indexes of leading textbooks in environmental economics – such as those by Charles Kolstad and by Eban Goodstein – do not have any entries for the term "price" or "prices."[24] Nor do they mention criteria used to assess the performance of the economy. Nor does their static concept of allocation or distribution recognize that innovation constantly increases available resources and determines what counts as a resource. Textbooks in environmental economics teach experts how to "value" environmental assets – to measure

"benefit" defined as maximum WTP – which is not what market prices reflect. The idea of competitive or equilibrium pricing has disappeared; the concept of the market, like the Cheshire cat, has vanished, leaving WTP as its disembodied smile.

EXTERNALITIES

As an example of a "market failure," environmental economists often invoke the concept of an "externality," which is to say, a cost (or benefit) involved in producing or consuming a good which the price of that good does not fully reflect. The concept of a cost "externalized" to those who do not consent to bear it can be used in either a narrow or an expanded sense. When economists speak of an "externality" in the narrow sense, they use the concept to refer only to physical side effects, such as pollution, that cause actual damage – the sort defined, for example, by the common law of tort – to person or property. These analysts may then measure the cost of pollution in terms of the health damage it causes to people and the economic losses it inflicts on them. This approach makes sense and can be useful because it refers to kinds of damages that can be physically measured. Courts and legislatures may then identify and try to remedy or control the causes of that damage.

Resource and environmental economists during the 1950s and 1960s generally defined economic efficiency in a narrow sense, that is to say, in terms of a conception that tied externalities to the physical side effects of market transactions. These economists did not try to estimate on a WTP basis the "worth" of moral, aesthetic, political, or cultural concerns and convictions. Many of the economists who first developed the techniques of cost-benefit analysis – E. J. Mishan would be an example – recognized, at least implicitly, the intractability of quantifying "benefits" associated with the ethical and aesthetic concerns expressed in public laws such as the Endangered Species Act or the Clean Water Act that intended to preserve the integrity of nature.[25] These economists urged analysts to list these "qualitative" benefits separately to bring them to the attention of public officials. They did not try to "price" ethical judgments and aesthetic values but saw them as the appropriate subject of political deliberation within a legislative process.

During the 1960s and 1970s, however, owing in part to the work of Ronald Coase, which I shall not pause to describe here, economists began to argue that externalities result not so much from spillover damage to nonconsenting third parties – for example, damage caused by

pollution – as from the inability of these third parties, because of the costs of bargaining, to organize themselves to enter into and thus influence the transactions that affect them. Accordingly, economists began to replace the notion of a physical spillover with that of a transaction or bargaining cost as the paradigm of a market failure. In evaluating the overall efficiency of a project or a policy, analysts began to ask not "What is a cause of what?" but "What is a cost of what?"[26] They widened the idea of an externality, then, to include any unpriced benefit or cost, which is to say, any WTP (or WTA) that was not reflected in the prices set by markets.

An efficient policy was understood, at first, to be one that would result from the functioning of markets free of externalities, where externalities were conceived in the old, narrow sense, that is, in terms of physical damage or economic loss to nonconsenting third parties who would, as a result, have standing to sue in courts of common law. When the notion of an externality expanded to cover any unpriced benefit or cost, however, the ideas of an efficient market and an efficient policy widened as well. A value of any kind – religious, aesthetic, political, whatever – would be considered a personal preference which WTP (or WTA) could measure. An efficient market then had to "internalize" or "value" not only the kinds of injuries or losses that are cognizable in common law but every belief, argument, or reason anyone might give for or against an outcome, as long as he or she were willing to back up those opinions with money.

Theorists who defend cost-benefit analysis as a tool for policy making face a dilemma. In identifying the costs and benefits of an action, they must construe externalities in either the narrow or the broad sense, that is, narrowly as damage to person or property of the sort recoverable under common law or broadly as any belief, sentiment, or desire – economic, moral, aesthetic, or political – that markets leave unpriced. If analysts construe externalities narrowly, they must concede that many policies that appall them and almost all the rest of us for cultural, aesthetic, and ethical reasons might be perfectly efficient. The conversion of the little-used wilderness at Mineral King into a Disney resort in the heart of Sequoia National Park would not injure anyone's person or property. We can suppose, moreover, that no one may suffer any injury or loss even remotely recognizable under common law as a result of the commercial development of the habitats of endangered species. If they use concept *externality* in a narrow sense, economists could leave spiritual, ethical, cultural, and aesthetic judgments to others. Before the

1960s, in fact, economists generally left these kinds of judgments – along with "equity" concerns – to the courts, to deliberative political processes, and to the voluntary actions of individuals.

After the 1960s, analysts introduced a wider notion of an externality, which includes not simply injury or damage of the sort that might give third parties standing to sue in common law but also any attitude, opinion, argument, or belief that a person might conceivably be willing to back up with money. When analysts expand the notion of an externality in this way to embrace the opinions and beliefs of everyone but themselves – when they accept their own assumptions about value as correct and "measure" the views of others on the basis of WTP – they do more than second-guess the results of actual markets by referring to their ideal market. They make a bald attempt to replace the political process as well, an attempt they may not acknowledge. It is for the political process – not for economic analysis – to gather and judge beliefs and opinions.

Cost-benefit analysis does not, because it cannot, assess opinions and beliefs on their merits but asks instead how much might be paid for them, as if a difference of view could be settled in the same way as a conflict of interest. Analysts who take this approach, of course, confuse views with interests. They give political, ethical, and cultural convictions technical names – "bequest," "existence," "intangible," "soft," and "fragile" values – and thus transform judgments that have carried the day before legislatures into data for cost-benefit analysis.

I recognize the importance of economic analysis when it is used narrowly to inform the public and its officials about the actual market costs associated, for example, with reclaiming mined lands or increasing highway safety. To make a wise decision, society must know these costs and recognize the law of diminishing returns. Economic analysis, moreover, can be useful by suggesting less expensive ways society may reach its cultural and ethical goals, such as by supplementing "command and control" bureaucratic approaches with regulatory systems that introduce market incentives for controlling pollution, for example, or preserving beautiful places.

When cost-benefit analysis attempts to do the work of ethical and political judgment, it loses whatever objectivity it might have had and becomes a tool of partisan politics. Economic analysis expands to play the role of moral philosophy, political deliberation, and aesthetic judgment. Any group who has an interest to advance or a view to vindicate can appeal to economic "valuation" to buttress its position. The other

side must then hire economists to get different estimates. When the concept of an "externality" extends beyond losses and injuries of kinds cognizable in common law, economic analysis deteriorates into story-telling likely to convince only those who agree with and possibly have been paid for its results.

VALUES AS WANTS

The idea behind political deliberation and negotiation is that the process can be educational and transform confrontation into collaboration. In the context of political deliberation, in other words, positions are not construed as exogenous variables but are endogenous to the decision-making process. Participants, therefore, may redefine a problem or consider alternatives that permit an unexpected resolution. Because people must argue their views on the merits and from a public or intersubjective point of view in order to persuade each other, they may refine or even change their positions to make them plausible representations of the public interest or the general good. Legitimacy depends on the extent to which an outcome represents a policy all can approve after deliberation rather than the preponderance of interest or WTP before discussion or debate.

Political deliberation can be seen as the opposite of welfare-economic valuation. Deliberation presents values as intersubjective – as legitimate because they take as their logical subject the community as a whole. Economic valuation, in contrast, takes all values to be statements of subjective interest – to express what the individual believes is good for him rather than good for us. Values enter welfare-economic calculation as exogenous variables, that is, as arbitrary preferences for which individuals are willing to pay. An analyst may therefore construe any policy as a benefit to those who approve it and as a cost to those who oppose it. Thus, analysts may interpret judgments a person may back up with reasons as if they were preferences of the sort he or she should "buy" with money. If you say, "This is what I believe" the analyst takes you to mean "This is what I prefer." Economists have objective beliefs about policy – for example, that it should maximize a concept of "benefit" they define. You and I have subjective preferences.

Value judgments lie beyond criticism if, indeed, they are nothing but expressions of personal preference; they are incorrigible, since every person is in the best position to know what he or she wants. All valuation, according to this approach, happens *in foro interno*; debate *in foro*

publico, other than an incantation in favor of efficiency or some balance of efficiency and equity, has no point. The economic approach denies the educative function of political discussion or persuasion; from its point of view, the political process is indistinguishable from an auction where policies are knocked down to the highest bidders. The reasons people give for their views (outside the journals of economic analysis, where argument is to be respected) are not to be counted; what counts is how much individuals will pay to satisfy their wants. Those willing to pay the most, for all intents and purposes, have the right view; theirs is the better judgment and the more informed opinion.

The assumption that valuation is subjective, that judgments of good and evil are nothing but expressions of desire and aversion, is not unique to the economic theory on which much policy analysis may be based. There are some psychotherapists – Carl Rogers is an example – who likewise deny the objectivity or cognitivity of valuation. For Rogers, there is only one criterion of worth: it lies in the "subjective world of the individual. Only he knows it fully."[27] The therapist, according to Rogers, succeeds when the client "perceives himself in such a way that no self-experience can be discriminated as more or less worthy of positive self-regard than any other."[28] The client then "tends to place the basis of standards within himself recognizing that the 'goodness' or 'badness' of any experience or perceptual object is not something inherent in that object, but is a value placed in it by himself."[29]

Rogers points out that "some clients make strenuous efforts to have the therapist exercise the valuing function, so as to provide them with guides for action."[30] The therapist, however, "consistently keeps the locus of evaluation with the client."[31] As long as the therapist refuses to "exercise the valuing function" and as long as he or she practices an "unconditional positive regard"[32] for all the affective states of the client, the therapist remains neutral among the client's values or "sensory and visceral experiences."[33] The therapist accepts all felt preferences as valid and imposes none on the client. There is no room for a concept of responsibility. The role of the therapist validates the feelings of the individual, Rogers suggests, and refrains from making value judgments. Indeed, the point is to deny that there are value judgments. All that counts is what a person feels and the value-neutral positive regard of the therapist for that feeling.

Welfare economists sometimes argue that their role in guiding social policy is legitimate because they remain neutral among and thus rise above values of individuals in the client society. The economic analyst,

according to James Buchanan, "is or should be ethically neutral: the indicated results are influenced by his own value scale only insofar as this reflects his membership in a larger group."[34] In this conception, the right or the good is reduced to the subjective world of each individual. Environmental economist Alan Randall makes this argument. According to him, "economists are doggedly non-judgmental about people's preferences; what the individual wants is presumed to be good for that individual."[35]

The economic analyst is able to claim legitimacy for the cost-benefit or WTP approach because it remains doggedly nonjudgmental or neutral among the preferences of individuals in the client society. The goal of social policy, according to this approach, is the same as the goal of Rogers's therapy – to express unconditional positive regard for the preferences of all individuals, however weird. All the analyst – psychological or economic – contributes is his or her theory of value, that is, conception of the right and the good.[36] The individual is represented simply as a channel or location at which affective states or WTP are found. Only the analyst knows that values are just preferences; beliefs are at best benefits. Welfare economists stipulate the equivalence of "WTP" and "value," and having postulated WTP as the measure of value, these economists speak with scientific authority about the right and the good, since they have or are developing scientific methods for measuring it.

TWO CONCEPTIONS OF LEGITIMACY

Consider, by way of contrast, what I have called a Kantian conception of value.[37] The individual, for Kant, is a judge of values, not a mere haver of wants, and the individual judges not merely for himself or herself but as a member of a relevant community or group. The central idea in a Kantian approach to ethics is that some values are more reasonable than others and therefore have a better claim upon the assent of members of the community as such.[38] The world of obligation, like the world of mathematics or the world of empirical fact, is objective – it is public not private – so that the intersubjective virtues and standards of argument and criticism apply.

Kant recognizes that judgments concerning value, like other beliefs and perceptions, are subjective states of mind, but he points out that, like other beliefs and perceptions, they have objective content as well. Accordingly, actions or choices may be criticized or praised as morally better or worse in view of the given circumstances. Thus, Kant discusses

valuation in the context not of psychology but of cognition. A person who makes a value judgment claims to know what is right or what is good and not just what is preferred in the circumstances. A value judgment is like an empirical judgment in that it claims to be true or at least responsive to the situation, not merely to be felt. Thus, the normative content of a judgment (or "preference") varies with the strength of the reasons for it – reasons that appeal for the agreement or correction of others. According to the Kantian approach, WTP has nothing to do with the normative content of judgments about better and worse or, if one must us the term, nothing to do with the normative content of "preferences."

We have, then, two approaches to social regulation before us. The welfare-economic approach assumes that political and economic decisions about the environment are justified in roughly the same way, which is, in relation to subjective preferences individuals express or would express in their consumer and, possibly, their voting behavior. According to this approach, the policy that may be defended on objective grounds – as the right thing to do – is the policy of maximizing the satisfaction of these preferences ranked by WTP; every other decision is an application of that one. The "true" theory of social value – the WTP criterion – is assumed in advance. Any other view is only as good as there is WTP for it.

The Kantian approach, on the other hand, asserts that policy recommendations in general are to be judged on the basis of reasons rather than wants. The functioning of political institutions – each appropriate to the kind of problem it must resolve – is crucial because individuals or their representatives must agree on decisions and be accountable for them. The Kantian approach like the economic one makes individuals the ultimate sources of policy – but it submits policy to their judgment rather than deriving it from their preferences or, more precisely, from the WTP associated with them. This approach treats people with respect and concern insofar as it regards them as thinking beings capable of discussing issues on their merits. This is different from regarding people as bundles of preferences or locations where WTP may be found.

The Kantian approach assumes that public policies may, in general, be justified or refuted on objective grounds, that is, on the basis of what can be said for or against them, not necessarily on the basis of the intensity of competing desires. The Kantian concedes, nevertheless, that many decisions are too trivial, too personal, or too knotty to be argued *in foro publico* and thus should be left to some nonpolitical resolution, usually to a market. Many choices – such as those related to religion – are so fraught

with passion they must be left wherever possible to the conscience of the individual. Other questions are too trivial to matter politically. How many yo-yos should be produced as compared to how many Frisbees? Should pants be cuffed? These questions are so inconsequential or personal, it is plain that markets should handle them. It does not follow from this, however, that we should adopt a WTP approach to resolving every question.

A WTP approach to arithmetic, for example, is plainly inadequate. No matter how much people are willing to pay, three will never be the square root of six. Similarly, segregation is a national curse, and if we are willing to pay for it, this does not make it better but only makes us worse. Also, the case for or against abortion rights must stand on the merits; it cannot be priced at the margin.[39] The war in Vietnam was a moral debacle, and this can be determined without shadow-pricing the WTP of those who demonstrated against it.[40] Similarly, we do not decide to execute murderers by asking how much bleeding hearts are willing to pay to see a person pardoned and how much hard hearts are willing to pay to see him hanged. All these matters appeal to conceptions of justice, moral intuitions, cultural and ethical arguments, and reflections on experience. These have nothing to do with willingness to pay. Our failures to make the right decisions in these matters are failures in arithmetic, in wisdom, in taste, in morality – but they are not market failures. There are no relevant markets to have failed.

What separates these questions from those that may be settled by the preponderance of WTP is this: they involve matters of knowledge, wisdom, morality, and taste that admit of better or worse, right or wrong, true or false – and these concepts differ from economic optimality. Environmental questions – the protection of wilderness, habitats, water, land, and air as well as policy toward environmental safety and health – involve moral and aesthetic principles and not just economic ones. This is consistent, of course, with cost-effective strategies for implementing environmental goals and with recognition of the importance of personal freedoms and economic constraints. It is also consistent with social prosperity, which free markets may achieve through competition and innovation, concepts that have no clear connection to the WTP approach that now dominates the discussion of environmental policy and valuation.

What Rogers's therapist does to the patient the cost-benefit analyst does to society as a whole. The analyst is neutral among our "values" – having first assumed a view of what values are, that is, having assumed

a particular theory of the good. This is a theory that fails to treat values as values and therefore fails to treat the persons who have them with respect or concern. It does not treat them even as persons but only as sites at which affective states may be found. And thus we may conclude that the "neutrality" of cost-benefit analysis is no basis for its legitimacy. We recognize this neutrality as indifference toward value – indifference so deep, so studied, and so assured that at first one hesitates to call it by its right name.

THE CITIZEN AS CLIENT

The residents of Lewiston at the meeting I attended argued that there are crucial moral, aesthetic, and political differences between the risks they take, for example, by smoking or by driving, and the risks imposed on them, for example, by a nearby but hidden depository for nuclear wastes. There is an ethical difference between jumping and being pushed – even if the risks and benefits are the same. Many risks are acceptable because they are accepted; they are familiar, voluntary, part of everyday life. Some risks are unacceptable because they have not been accepted: They are unknown, insidious, out of one's own hands. What is important to the residents of Lewiston is not necessarily the magnitude of the risk, about which they know experts will disagree, but its meaning, that is, what it suggests about their relationship with their government and about their ability to participate in the decisions, public and private, that affect their lives.

The officials at the other side of the table found much of this anxiety "irrational," given the trade-offs the residents were willing to make, as a rule, between safety and other goods and services. What the residents saw, fundamentally, as a political problem involving the maintenance and functioning of our democratic institutions the officials understood as a matter of making allocation efficient and of balancing benefits and costs.

One official from a large chemical company dumping wastes in the area told the residents, in reply, that corporations were people and that people could talk to people about their feelings, interests, and needs. This sent a shiver through the audience. Like Joseph K. in Franz Kafka's *The Trial*, the residents of Lewiston asked for an explanation, justice, and truth, and they were told that their wants would be taken care of. They demanded to know the reasons for what was continually happening to them. They were offered a personalized response instead.

This response, that corporations are "just people serving people," is consistent with a particular view of power. This is the view that identifies power with the ability to get what one wants as an individual, that is, to satisfy one's personal preferences. When people in official positions in corporations or in the government put aside their personal interests, it would follow that they put aside their power as well. Their neutrality then justifies their directing the resources of society in the ways they determine to be best. This managerial role is legitimate, they believe, because it serves their clients' interests and not their own.

Behind this managerial role, as William Simon observes of the lawyer-client relationship, lies a theory of value that personalizes power. "It resists understanding power as a product of class, property, or institutions and collapses power into the personal needs and dispositions of the individuals who command and obey."[41] Once economists, therapists, or lawyers abjure their own interests and act wholly on behalf of client individuals, they appear to have no power of their own and thus justifiably control everything. "From this perspective it becomes difficult to distinguish the powerful from the powerless. In every case, both the exercise of power and submission to it are portrayed as a matter of personal accommodation and adjustment."[42]

Once the affective, that is, the welfare-economic, self becomes the source of all value, the public self becomes merely "apparent" and cannot participate in the exercise of power. Power, indeed, appears to be entirely private; it is the power to satisfy one's personal preferences. It ceases to be the power to join with others in effective political action to define and pursue collective values and shared aspirations. As Philip Rieff remarks,

> the public world is constituted as one vast stranger who appears at inconvenient times and makes demands viewed as purely external and therefore with no power to elicit a moral response. There is no way to distinguish tyranny from the legitimate authority that public law and public values create.[43]

The key to the emotive or interest theory of value, as one commentator has said, is "the fact that emotivism entails the obliteration of the distinction between manipulative and non-manipulative social relations."[44] When we accept the idea that values are subjective, that they are just "wants," we must also accept the idea that managers – whether therapists, lawyers, or cost-benefit analysts – are in the best position to handle them for us. We must also accept the idea that we all want the same thing, namely, the satisfaction of as many preferences as possible, taking their

intensity into account. We consent hypothetically, counterfactually, or implicitly, therefore, to policies experts say promote efficiency and maximize utility. Not just socialism but also this kind of economic analysis takes us into an untenable collectivist fiction about the unity of society. In welfare economics, the Marxist dream is realized: the triumph of science over polity, administration over government – and thus the final withering away of the state.[45]

"At the rate of progress since 1000," Henry Adams speculates in his *Education*, "every American who lived into the year 2000 would know how to control unlimited power."[46] Adams thought that the Dynamo would organize and release as much energy as the Virgin. Yet the citizens of Lewiston, surrounded by dynamos, high-tension lines, and nuclear wastes, are powerless. They do not know how to criticize power, resist power, or justify power – for to do so depends on making distinctions between good and evil, right and wrong, innocence and guilt, justice and injustice, truth and lies.

Distinctions such as these have no significance within an emotive or psychological theory of value. To adopt such a theory is to imagine society as a system of exchange in which individuals represent only their arbitrary and subjective preferences. No individual, no belief, no faith has authority over them. To have power to act as a nation, however, we must be able to act, at least at times, on a public philosophy, conviction, or faith. We cannot permit welfare economics to replace the moral function of public law. The antinomianism of cost-benefit analysis is not enough.

Chapter 3

The Allocation and Distribution of Resources

In a course I teach on environmental ethics, I ask students to read the opinion of the Supreme Court in *Sierra Club v. Morton*.[1] This case involves an environmentalist challenge to a decision by the U.S. Forest Service to lease the Mineral King Valley, a quasi-wilderness area in the middle of Sequoia National Park, to Walt Disney Enterprises to develop a ski resort. But let the Court describe the facts:

> The final Disney plan . . . outlines a $35 million complex of motels, restaurants, swimming pools, parking lots, and other structures designed to accommodate 14,000 visitors daily. . . . Other facilities, including ski lifts, ski trails, a cog-assisted railway, and utility installations, are to be constructed on the mountain slopes and in other parts of the valley. . . . To provide access to the resort, the State of California proposes to construct a highway 20 miles in length. A section of this road would traverse Sequoia National Park, as would a proposed high-voltage power line.[2]

I asked how many of the students had visited Mineral King or thought they would visit it as long as it remained undeveloped. There were about six hands. Why so few? Too many mosquitoes, someone said. No movies, said another. Another offered to explain in scrupulous detail the difference between chilblain and trench foot. These young people came from Boston, New York, and Philadelphia. They were not eager to subsist, for any length of time, on pemmican and rye biscuits.

Then I asked how many students would like to visit the Mineral King Valley if it were developed in the way Disney planned. A lot more hands went up. Someone wanted to know if he had to ski if he went. No; I told him if he stayed indoors, he need miss nothing. He could get snow blindness from the sour cream. He could meet Ms. Right at the après-ski sauna and at encounter sessions. The class got really excited.

Two students in the back of the room stood on tiptoe, bent their wrists, and leaned forward, as if to ski. I hope I have left no doubt about where the consumer interests of these young people lay.

I brought the students to order by asking if they thought the government was right in giving Disney Enterprises a lease to develop Mineral King. I asked them, in other words, whether they thought that environmental policy, at least in this instance, should be based on the principle of satisfying consumer demand. Was there a connection between what the students as individuals wanted for themselves and what they thought we should do, collectively, as a nation?

The response was nearly unanimous. The students believed that the Disney plan was loathsome and despicable, that the Forest Service had violated a public trust by approving it, and that the values for which we stand as a nation compel us to preserve the little wilderness we have for its own sake and as a heritage for future generations. On these ethical and cultural grounds, and in spite of their consumer preferences, the students opposed the Disney plan to develop Mineral King.

CONSUMER AND CITIZEN PREFERENCES

The consumer interests or preferences of my students are typical of those of Americans in general. Most Americans like a warm bed better than a pile of wet leaves at night. They would rather have their meals prepared in a kitchen than cook them over a camp stove. Disney's market analysts knew all this. They found that the resort would attract more than 14,000 tourists a day, in summer and winter alike, which is a lot more people than now hike into Mineral King.[3] The tourists would pay to use the valley, moreover, while the backpackers just walk in.

You might suppose that most Americans approved of the Disney proposal; after all, it would service their consumer demands. You could ride up the mountain and get a martini or watch TV. You could buy a burger and a beer at the gondola stops. The long Kaweah River might be transformed into a profitable commercial strip. Every red-blooded American with a camper, an off-road vehicle, a snowmobile, or some snazzy clothes and a taste for a little "action" might visit the Disney playland.

You might think that the public would have enthusiastically supported the Disney plan. Yet the public's response to the Disney project was like that of my students – overwhelming opposition.[4] Public opinion was so unfavorable, indeed, that Congress acted to prohibit the

project by making the Mineral King Valley a part of Sequoia National Park.[5]

Were the rights of the skiers and scene-makers to act freely within a market thwarted by the political action of the preservationists? Perhaps. But perhaps some of the swingers and skiers were themselves preservationists. Like my students, they may themselves condemn the likely consequences of their own consumer interests on cultural or ethical grounds.

I sympathize with my students. Like them and like members of the public generally, I, too, have divided preferences or conflicting "preference maps." Last year, I bribed a judge to fix a couple of traffic tickets, and I was glad to do so because I saved my license. Yet, at election time, I helped to vote the corrupt judge out of office. I speed on the highway; yet I want the police to enforce laws against speeding. I used to buy mixers in returnable bottles – but who can bother to return them? I buy only disposables now, but to soothe my conscience, I urge my state senator to outlaw one-way containers.

I love my car; I hate the bus. Yet I vote for candidates who promise to tax gasoline to pay for public transportation. I send my dues to the Sierra Club to protect areas in Alaska I shall never visit. And I support the work of the American League to Abolish Capital Punishment although, personally, I have nothing to gain one way or the other. (If I hang, I will hang myself.) And of course, I applaud the Endangered Species Act, although I have no earthly use for the Colorado squawfish or the Indiana bat. The political causes I support seem to have little or no basis in my interests as a consumer, because I take different points of view when I vote and when I shop. I have an "Ecology Now" sticker on a car that drips oil everywhere it's parked.

I am not alone in possessing incompatible "consumer" and "citizen" preference-orderings. Economists have long been aware of the existence of these conflicting preference-schedules in the average individual. Indeed, the distinction between consumer and citizen preferences has long vexed the theory of public finance. R. A. Musgrave, reporting a conversation he had with another economist, Gerhard Colm, states the problem as follows:

> He [Colm] holds that the individual voter dealing with political issues has a frame of reference quite distinct from that which underlies his allocation of income as a consumer. In the latter situation the voter acts as a private individual

determined by self-interest and deals with his personal wants; in the former, he acts as a political being guided by his image of a good society. The two, Colm holds, are different things.[6]

Are these two different things? Stephen Marglin suggests that they are. He writes:

> The preferences that govern one's unilateral market actions no longer govern his actions when the form of reference is shifted from the market to the political arena. The Economic Man and the Citizen are for all intents and purposes two different individuals. It is not a question, therefore, of rejecting individual . . . preference maps; it is, rather, that market and political preference maps are inconsistent.[7]

Marglin observes that if this is true, social choices optimal in one set of preferences will not be optimal under another. What, then, is the meaning of optimality? An "efficient" policy, let us say, is one that maximizes the satisfaction of preferences weighted by their intensity, that is, by the amount individuals are willing to pay to satisfy them. If individuals possess conflicting preference-maps, however, how can we say what an efficient policy is?

Marglin jokes that economists, to preserve the coherence of the efficiency concept, "might argue on welfare grounds for an authoritarian rejection of individuals' politically-revealed preferences in favor of their market revealed preferences!" Marglin could correctly point out that the students in my class even though they favored politically the preservation of Mineral King would benefit personally only from its exploitation. Economist Paul Milgrom speculates along these lines that if society wanted economically efficient policies it would have to exclude from the welfare calculus all idealistic or moral choices since these are not related to what people believe benefits them. He notes, "it would be necessary . . . to reflect only their own personal economic motives and not altruistic motives, or sense of duty, or moral obligation."[8] My students plainly revealed conflicting preferences or values and would do so in their political as contrasted with their consumer behavior. Which kind of preference or preference-ordering should we privilege; which should we reject?

Very few economists, if any, advocate an authoritarian rejection of either political or consumer preferences. Some would seek a way to combine both sorts of preferences on the same preference-map. They

might agree with Gordon Tullock, who observes that two assumptions about preferences are essential to modern economic theory.

> One of these is simply that the individual orders all alternatives, and the schedule produced is his total preference schedule. The second is that he will be able to make choices among pairs of alternatives, unless he is indifferent between them. . . . From this assumption and a further assumption, that such choices are transitive, it is possible to deduce the preference schedule, and most modern economists have taken this route.[9]

If we make these assumptions, which are essential to the theory of welfare economics, then we would say that social policy should seek the overall goal of efficiency – the satisfaction of preference, taken as it comes, and measured by willingness to pay (WTP) – and that no other moral, aesthetic, cultural, or political judgments should count except that they are treated as preferences, at least when equity issues are not urgent. In that case, the only people who can assert political judgments or principles are economists because they speak truth to power, while everyone else expresses – and is only capable of expressing – personal wants and desires.

On this approach, individuals represent channels or locations at which preference or WTP is to be found. If one makes this assumption – which is basic to welfare economics – one may in principle be able to infer, for any individual, a "meta-ordering" of his consumer and political preferences. Once WTP becomes the metric for valuation, then, in principle, all the preferences located at a site can be ordered in relation to that metric. A rational public policy, on this approach, would respond not to the quality of ideas – their plausibility, credibility, or merit – but to the quantity of WTP they represent. The reason for this is simple: economists prefer to define "welfare" or "value" as willingness to pay.

Markets, to be sure, would *not* reveal this meta-ordering, for it includes politically expressed values. Society must then hire experts to determine people's meta-orderings by estimating the WTP of the individual to satisfy his or her cultural, political, and ethical commitments *together with* consumer demands. While the fees economists charge will be expensive, no demand is too great, since once society empowers economists to measure its values scientifically on the basis of WTP it can save money by disbanding legislatures, abolishing courts, and doing away with democracy generally.

No matter how much economists are paid, however, they are bound to fail in their attempt to find a "combined" or inclusive preference-ordering. They will fail for logical, not merely practical, reasons. Individuals have a variety of often incompatible preference schedules they reveal in the contexts appropriate to each – for example, in markets, family situations, professional contexts, and political circumstances. To try to combine these preference schedules into one is to search for a single comprehensive role the individual plays; it is to ask for the individual to think and behave *not* as a parent, citizen, consumer, or the like but in all and none of these roles at once. The individual, in effect, must reveal himself or herself as the "rational man" of economic theory simply because economic theory demands it. As one commentator rightly points out, no such social role exists, unless it is the role of a social moron.[10]

In some roles – particularly that of a citizen or a member of a community – the individual states what he or she thinks the group should do; the individual makes a judgment with which he or she would expect any member of the community to agree insofar as that person reflects on the values of the community, not just on his or her own interests. In that situation, each member of the group judges, as it were, for all, and if they disagree, they must deliberate and debate together to determine who is right and who is wrong. This way of finding the will of the community may require a vote; the vote addresses a logical contradiction between beliefs, however, not necessarily a conflict among personal interests. Thus, analysts who attempt to shuffle citizen judgments and personal preferences into the same ordering commit a logical mistake. They confuse judgment with preference, that is to say, beliefs about what *we* should do as a community with expressions of what *I* want or prefer as an individual.

Some economic analysts attack the problem of split preference-orderings in another way. They note that since efficiency need not be the only goal of social policy, the political process may deal with matters of equity or justice. Thus, the government might rely on self-regarding preferences, measured by WTP, to determine efficient social policies. This is the realm of microeconomics. Then the political process could respond to altruistic or ideal-regarding preference-orderings to organize the redistribution of opportunities and wealth.

This reply may be helpful insofar as consumer preferences reveal a person's interests with regard to his or her own consumption opportunities, while citizen preferences express his or her altruistic concerns

about the distribution of consumption opportunities in society generally. Yet citizens advocate many ideal-regarding convictions and beliefs that are not directed to the ways consumption opportunities are distributed. Environmentalists are sensitive to the distributive effects of the policies they favor, but they do not necessarily support these policies for the sake of those effects. To join an organization to preserve an endangered species, for example, is not to seek to achieve greater equity in the distribution of wealth.

One could speculate, indeed, that the distributive effect of environmental protection is often to make the rich richer and the poor poorer.[11] When land is removed from development, housing becomes more expensive; consumer products also cost more when corporations are required to pollute less. The rich can afford to live in environmentally protected areas and, therefore, arguably benefit more than the poor from environmental preservation. It has been very difficult for state governments to site environmentally necessary hazardous-waste treatment and landfill facilities; one often hears, however, that these tend to end up in the neighborhoods of the poor. This would be another example of the way the poor may pay the costs of environmental protection while the rich reap the benefits.

I do not think any systematic relationship exists in fact between the policies environmentalists favor and the relative well-being of the rich and the poor or, for that matter, of present and future generations. The speculations I have offered so far are just that – speculations. I know of no empirical study that substantiates them. They suggest, however, that equality or justice is not the only ethical or cultural goal that concerns us as citizens. We may also be concerned as citizens with education, the arts and sciences, safety and health, and the integrity and beauty of the natural environment. These concerns cannot be assimilated to the personal, arbitrary preference-maps of consumers. Nor can they be entirely analyzed in terms of equity or justice.

ALLOCATION AND DISTRIBUTION

I want to approach my thesis in this chapter by way of an important distinction: that between the *allocation* and the *distribution* of resources. The allocation of resources has to do with how they are used; the distribution has to do with who uses them or benefits from their use.[12] The Mineral King Valley, as a matter of *allocation*, could be used as a ski resort, kept as a wilderness, or exploited in some other way. Some

individuals or groups would be made better off as a result; some would be made worse off; the decision, in other words, would have *distributive* or *redistributive* effects. The resort, for example, would benefit skiers at the expense of hikers; it would be good for property owners in Tulare County but bad for property owners in Sun Valley. Some might argue in favor of the Disney project because it would produce tax revenues to support social welfare programs for the poor. This would be to argue in favor of an allocation because of a beneficial distributive effect.

Some economic theorists who write about the environment assume that natural resources should be allocated in the way that maximizes a theoretical construct variously labeled "potential Pareto improvement," "Kaldor-Hicks efficiency," "consumer surplus," "net WTP," "utility," "benefit," "economic value," and "preference satisfaction." For a given allocation, of course, questions of justice, fairness, or equality may arise with respect to the distribution of costs and benefits. In general, economists concede that ethical or political choices may have to be made concerning these distributive effects.[13] (Some theorists argue more consistently that once we stipulate WTP as the measure of value, we should use it to tell which distributive principles are worth more than others, for example, by determining WTP for more or less equity.)[14] Many theorists suppose that the best way to produce wealth and the best way to divide it are separate issues best decided separately; they urge us, therefore, not to make an allocative decision on the basis of its distributive consequences.[15] Efficiency should guide the allocation of resources; wealth can then be redistributed to address poverty.

Analysts who argue along these lines tend to collapse all discussion of regulatory policy into questions concerning efficiency in the allocation of resources and equity or fairness in the distribution of wealth. They argue, for example, that the allocation of fossil fuels should be left to the market, properly regulated for externalities. The inequalities that result may then be remedied, for instance, by a windfall profit tax used to help the poor pay their heating bills.[16]

Not all policy problems allow a neat separation between issues of allocation and issues of distribution; for example, any social transfer of wealth to the poor could distort the cost of labor and thus lead to an inefficient allocation of human resources. Many policy analysts speak, therefore, of a "trade-off" between equality and efficiency. They recommend, however, that policy makers use those two values to justify whatever decisions they make with respect to environmental and regulatory

policy. Decisions that cannot be explained as attempts to allocate resources more efficiently, then, must be explained as attempts to distribute wealth more fairly.

Although some writers like to emphasize a trade-off between efficiency and equality, it is useful to recognize that these concepts complement each other and that the conflict between them, insofar as one exists, is largely overstated. Analysts who believe that efficiency is an important social value do so, in general, because they conceive of the social good as the satisfaction of preferences, weighted by their intensity, however arbitrary or contingent these preferences may be. Philosophers who emphasize the claims of justice or equity too often do not disagree with this conception of the good but may rely on it. When the good is conceived in this way – when it is assimilated to preference taken as it comes and measured by WTP – then it is unsurprising that a conception of the right, that is, a conception of justice, should be prior to it. Some have argued that an adequate philosophy of right has yet to be written: one that shows how we should balance a conception of justice with a more appealing or more persuasive conception of the good than the notions of efficiency, WTP, and preference-satisfaction imply.[17]

Many well-known writers (Ronald Dworkin is an example) argue that a conception of equality should be the criterion of public policy.[18] Others argue that the efficiency criterion should be the principal guideline. Most of the statutes and regulations that govern social policy, particularly for natural resources, public safety, and the environment, however, have fairly specific goals, like improving mine safety or protecting endangered species. These concerns of public policy stand on their own and do not need to be supported by criteria or guidelines established by a priori philosophical or economic arguments.

What characterizes the debate between the "efficiency" and "equality" positions is not the touted conflict between them but the extent to which each is plausible only in comparison to the other. Both adopt the same vocabulary and conceptual framework; each assimilates all values either to essential human rights or to arbitrary personal preferences. They agree that any claim that is not based on a *right* must, then, simply state a *preference* or reveal a *want*.

Those who advocate the priority of equality find worthy opponents in those who defend the priority of efficiency.[19] They debate at length and without any apparent sense of tedium the extent to which rights "trump" interests because (1) rights go to the essence of free agency and personhood or (2) rights are justified, at a higher level of analysis, in

relation to interests.[20] Once discussion takes off at this level of abstraction it becomes irrelevant to officials and others who need a vocabulary adequate to the particular and often contingent moral, aesthetic, historical, scientific, and legal considerations that matter in health, safety, and environmental policy.[21]

Congress, by rescinding the Disney lease, for example, made a decision based on aesthetic and historical considerations such as the argument that a majestic million-year-old wilderness is aesthetically or objectively *better* than a commercial honky-tonk. Congress responded to the opinions citizens backed up with arguments in public hearings and not to the wants individuals might back up with money in a market or the rights they might assert in court.

To speak bluntly, the problem with efficiency and equality as principles of social policy is that they are basically subjects of academic study; in other words, they have the smell of the lamp about them. Each approach assumes that academic experts, notably economists and philosophers, by practicing deep thinking, will discover the fundamental truths about Man, Civil Society, and the State from which the goals of social regulation may be derived. This assumption is false. The goals of social regulation are based in historically contingent public values that influence legislation, court decisions, and the actions of many local boards and panels. Experts with Ph.D.s in economics and related fields may suppose that democracy has become obsolete to the extent that they can measure the good as WTP; similarly philosophers may be eager to impart to the world their conceptions of justice. Indeed, I have been privileged to serve on committees in which economists, ecologists, and philosophers are convened in the odd belief that these panels are representative as long as they are interdisciplinary. It might be better to get a focus group together of citizens whose names are selected at random from the telephone directory.

THE RIGHTS OF FUTURE GENERATIONS

Some writers have suggested that the way we use the environment could change if we balanced our consumer interests with those of future generations. Some of these writers have worked hard to define a "social rate of discount"[22] to determine how we should take the interests of future consumers into account.

The rate at which we discount future preferences may make little difference, however, in the way natural resources are used. We can build

resorts, highways, shopping centers, tract housing, and power lines to satisfy future as well as present demand. There are few decisions favorable to our wishes that cannot be justified by a likely story about future preferences. Even a nasty strip mine or a hazardous-waste dump may produce wealth that strengthens the industrial base left to future generations.

What are future generations likely to want? Will vacationers a hundred years from now want to backpack into Sequoia National Park, or will they prefer to drive their recreational vehicles in? I think the interests of future generations will depend largely on two things. The first is education, or advertising. I suspect that the Disney resort would always be jammed with visitors because Disney knows how to run an effective advertising campaign. Through the use of advertising, corporations typically ensure demand for the goods and services they create so that the product and the market for it are developed at the same time. Since what corporations want to sell is usually a good indicator of what consumers will be trained to buy, perhaps we should let the marketing departments of the top 500 businesses tell us how to prepare the Earth for future generations. The best way to create the bars and pizza palaces and motels and strips tomorrow's consumers will want may be to bring in the bulldozers today.

Second, the tastes of future individuals will depend not only on what is advertised but on what is available. People may come to think that a gondola cruise along an artificial river is a wilderness experience if there is simply nothing to compare it with. When I moved from a rural area to an urban one, I was appalled at the changes: noise, pollution, ugliness, congestion. People said I would get used to it – that I would come to *like* the convenience stores and the fast-food stands. They were right. This is what happens. Preference adapts. If individuals in the future have no exposure to anything that we would consider natural or unspoiled, they will not acquire a taste for such things. What they will want will be determined more or less by what we leave to them, however dreary it may be.

Derek Parfit has constructed an argument that supports the point I wish to make. He argues that any policy we adopt today will make people born in the future better off than they would have been had we made some other decision. The reason is that these people would not even exist, and therefore could not be better off, had we made the other choice.

To show this, Parfit describes two policies, which he calls "High Consumption" and "Low Consumption." He then writes:

> If we choose High rather than Low Consumption, the standard of living will be higher over the next century. . . . Given the effects of . . . such policies on the details of our lives, different marriages would increasingly be made. More simply, even in the same marriages, the children would increasingly be conceived at different times. . . . this would in fact be enough to make them different children.
>
> Return next to the moral question. If we choose High Consumption, the quality of life will be lower more than a century from now. But the particular people who will then live would never have existed if instead we had chosen Low Consumption. Is our choice of High Consumption worse for these people? Only if it is against their interests to have been born. . . . We can suppose that it would not go as far as this. We can conclude that, if we choose High Consumption, our choice will be worse for no one.[23]

The idea is that whichever policy we choose, future generations will have nothing to complain about because but for that choice, different marriages would have been made and different children conceived. Whatever policy decision we make, therefore, determines who shall exist, and thus the policy we choose is better for those who will be born than any other policy would have been. Because these people will be all who exist, our choice will make no one worse off. Most people would agree that a policy that is the very best for all those it affects, and that makes no one worse off, is satisfactory from the point of view of distributive justice and efficiency. Thus, whichever policy we choose will be just and efficient with respect to the generations that come after us.

Parfit's argument does not clear us of moral responsibility with respect to future generations; rather, it helps us to understand what our responsibility is. It is not – if I may put it this way – a responsibility *to* the future as much as it is a responsibility *for* the future. If Parfit is correct, the major decisions we make determine the identity of the people who follow us; this, however, is not the only, or the most morally significant, consequence. Our decisions concerning the environment will also determine, to a large extent, what future people are like and what their preferences and tastes will be.

If we leave them an environment that is fit for pigs, they will be like pigs; their tastes will adapt to their conditions as ours might when we move from the country into town. Suppose we destroyed our literary,

artistic, and musical heritage; suppose we left to future generations only potboiler romances, fluorescent velvet paintings, and disco songs. We would then ensure a race of uncultured near illiterates. Now, suppose we leave an environment dominated by dumps, strip mines, and highways. Again, we will ensure that future individuals will be illiterate, although in another way. Surely, we should strive to make the human race better, not even worse than it already is. Surely, it is morally bad for us to deteriorate into a pack of yahoos who have lost both knowledge of and taste for the things that give value and meaning to life.

Future generations might not complain: a pack of yahoos will *like* a junkyard environment. This is the problem. That kind of future is efficient. It may well be equitable. But it is tragic all the same.

Our obligation to provide future individuals with an environment consistent with ideals we know to be good is an obligation not necessarily to those individuals but to the ideals themselves.[24] It is an obligation to civilization to continue civilization: to pass on to future generations a heritage, natural and cultural, that can be valued and enjoyed without absurdity. These ideals are aesthetic; they have to do not with the utility but with the meaning of things, not with the preferences they satisfy but the qualities they express. The programs that preserve them, however, are morally good. The moral good involved is not distributional; for it is not the good *of* individuals we are speaking of, but *good individuals* who appreciate things that are good in themselves. The allocation of resources in environmental law need not always – it sometimes should not – be based on norms of distribution. The way we use resources may also be justified in the context of a reverence we owe to what is wonderful in nature; for in this kind of appreciation, aesthetic and moral theory find a common root.[25]

That political authority should avoid acts of paternalism has been a traditional theme of liberalism. Liberals since John Stuart Mill have argued that the state should restrict the freedom of one individual only to protect the welfare of another – not to prevent the individual from harming himself. Although this reluctance to interfere with a person "for his own good" is not absolute in liberalism (or even in Mill himself),[26] it is a consequence of the principle that the state should leave it to individuals to answer the moral questions and thus should not make their mistakes for them.

To protect a wilderness, however, we may have to prohibit a resort; to provide a resort we may have to destroy a wilderness. So we must make decisions that affect the preferences or values future generations

will have, not just the degree to which they can act on their own values or satisfy their preferences. To what extent should the possibility of one lifestyle be restricted to protect the possibility of another? What moral opportunities are worth providing? As we debate public policy for the environment, we must answer questions such as these. We cannot avoid paternalism with respect to future generations.[27]

Yet this paternalism, if that is what it is, is of a peculiar kind. It is not paternalism about the welfare of future generations; for whatever policy we choose is likely to be optimal for the individuals and interests it helps to create. Rather, it is paternalism about the character of future individuals, their environment, and their values. It is a concern about the character of the future itself. We want individuals to be happier, but we also want them to have surroundings to be happier about. We want them to have what is *worthy of happiness*. We want to be able to respect them and to merit their good opinion. How may we do this except by identifying what is best in our world and trying to preserve it? How may we do this except by determining, as well as we can, what is worth saving, and then by assuming that this is what they will want?

What is worth saving is not merely what can be consumed later; it is what we can take pride in and, indeed, love. To protect wilderness and to restore the environment to meet shared ideals are not merely to show respect and concern for future generations but to show respect for ourselves as well. To think about our moral responsibilities to future generations is to consider how resources should be used and not merely to consider who should use them. Ethics in allocation, in other words, is not a consequence of ethics in distribution. An environmental ethic cannot be derived entirely from a theory of justice.

THE CONFLICT WITHIN US

If an environmentalist wants to preserve parts of the natural environment for their own sake, he might do well to concede that this is his intention. The environmentalist must then argue that the principles of justice, fairness, and efficiency that may apply to the distribution of income in our society need not apply to the protection or preservation of the natural environment. The reason is that the conflict involved, for example, over Mineral King is not primarily a distributional one. It does not simply pit the skiers against the hikers. The skiers themselves may believe, on aesthetic grounds, that the wilderness should be preserved, even if that belief conflicts with their own consumer preferences. Thus,

this conflict pits the consumer against himself as a citizen or as a member of a moral community.

The conflict, in other words, arises not only *among* us but also *within* us. It confronts what I want as an individual with what I believe as a citizen. This is a well-known problem. It is the conflict Pogo describes: "We have met the enemy and he is us."

The conflict is an ethical one. It is not ethical only because it raises a question about the distribution of goods to the rich or the poor, to the present or the future. The ethical question is not simply the distributional question. It concerns, rather, how we satisfy our interests and how we live by our beliefs. This sort of question could never arise in a society that made its only goals efficiency and equity in the satisfaction of consumer demand. That sort of society could deal only with the opposition between the hikers and the skiers. It could never respond to, act upon, or resolve the opposition between the skiers and themselves.

I do not want to comment on the ethical position my students, like many Americans, hold with respect to preserving the natural environment. I merely want to point out that it *is* an ethical position. It is also an opinion that is widely shared, deeply held, and embodied in legislation. I imagine that if the law were changed and the Disney resort were built, more than half the skiers in the lift line would agree, in principle, with my students. They might condemn the resort on ethical grounds. But money is money, and only money talks. The skiers would have paid a lot of money and gone to a lot of trouble to use the facilities. There could be no question – could there? – about what they want or what they believe.

The problem is a general one. It arises not just because of our high regard for wilderness areas, such as Mineral King, but because of broad values we share about nature, the environment, health, safety, and the quality and meaning of life. Many of us are concerned, for example, that the workplace be safe and free of carcinogens; we may share this conviction even if we are not workers. And so we might favor laws that require very high air-quality standards in petrochemical plants. But as consumers, we may find no way to support the cause of workplace safety. Indeed, if we buy the cheapest products, we may defeat it.

We may be concerned as citizens, or as members of a moral and political community, with all sorts of values – sentimental, historical, ideological, cultural, aesthetic, and ethical – that conflict with the interests we reveal as consumers, buying shoes or choosing tomatoes. The conflict within individuals, rather than between them, may be a very

common conflict. The individual as a self-interested consumer opposes himself as a moral agent and a concerned citizen.

What kind of society are we? Do we admit into public consideration values of only two kinds: personal preferences and distributive norms? Do we insist that the only political decisions we can make are intended to distribute wealth, for example, by making market participation more equitable, while every other choice – every allocative decision about the environment – should be left, if possible, for those markets to decide? Since markets can always be construed to fail, does this mean that allocation should be left to the experts to decide? Should we leave allocative choices to the tourist listening to his John Denver cassette as he pulls his recreational vehicle into the Automobile Reception Center at the Disney resort? Is this fellow the appropriate legislator of our common will?

Suppose *he* opens his mouth to express an ethical opinion – *horribile dictu* – about the use of the environment. Suppose he tells us that we should have kept Mickey Mouse out of the mountains. Must we shut our ears to him? Is that the kind of society we are? Is aggregation of WTP the goal? When markets fail, which is to say, always, shall experts base allocation on WTP instead?

I suspect that most people may be resigned, by now, to an affirmative answer to these questions. Nobody can appear to be soft or unscientific, that is, by speaking in ethical, aesthetic, or spiritual terms. Every debate is cast in the language of economics however irrelevant or misleading that vocabulary really is. How else can one explain the reluctance of environmentalists to argue on openly moral or political grounds? Why do they prefer to tell stories about the possible benefits of the furbish lousewort rather than offer moral reasons for supporting the Endangered Species Act? That law is plainly ethical; it is hardly to be excused on economic grounds. Why do environmentalists look for interests to defend, costs to price, benefits to enter – even if they have to go to the ludicrous extreme of counting the interests of the trees?[28]

Americans, no matter how they shop, generally share the ideology of the environmentalists.[29] Indeed, most Americans claim that they are environmentalists.[30] Why, then, are we reluctant to confess that we make environmental law on the basis of shared ideals rather than on the basis of individual utilities? Why do we find it hard to concede that society is more than a collective action problem or a maximization exercise and that allocative efficiency and distributional equity do not exhaust the repertoire of public values? Why is it so difficult for us to say that one

may allocate resources not to maximize aggregate WTP but on substantive, normative, and frankly ethical grounds?

I think the answers have something to do with the insecurity many of us feel when we find ourselves without "neutral" theories and criteria against which to evaluate political, ethical, and aesthetic positions. It's scary to think about problems on their own terms; it's easier to apply a methodology; it's even more tempting to think about the problems raised by the methodology or to investigate the theory itself. Besides, if one side has numbers, the other side needs numbers as well. Developers can justify their projects in terms of profits – the prices they can charge – and therefore they can say that these projects create jobs and are productive from the perspective of the economy as a whole. Unfortunately, environmentalists too often accept the assumption that the important values are economic; environmentalists believe they have to argue in economic rather than in ethical, political, or cultural terms. This strategic mistake leads environmentalists to endorse WTP as a way to measure "non-use" values, "existence" values, "option" values or "intangible" variables – in other words, to measure the validity of their own beliefs.

As a result, both the public and its officials are bamboozled into expressing moral principles and aesthetic judgments about the natural environment – beliefs that have often carried the day politically – in terms of WTP, that is, terms that are appropriate to personal consumption. A principal purpose of an environmental ethic may be to help public officials understand that it is legitimate to think in terms of public values and to make political choices. They do not have to pretend these choices are dictated by a value-neutral policy science.

MONEY AND MEANING

The things we cherish, admire, or respect are not always the things we are willing to pay for. Indeed, they may be cheapened by being associated with money. It is fair to say that the worth of the things we love is better measured by our *unwillingness* to pay for them. Consider, for example, love itself. A civilized person might climb the highest mountain, swim the deepest river, or cross the hottest desert for love, sweet love. He might do anything, indeed, except be willing to pay for it.

The Church once auctioned off indulgences. It sold future shares in Heaven at the margin with a very favorable discount rate. Was it a good idea to establish a market in salvation? Of course it was. How else can you determine how much an infinity of bliss, discounted by the

probability that God does not exist, is worth?[31] The Church membership, however, grew a little disillusioned when it saw that the favors of the Lord were auctioned for silver and gold. This disillusionment was one cause of the Reformation.

The things we are unwilling to pay for are not worthless to us. We simply think we ought not to pay for them.[32] Love is not worthless. We would make all kinds of sacrifices for it. Yet a market in love – or in anything we consider "sacred" – is totally inappropriate. These things have a *dignity* rather than a *price*.[33]

The things that have a dignity, I believe, are in general the things that help us to define our relations with one another. The environment we share has such a dignity. The way we use and the way we preserve our common natural heritage help to define our relation or association with one another and with generations in the future and in the past.

Let me return, now, to the example with which I began. My students, as I said, are pulled one way when they are asked to make a consumer choice about whether or not to patronize the Disney resort. That question goes to their wants and desires simply as individuals. They are pulled another way when asked to make a political decision about whether the United States should turn wilderness areas into ski resorts. That decision calls on their conception of the values we share or the principles we respect as a nation.

Should we base environmental policy on the interests individuals may act on as consumers or on the values that they may agree on as citizens? Our policy may be "rational" either way. We may have a "rational" policy in an economic sense if we limit the role of law to protecting rights and correcting market failures. We should then assume that the ends of policy making are simply "given" in the preferences consumers are willing to pay to satisfy. Alternatively, we might suppose that a "rational" policy advances a certain conception of equality – or meets some other condition or criterion laid down in advance.

We may have a policy that is rational in what we may call a deliberative sense, however, if we strive to base law on principles and ideals that reflect our best conception of what we stand for and respect as a nation. This kind of rationality depends on the virtues of collective problem solving; it considers the reasonableness of ends in relation to the values they embody and the sacrifices we must make to achieve them. This deliberative approach respects the constitutional rights that make it possible for people to contribute as equals to the political process, but it asserts no a priori political theory about the purposes of public policy.

This approach assumes, on the contrary, that the values on which we base social policy are objects of public inquiry. They are not to be derived (as they would be in an economic calculus) by aggregating exogenous preferences, or (as they might be in a political philosophy) from metaphysical truths about the nature of persons. Thus, the general goals of public policy are to be determined through a political process in which citizens participate constrained only by rights of the kind protected by the Constitution. These goals are not known beforehand by a vanguard party of political economists or by an elite corps of philosopher-kings.

COMPROMISE AND COMMUNITY

The students in the class I taught had no trouble understanding the difference between the judgments they make as citizens and the preferences they entertain as individuals. They also understood the importance of their "positive" freedom to lobby for their views politically and their "negative" freedom to pursue their personal interests without undue interference from the state.[34] Plainly, these freedoms, like these values and preferences, are bound to come into tension or conflict. If the nation preserves every mountain as a wilderness heritage, there will be no place for these young people to ski.

The students in my class found it fairly easy to resolve the tension between their consumer interests and their public values with respect to the example of Mineral King. They recognized that private ownership, individual freedom of choice, and the profit motive (to recall the remarks of Dr. Kneese I quoted earlier) would undoubtedly lead to the construction of the Disney paradise. They reasoned, nevertheless, that we should act on principle to preserve this wilderness, which has an enormous cultural meaning for us, since the resort, though profitable, would not serve important social ends. The students argued that because there are a lot of places for people to party, we do not need to make a ski resort of Sequoia National Park.

But what if the stakes were reversed? What if we should have to make enormous sacrifices to protect an environmentally insignificant landscape? (The example of the "1002" area of the Arctic National Wildlife Refuge comes to mind). Suppose industry would have to pay hundreds of millions of dollars to reduce air pollution by a small, perhaps an insignificant, amount? The students in my class answered these questions the way they answered questions about Mineral King. Just

as they rejected the dogma of the perfect market, they also rejected the dogma of the perfect environment.

The students recognized that compromise is essential if we are to act as a community to accomplish any goal, however idealistic it may be. To improve air quality, for example, one needs not only a will but a way; one needs to express goals in parts per billion or, more generally, to deal with scientific uncertainties and technical constraints. The goal of environmental purity, like the goal of economic efficiency, can become a Holy Grail suitable only as the object of an abstract religious quest. To make progress, we need to recognize that God dwells not only in the mountains but also in the details – in the minutia of testing, monitoring, and enforcement.

Although the students thought that social policy usually involves compromise, they kept faith with the ideals they held as citizens. They understood that if we are to take these ideals seriously, we must evaluate them in the context of the means available to achieve them. To will the end, in other words, one must also will the means: one must set goals in relation to the obstacles – economic, political, legal, bureaucratic, scientific, technical, and institutional – that stand in the way of carrying them out. We do not function as a political community simply by sharing public goals and by celebrating a vision of harmony between nature and society, even if ceremonies of this sort are a part of citizenship. To function as a community we must also reach the compromises necessary to move beyond incantation to political and economic implementation.

This is the reason that the Mineral King example – and the difference between citizen and consumer preferences it illustrates – may serve to introduce a course in environmental ethics, but it does not take us very far into the problems of environmental policy. The interesting problems arise when we move, in Winston Churchill's phrase, "from the wonderful cloudland of aspiration to the ugly scaffolding of attempt and achievement."[35] Then we must chasten our goals by adjusting them to economic, legal, scientific, and political realities. How can we do this and still retain the ethical and aspirational nature of our objectives? How do we keep faith with the values of the citizen while recognizing the power of the consumer?

The following chapters discuss these questions. In the next chapter, I complete my argument intended to show that WTP is not a credible measure of the good – that preference in the sense of WTP is not normative – and that therefore economic science cannot explain or measure the value of anything. I shall then demonstrate the failure and fatuity of

attempts to use WTP as a measure of the value of environmental goods – for example, attempts to attribute to "ecosystem services" much higher prices than are usually paid for them. The useful function of economic science and analysis is not to assign "values" but to show how economies can perform better in terms of employment, productivity, price stability, and so on. Economic analysis is also useful when it explains how people can organize their activities in ways that minimize conflict and maximize collaboration and cooperation.[36]

The remaining chapters describe widely shared cultural and religious commitments and beliefs that can explain the kinds of values the natural world possesses – spiritual, aesthetic, ethical, and historical. I hope these chapters will help counter the alienation from nature that necessarily accompanies attempts to assess its value in economic terms.

Chapter 4

Values and Preferences

A popular joke tells us that the winner of a $100 million lottery who died miserable and broke said, "I spent half the money on prostitutes, booze, and gambling, but the rest I just squandered."[1] The lottery winner, like the rest of us, has a right to spend his money as he pleases; his preferences are his business. Is the satisfaction of those preferences somehow also our business? According to many environmental and welfare economists, if an individual is willing to pay for something, it is valuable to that extent not just from his or her perspective but also from that of society. These economists define societal "well-being," "benefit," "welfare," "utility" and other ostensibly normative concepts as a function of the satisfaction of preferences weighed according to the maximum amount the individual is willing to pay to satisfy them. According to this view, the economic value of an environmental policy is defined in terms of the aggregate willingness to pay (WTP) of everyone affected by it.

The purpose of this chapter is to raise doubts about whether preference – or more precisely the WTP that accompanies it – has any connection with value either for the individual or for society. The proposition that an individual S prefers state a to state b does not entail, as I shall argue, that S is better off with a than with b in any meaningful sense. Having a preference may give the individual a reason to try to satisfy it – although in many instances, such as that of the unhappy lottery winner, not so much a reason as a motive. That he or she should be free in the general case to try to satisfy his or her preference under rules that secure the similar liberty of others is a platitude I do not question. I accept the common wisdom that as a general rule, society should structure competitive markets and deliberative political processes to enable people as far as possible to make and to coordinate their own choices. These

pieties, as I shall argue, do not imply that welfare or utility defined in terms of WTP has any normative significance. This chapter argues that WTP has no normative significance; concepts that are defined on it, such as "economic value," "benefit," and "consumer surplus," lack normative significance as well.

Society has reason to support the satisfaction of certain preferences – those associated with basic needs (according to a theory of justice), security (according to any political theory), and merit goods (if it wishes). Society has reason to promote the performance of the economy and to seek reforms in its institutions so that people better understand and trust each other. This chapter argues that the purpose of society is not to seek to satisfy preference weighed by WTP and taken as it comes – to maximize aggregate WTP as an intrinsic good – but "to maintain a framework of rules within which individuals are left to pursue their own ends."[2]

PRACTICAL PRELIMINARIES

Before embarking on my argument I want to describe three practical objections to any attempt to use preference or the WTP associated with it as a basis of environmental valuation. I shall propose that even if preference had normative significance – even if there were some basis for believing it has a kind of normative content – economists cannot as a rule (1) identify preference or (2) measure WTP for it. Even if they could, (3) the benefits involved in measuring WTP for environmental public goods will not equal the costs.

First, preferences are not observable. They are enigmatic. People prefer and are willing to pay for a good because of some quality or qualities it possesses. Every object, however, possesses many different qualities. It is often hard to say what it is exactly – which quality – the individual wants or desires. In an earlier book, I used the example of Girl Scout cookies to illustrate this point. When a nine-year-old daughter of my neighbor asked me to purchase cookies I obliged but I am not sure why. I might have wanted or preferred (1) to support the Scouts; (2) to avoid friction with my neighbor; (3) to appear generous; (4) to spare my own daughter from embarrassment among her friends; (5) to do the right thing; (6) to feel a warm glow that I did the right thing; (6) to avoid guilt; or (7) any of a hundred other reasons. In any case, it was not the cookies; I took them to the office. Preference is not observed; it is constructed

from a description of the choice a person makes.[3] Different descriptions of the same behavior – from which different preferences may be construed or inferred – are often equally plausible. To interpret observed behavior as performing a choice, one must attribute a preference to the agent. One may then infer that preference from that interpretation. The circularity is obvious. I developed this argument in detail in an earlier book; therefore, I shall not belabor it here.[4]

Second, one cannot measure WTP for a representative or typical environmental public good. More than a century ago, Alfred Marshall wrote "that we cannot guess at all accurately how much of anything people would buy at prices very different from those they are accustomed to pay for it: or, in other words, what the demand prices would be for amounts very different from those which are commonly sold." Marshall understood the difficulty involved in attempts to project the "demand curve" from points hovering around customary prices. He called such attempts "liable to large error" and "highly conjectural except in the neighborhood of the customary price."[5]

Today economists have huge data sets on many commodities, such as petroleum, which may provide enough historical information about the relation of price to demand that different economists, using the same data, may project similar demand curves or derive the same range of WTP for those commodities. With respect to environmental public goods, however, there are no such data sets, so the situation may not differ from that which Marshall described. One way to parry this objection, however, would be to see whether economists working independently arrive at anything like the same measures of WTP for a given public good. Replication is vindication. Would these independent teams of economists, each using its own method and gathering its own data, project anything like the same demand curves? In the only instance of this sort of experimental replication I know of, the teams differed by an order of magnitude in their estimates of WTP for an environmental public good.[6]

Third, the costs the government sinks into any effort to measure WTP for a public good or to "price" any environmental "externality" are likely to outweigh the benefits – a lesson that Ronald Coase elegantly presented, that Duncan Kennedy elaborated, and that has been often repeated.[7] Coase wrote that "the costs involved in governmental action make it desirable that the 'externality' should continue to exist and that no government intervention should be undertaken to eliminate it."[8]

One problem is this. If an agency tries to determine WTP for some good in which anyone has a significant interest – for example, because of damage awards in tort – the estimates themselves become objects of controversy, review, and litigation. At a conference on "contingent valuation" I attended, an environmental attorney who worked for the government, who was also a conferee, met with a number of prominent economists in this specialty. The economists chose among themselves which of them would appear as expert witnesses for the government (to defend a high estimate of WTP for the damaged environmental good) and which would appear for the defense, a petrochemical firm (to testify to a much lower figure). Estimates of WTP themselves become goods for which buyers compete. There is the possibility of rent-seeking, that is, paying to influence an agency decision. "You get the WTP you are willing to pay for," one knowledgeable lawyer said.

IS WTP RELATED TO BENEFIT?

Consider the sentence: "Something's economic benefit is determined by how much people are willing to pay for it."[9] I believe this statement stipulates or postulates a definition of "economic benefit." It is not as if anyone has measured *economic benefit* and *WTP* separately and shown empirically a correlation between them. If person *S* chooses or prefers outcome *a* over *b*, for whatever reason, does it follow that *S* obtains (or expects to obtain) more utility from *a* than *b*? How would one test an answer to this question?

If utility were observable, then one could measure it empirically to see whether it correlates with WTP or with the satisfaction of preference. Since it is not observable, whether it equals or correlates with anything is anyone's guess. One's person's opinion would seem to be as good as another's.

Why do economists believe that preference or the associated WTP has a meaningful relation to economic value or benefit? The literature sometimes suggests that *economic benefit* and *WTP* are related because people choose or are willing to pay for things only insofar as they believe those things benefit them. One finds in the literature the proposal that a meaningful relation holds between WTP and benefit or welfare because "each individual is the best judge of how well off he or she is in a given situation."[10] In *A Primer for Policy Analysis*, Edith Stokey and Richard Zeckhauser, for example, state that "individual welfare is all that matters in policy choices." The preferences of each individual, these authors

say, constitute the criterion by which we are to judge his or her well-being. "In the United States, we usually take the position that it is the individual's own preferences that count, that he is the best judge of his own welfare."[11]

Even if the individual "is the best judge of his own welfare," however, this does not mean that that individual is a better or worse judge of the issues that may concern him or her, namely, whether an outcome is good in general, good from the perspective of the community, or consistent with its standards and goals. When a person judges a social policy or outcome, he or she may take and should take the perspective of the community – to ask what is best not for *me* but for *us*. Judgment of this sort, basic to political life, rests on argument and evidence; it may not turn on how the individual thinks an outcome will affect her or him. To be sure, people who believe in some political cause or candidate may contribute to a campaign; they may do so, however, to support that cause or candidate not necessarily to enhance their own well-being. According to many studies, people base their preferences with respect to social outcomes on what they believe is good for society or right in principle, not just (or even primarily) on a consideration of what benefits them personally.[12] The individual may be the best judge of what is good for her or him – but that kind of judgment may not always affect choices the person makes. As Kenneth Arrow has written, "the individual orders all social states by whatever standards he deems relevant."[13]

In a series of influential papers, Amartya Sen discusses "the reasons that may lead a person to have different goals from what she sees as her own welfare, or to choose behavior and conduct that go beyond pursuing her own goals." In such cases, "a person's choice behavior may be constrained or influenced by . . . rules of conduct (for reasons that Immanuel Kant and Adam Smith described so well)."[14] Sen distinguishes between "sympathy" and "commitment." Sympathy occurs when one person's welfare is affected by the position of others. "One way of defining commitment is in terms of a person choosing an act that he believes will yield a lower level of personal welfare to him than an alternative that is also available to him."[15]

According to Sen, "commitment then involves choosing an action that yields a lower expected welfare than an alternative available action."[16] Commitment, Sen concludes, destroys the assumption "that a chosen alternative must be better than (or at least as good as) the others for the person choosing it."[17] People who act on moral commitment – who act

morally – act on beliefs about what is good in general or appropriate in the circumstances rather than on a view of what is advantageous for them. This "drives a wedge between personal choice and personal welfare, and much of traditional economic theory relies on the identity of the two."[18]

When Stokey and Zeckhauser state that "individual welfare is all that matters in policy choices" they rule out all the other standards the individual may deem relevant. They allow the person to choose only one thing – her own well-being – or her choices would not count. If people are willing to pay for policy outcomes for reasons other than their own well-being, how does that WTP connect to welfare or utility? How can economists explain the relation between WTP and value or between WTP and benefit?

The pervasiveness of "commitment" or "disinterested" values places welfare economists in a dilemma. They may include them in or exclude them from the cost-benefit valuations they prepare. To include them is to confront at least two difficulties. First, as Matthew Adler and Eric Posner have correctly observed, it would be odd to construe a person's disinterested judgments and preferences as part of his or her welfare function. For example, if a person approves the preservation of the endangered Sri Lankan squirrel on moral or religious grounds, it hardly follows that its protection makes that person better off in any meaningful sense.[19] Second, if political beliefs, aesthetic judgments, and ethical commitments are only as good as the WTP for them, this rule would have to apply equally to economists and noneconomists. Economists typically prefer that society maximize utility. Why would this view be privileged, that is, be accepted on its merits? It should be "valued" in terms of the WTP of those who favor or propose it – the same as any other policy view or preference.

On the other hand, to exclude disinterested beliefs or judgments from cost-benefit valuation is also problematical. First, one has to distinguish ideal-regarding from self-regarding preferences. Who knows whether a person who buys Girl Scout cookies does so for self-interested reasons (for the cookies) or for disinterested reasons (for the cause)? Second, to provide a normative analysis of environmental policy, which is preponderantly ideological, without including disinterested values is like trying to stage *Hamlet* without the Prince of Denmark. The principal character is missing. Cost-benefit analysis can neither include disinterested values (to be a measure of welfare) or exclude them (to be relevant).

THE UNDERLYING TAUTOLOGY

The centrality of moral commitment or judgment in human behavior, as Sen among others has shown, points to a difference between two ways in which one may think of the relation – the ordering or ranking – of preferences. First, one may define this relation as the way rational choice is to be explained. In this purely formal, positive, and non-normative representation of preference, one would say that if agent *S* chooses *a* over *b*, *S* prefers *a* to *b*, and one may introduce measures of WTP to give a fuller numerical account of this relationship. Social choice theory often supposes that a person's preference-orderings, to be rational, must exhibit certain logical traits or conform to certain axioms. Adherence to these formal axioms provides no basis to believe, however, that it is good that preferences are satisfied – good from the perspective of the well-being of the individual or good from the point of view of society.

Second, one may assume that *S* will choose *a* over *b* if and only if *S* believes *a* benefits her or him more than *b*. If one assumes that agents always act to maximize their welfare or well-being, one can then represent any choice – whatever the reason for it – as expected welfare or advantage. To do this, one must presuppose – without warrant and contrary to fact – that if *S* prefers *a* over *b*, *S* must perceive himself or herself to be better off with *a* than with *b*. What would justify this presupposition?

The too hasty connection economists draw between preference and welfare – between the amount a person is willing to pay for an outcome and the amount he or she expects to benefit from it – rests on a plain and obvious fallacy. The fallacy is to confuse choice (*S* chooses *a* over *b*) with welfare (*S* believes *S* is better off with *a* rather than *b*). From the observation that *S* chooses *a* rather than *b* or will pay more for it, economists cannot conclude anything about whether *S* is better or worse off with *a* rather than *b* even in *S*'s own estimation. Economists may base the belief that preference is normative on the assumption that individuals prefer only what they believe is good for or benefits them. This assumption is plainly mistaken.

Economists use the term "economic benefit" or "economic value" to serve simply as a proxy or stand-in for WTP; these concepts in their view are logical equivalents. One economist asserts, "Total willingness to pay is the concept we shall use to define total benefits."[20] Another economist has written, "Economic value is measured in terms of willingness to pay."[21] An authoritative text states "*Benefits are the sums of the maximum*

amounts that people would be willing to pay to gain outcomes that they view as desirable."[22] The price set by a competitive market does not represent the maximum amount a given individual would pay for a good if she had to; thus market price does not equal the "value" or "benefit" of the good to the individual in that sense. The market price represents the minimum amount a person has to pay for the good no matter how much the person may want or benefit from it. In their zeal to measure maximum WTP, welfare economists seek to know the value of everything but the price of nothing.

The sentence, "Something's economic benefit is determined by how much people are willing to pay for it," states a tautology. When you replace "economic benefit" with its logical equivalent "WTP," the sentence states that the amount people are willing to pay for something is determined by the amount they are willing to pay for it. This tautology offers the only justification welfare economists offer for taking WTP as a criterion of value. How does this tautology – this stipulated equivalence between "WTP" and "value" – make preference normative or inform environmental policy? In an earlier chapter, I quoted Bertrand Russell, who characterized the method of postulation as offering a single advantage – the advantage of theft over honest toil. To posit that WTP is equivalent to value is to assume what has to be shown. Why should society accept the postulated equivalence of WTP and value? Why should it care about WTP or the conception of economic value it enshrines?

HAS THE WTP CRITERION A BASIS IN UTILITARIANISM?

Environmental economists often suppose that the ethical theory of utilitarianism provides some intellectual comfort to their position.[23] Eban S. Goodstein states that the "human-centered (or anthropocentric) moral foundation underlying economic analysis is known as utilitarianism."[24] In an earlier chapter, I noted that a Kantian position, such as this book advocates, is also human centered or "anthropocentric" in assuming that human beings assign all the values. Kantians agree with Utilitarians on the truism that only values held by persons count. They disagree about whether the morality of an action has to do with (1) a principle or judgment that commands the action in the given circumstances or (2) a quantity (e.g., "utility") associated with the consequences of that action. A Kantian asserts that society must rely on deliberative social processes to find its conscience on matters of social policy.[25] The Kantian approach

accepts the idea that people assign all the values, but it does not make the assumption that WTP is a relevant measure or criterion for social valuation.

If the preference-utilitarianism of contemporary welfare economics has any basis in the moral theory of Utilitarianism it must meet two conditions. First, it has to judge actions, choices, or policies according to their consequences. Second, it must use an empirical conception of the good, such as happiness, to evaluate policies in relation to those consequences. The preference-utilitarianism associated with contemporary welfare economics fails on both these criteria. This kind of "utilitarianism" is not a consequentialist theory. This approach allocates resources to those willing beforehand to pay the most for them. There seems to be no concern with, or even reference to, the actual consequences of that allocation. Wefare economics cannot be a consequentialist theory because it measures welfare or utility in terms of the expectations that lead to actions ("expected" utility), not the consequences ("actual" utility) that result from them.

According to Goodstein, economists assume that "the consumption of goods brings happiness."[26] Social science research consistently shows that after basic needs are met, income (taken as a surrogate for WTP) does not correlate with happiness.[27] If one takes income as a surrogate for preference-satisfaction, and if one takes "utility" to mean anything like "happiness," the relation of preference-satisfaction to utility is weak or nonexistent after basic needs are met. "As Western societies have got richer," economist Richard Layard tells us, "their people have become no happier."[28] According to Alois Stutzer and Bruno Frey, "differences in income only explain a low proportion of the differences in happiness among persons."[29] According to Richard Posner, "the most important thing to bear in mind about the concept of value [in the economist's sense] is that it is based on what people are willing to pay for something rather than the happiness they would derive from having it."[30] Robert Lane, a political scientist, has written, "If 'utility' has anything to do with happiness, above the poverty line the long-term marginal utility of money is almost zero."[31] An empirical relation between WTP and subjective well-being is not observed.

Someone might suppose that when preferences are satisfied (in the sense of "met" or "fulfilled"), individuals become satisfied (in the sense of "happy" or "content"). Social scientists have often observed, on the contrary, that "acts of consumption . . . which are undertaken because they are expected to yield satisfaction also yield disappointment and

dissatisfaction."[32] It is hard to say what happiness is, how it should be measured, or under what circumstances it is appropriate to its cause.[33] Fred Hirsch offers the following partial explanation. He argues that consumers, after their basic needs are met, tend to want "status" or "positional" goods.[34] Plainly, the satisfaction of these "status" preferences cannot be maximized, any more than one can maximize the number of people who are first in line or win a race.[35] Hirsch concludes that the satisfaction we take in consumer goods depends more on their scarcity than on their abundance. This is the reason, he says, that "economic advance [has] become and remained so compelling a goal to all of us as individuals, even though it yields disappointing fruits when most, if not all of us, achieve it."[36]

Mary Douglas has observed that as societies rise above the poverty level, goods are valued more for their social or cultural meaning than for their use; this meaning, moreover, is largely determined by their distribution.[37] Thus, as goods are more widely distributed, they may lose both their meaning and their value. When everyone stands on tiptoe, as Hirsch put the idea, no one sees any better.[38] These observations suggest that the "greatest happiness" principle of classical utilitarian theory and the WTP criterion of contemporary welfare theory have a tenuous connection at best. To think otherwise is merely to confuse the satisfaction of preference, which policy analysts propose, with the utilitarian preference for satisfaction.

It is not clear people even want their preferences satisfied. Recognizing that it is "better to be Socrates dissatisfied than a fool satisfied,"[39] a person may reflect on and then strive to improve his or her tastes. The improvement or education of taste – rather than the satisfaction of whatever desires a person has – may be a goal of public policy that can be justified on utilitarian grounds. "The chief thing which the common sense individual actually wants," Frank Knight observes, "is not satisfaction of the wants he has, but more, and better wants. . . . True achievement is the refinement and elevation of the plane of desire, the refinement of taste."[40]

It cannot be argued that the satisfaction of preferences is a good thing in itself – that preference is intrinsically normative – for many preferences are sadistic, envious, racist, or unjust. Preferences may also be coerced or adapt to coercive circumstances; these express not the autonomous choice of the individual but a process that preempts autonomy. Many preferences – for example, some that are endogenous to consumption, like the urge for a cigarette – are despised by the very

people who have them. Why should we regard the satisfaction of preferences that are addictive, boorish, criminal, deceived, external to the individual, fetishistic, grotesque, harmful, ignorant, jealous, . . . wanton, xenophobic, yucky, or zany to be a good thing in itself?

To this, the welfare economist could reply that he or she has no basis for judging between better and worse preferences.[41] Three economists ask, "Who is to decide what objectives are 'meritorious' and how are they to do it?"[42] This question ignores 3,000 years of political theory – for example, the idea that democratic political processes sort out the better from the worse by responding at least over the long run to evidence and argument. Economists may emphasize their "neutrality" because they believe (as do therapists in the tradition of Rogers I described in an earlier chapter) that it empowers them. As Deidre McCloskey comments, the science of economics "promises knowledge free from doubt, free from metaphysics, morals and personal conviction. What it is able to deliver renames as scientific methodology . . . the economic scientist's metaphysics, morals and personal convictions."[43]

KALDER-HICKS EFFICIENCY AND WTP MAN

Welfare economists are well aware of a large literature that charges that the use of WTP as a criterion of "value" or "benefit" undermines democratic processes, misrepresents the value of life and other "priceless" goods, and ignores distributional effects.[44] I quibble with this literature because I believe it concedes too much. It concedes that WTP at least sometimes measures something normative – for example, utility, benefit, value, well-offness, well-being, or satisfaction. In fact, these concepts do not explain why WTP is normative; they serve as mere stand-ins, logical equivalents, or proxies for it. I contend that WTP is useless as a normative concept because it measures or correlates with nothing but itself and with concepts it defines.

A welfare economist may concede this point, however, and reply that it is not so much *utility* as *rationality* that the science has in mind. According to this reply, "The utility analysis rests on the fundamental assumption that the individual confronted with given prices and confined to a given total expenditure selects that combination of goods which is highest on his preference scale."[45] This individual, whom I shall call "WTP Man," is defined by a preference scale or ordering that meets various formal conditions, or example, if WTP Man prefers option *a* to option *b*, he cannot at the same time also prefer *b* to *a*, even under a

different description. Willingness-to-Pay Man consists in a preference function which is "no more than a numerical representation of an underlying ordering of alternatives, on the basis of which the person does his choosing."[46]

WTP Man as a theoretical construct is assumed to have a complete preference ordering, which is to say, for any two goods *a* and *b*, he must prefer one to the other or be indifferent between them. According to two environmental economists, "All that rationality requires in respect of preferences over states of the world is that these states are ranked by a complete and transitive ordering." This means that individuals respond rationally to matters of environmental policy "only if they are able to rank all possible outcomes of an environmental dilemma consistently."[47]

Students of social psychology have for many years criticized the relevance of WTP Man as a theoretical construct because in its fundamental concept it conflicts with the way people in fact behave. Many studies have shown that "theoretically equivalent measures of preference, such as choices and prices, can lead to systematically different preference-orderings, known as preference reversals."[48] The normative consequence of an enormous number of studies is to show that the preferences of individuals "may not typically be stable and well defined" when any risk or uncertainty is involved and even in a risk-free environment.[49] If this is the case, economists would have to reject or dismiss the typical preferences of ordinary people because they do not come anywhere near the standard of rationality required by WTP Man.

The empirical research that has established the gulf between WTP Man and the normal socialized person is useful and important. It does not answer the question, however, of whether WTP Man is a sort of ideal – in other words, whether human beings fail somehow because they do not come up to that standard. For example, human beings adjust their choices in view of moral principles, opportunities, situations, occasions, and exhortations that may not reflect a preexisting stable preference schedule but may respond to qualities such as self-doubt, willingness-to-learn, decency, and social-mindedness – qualities that may spontaneously appear or develop with the formation of character. To reflect a preexisting complete preference-ordering may be to ignore these virtues and to abjure one's humanity. As Walt Whitman noted, a human being contains multitudes; to paraphrase R. W. Emerson, the foolish consistency of WTP Man requires a small mind. As Amartya

Sen has written, WTP Man or what he calls the *purely* economic man "is indeed close to being a social moron. Economic theory has been much preoccupied with this rational fool in the glory of his *one* all-purpose preference ordering."[50]

To get from individual to collective choice – that is, from WTP Man to WTP Society – welfare economists conceive society as a single individual with a preference or utility schedule that aggregates across its members. Willingness-to-Pay Man at least in theory and within an income constraint calibrates the amount he is willing to pay to satisfy one preference relative to the amount he would pay to satisfy a different preference – or the amount he will accept to surrender a good he already possesses. At least in principle, then, WTP Men will exchange goods with one another until they exhaust the "benefits" (defined in terms of net WTP) they can obtain by trade. This state of exhaustion is thought to be optimal. For example, the $100-million lottery winner apparently reached this optimum state. He satisfied all his preferences – and thus realized their intrinsic normative content – after he had spent half his winnings on whores, hooch, and horses. There was nothing more for him to gain from trade but he did what he could by squandering the rest.

The idea that WTP Men exchange goods with each other each to attain the highest place possible on the preference scale suggests that society might be conceived as a single rational actor who combines the preferences of all individuals on a WTP basis. The individual has no separateness or autonomy; he or she is conceived as a container of preferences or of WTP that can be aggregated with the WTP of other individuals into a single overall social account. It is a commonplace to say that from the perspective of WTP Man, "persons do not count as individuals in this any more than individual petrol tanks do in the analysis of the national consumption of petroleum."[51]

Economists introduce the Kaldor-Hicks compensation test to aggregate the individual tanks into the national account, that is, to get from WTP Man to society, from the individually preferred to the socially preferable. The Kaldor-Hicks test justifies government intervention to realize the net gains WTP Man would have been able to achieve but for the costs of exchange or the imperfections or failures of markets. According to this test, "If [person] A is made so much better off by the change [from one situation to another] that he could compensate B for his loss, and still have something left over, then the reorganization is an unequivocal improvement."[52] The Kaldor-Hicks test justifies government

interventions which create "losers" as well as "winners" on the argument that if the winners could compensate the losers and still be winners, society would be "better off" as a whole.

The Kaldor-Hicks test assumes that "better-offness," whatever it means, aggregates across society, which it treats as a sort of super-individual. Just as society may be said to be "heavier" if weight-gainers could offset weight-losers and remain gainers, or that society is "taller" if taller people could offset shorter ones and still be taller than before, this approach supposes society is "better off" if those who gain "better-offness" can compensate those who lose it and still be "better off" than before.

Gunnar Myrdal observed that welfare economics presupposes a "harmony of interests" or a "communistic fiction" about the oneness of society.[53] This communistic ideal "amounts to the assertion that society can be conceived as a single subject." Society is not "a single subject" with respect to weight or height or color; these qualities attach only to the unit and do not aggregate over the whole as emergent or community properties. If you put on twenty pounds, for example, it is not any solace to you that someone else managed to lose the same amount of weight. Similarly, if a change makes one person "better off" and another "worse off" that is all that can be said about it. There is no way to sum and ascribe these qualities to society as a single subject. As Posner and Adler conclude, "In sum, the Kaldor-Hicks test is simply not an attractive normative criterion, and for that reason there is no point in trying to defend cost-benefit analysis on the ground that it implements the Kaldor-Hicks test."[54]

THE INVISIBLE HAND AND ECONOMIC MAN

Ever since Adam Smith, economists have applied two theoretical constructs – the "Invisible Hand" and the "Economic Man" – to understand the functioning of an economy. The theory of the Invisible Hand explains "how within a specific set of institutional arrangements the power of self-interest can spontaneously generate patterns of social order that simultaneously achieve individual autonomy, generalized prosperity, and social peace."[55] According to this approach, the economic problem is one of *coordination* in relation to information implicit in prices, rather than one of *valuation* in relation to a conception of the good defined as WTP within economic science. The problem for economic theory is not to posit and then measure "value" as an intrinsic quantity,

whether as labor surplus (as Smith and Marx believed) or as consumer surplus (as is assumed today). It is to analyze "how the spontaneous interaction of a number of people, each possessing only bits of knowledge, brings about a state of affairs in which prices correspond to costs, etc., and which could be brought about by deliberate direction only by someone who possessed the combined knowledge of all those individuals."[56]

Economic Man is a theoretical construct used to explain how price signals coordinate choices in ways that promote overall economic performance. All Economic Man does is exchange goods with other Economic Men within an income constraint in view of prevailing prices. "About the only thing this person is reported to be doing is buying and selling goods in markets where prices are given."[57] He tries to buy low and sell high. All we know about Economic Man is that the constraints he faces "are shaped only by market prices and the earned and unearned incomes he is able to command."[58] Otherwise he is a Black Box. The maximum Economic Man is willing to pay for a good is irrelevant in most instances. If he buys a good, he pays the lowest price he can conveniently find. If one insists on introducing the concept of "value" with respect to ordinary consumption goods, one may construe the price Economic Man pays as a lower bound on how much he "values" that good. His maximum WTP (how much more he would pay if he had to) is unlikely to be known even to him.

Price signals lead Economic Man as a producer to opportunities for profit. These signals lead him as a consumer to bargains. By a "bargain" I mean a good a person wants and is able to purchase at a price significantly lower than that person expects to pay for it. (The concept of maximum WTP remains inscrutable, hypothetical, and nearly always irrelevant.) As less expensive goods of higher quality force more expensive goods of lower quality out of the market, firms constantly innovate to remain competitive. Innovation, insofar as it develops and applies knowledge to knowledge, continually creates new kinds of goods and redefines which kinds of assets are considered resources. Price signals – even though they do not equate with the maximum WTP that welfare economics associates with value – lead market players to coordinate their activities in mutually beneficial ways. It is a virtue, not a fault, of this theory that it seeks to know the price of everything but the value of nothing.

Economic Man may not possess a preestablished preference function. On the contrary, the theory of the Economic Man recognizes the

extreme contingency of preference. An Economic Man may not have a well-defined preference for apples, for example. Rather, one can only say that, given a price for apples and a very wide range of other prices and available objects of consumption, for example, oranges, he prefers an apple at the moment. The individual, insofar as he has any preference-ordering, changes it constantly as he obtains more information about what is on offer at what prices. On this approach, the epistemic problem is not that of determining stable, exogenous, or "given" preference-orderings. The epistemic problem is getting to economic actors, firms as well as consumers, the immense amount of information that price signals gather and convey. It is the "problem faced by economic actors whose beliefs about the possible consequences of their actions are invariably subjective, incomplete, partial, vague and even on occasions (and viewed with the benefit of hindsight) just plain wrong."[59]

A reader may object that Economic Man and WTP Man come to the same thing – that the theory of the Invisible Hand and the theory of Kaldor-Hicks efficiency are two sides of the same coin. These different theories may remind one of the "duck" and the "rabbit" which are two perspectives on the same cartoon. I have no opinion about whether this objection is correct. I believe that even if it is true, however, we are much better off with the classical "duck" than with the "neoclassical "rabbit." The theory associated with Adam Smith allows us the metaphors we need to deal with contemporary problems such as energy policy and climate change. This approach encourages the rhetoric of innovation, technological change, competitiveness, decentralization, expansion, liberty, and the kind of consent – actual consent – basic to the protection of personal and property rights.

The theory of Kaldor-Hicks efficiency and WTP Man in contrast allocates fixed or "given" resources according to a collectivist rule that permits losses to any one individual if they could hypothetically be offset by gains to another. The neoclassical approach allocates the resources we have but does not help us create the resources we need. This approach transfers political power to experts versed in measuring WTP – experts who are likely to appeal to different constituencies by awarding them the WTP they are willing to pay for. The classical economics of Adam Smith celebrates the spontaneity and creativity of competition and consent. The neoclassical theory of WTP Man, in contrast, favors the rhetoric of market failure, transaction costs, dirigisme, and the zero-sum game.

IS PROSPERITY GOOD?

The conceptual constructs of the Invisible Hand and Economic Man have a normative side; in contrast the conceptual constructs of WTP Man and Kaldor-Hicks Efficiency do not. The normative significance of the Invisible Hand and Economic Man has nothing to do with "value" or "benefit" as microeconomists use these terms today. The point of Invisible Hand theory is to promote overall prosperity. If one needs a more explicit characterization of overall prosperity one can consult Richard Musgrave. "Economists distinguish three criteria for assessing performance." The first involves "aggregate or macro-efficiency, measured principally in terms of total output, employment and price stability." The second criterion concerns the degree to which an economic system expands to meet the "manifold and constantly changing demands of individuals for public and private goods." Musgrave included "the distribution of income and wealth" as a third indicator of economic performance.[60]

Why is economic performance a good thing; why might it be thought to be normative? One answer lies outside economics, for example, in the uncontroversial findings of social psychology. Social psychologists have shown that the performance of an economy – as distinct from WTP – strongly affects perceived or subjective social well-being. Stutzer and Frey summarize the factors that relate to happiness:

> When people do get to be better off, higher income scarcely raises happiness, and then only for a limited period of time. Other determinants of happiness more strongly affect it, particularly the condition of unemployment, which strongly depresses; whereas, institutional factors, such as political participation rights and the extent of government decentralization, raises people's satisfaction with their lives.[61]

Carol Graham has written, "Most studies find that inflation and unemployment have negative effects on happiness."[62] R. J. Shiller found that people associate inflation with nonpecuniary costs such as exploitation, lowered morale, and loss of status or prestige.[63] The nonincome effect of involuntary unemployment on well-being exceeds by many times the effect of lost income alone.[64] According to other investigators, when "individuals are asked in surveys how happy they are with life . . . their en masse answers move systematically with their nation's level of joblessness and rate of price change." They add that from a

societal perspective, "inflation and unemployment belong in a well-being function."[65]

Insofar as economists agree with commonsense moral intuitions and settled political convictions about the goals of an economy – enlarging the pie, increasing job opportunities, improving the lot of the poor, subsidizing education, health, and merit goods – they do not need to discuss the normative purpose of economic analysis because "to do so would be to state the obvious and sound grand at the same time."[66] The economic goals of a society, such as employment, price stability, and productivity, are uncontroversial; the task is to determine how to achieve them. This requires economists to debate facts, not measure values. Economists suggest how institutions can be reformed, property rights can be better defined, and incentive structures could change, so that new, better, and less expensive goods will appear. Economists can and should help find policies that "grow" the economy in the ways that Musgrave described while responding to environmental challenges such as climate change.

A consensus in society and among empirically minded economists suggests that prosperity is a good thing largely because prosperity (unlike Kaldor-Hicks efficiency, aggregate WTP, the area under the demand curve, consumer surplus, and other proxies and stand-ins for WTP) in fact correlates with happiness. While this justification of prosperity might appeal to a Utilitarian, it will not necessarily convince a Kantian like me. For a Kantian, it is not enough to say that meaningful employment – "gd jbs w hi pa" – correlates with happiness. It must also be "worthy of happiness," that is, the idea of meaningful work must have some sort of intrinsic value – it may appeal to a sense of duty or to a sense of one's self-worth – if the happiness it affords has moral value. To show that prosperity not only leads to happiness but is also worthy of it – that the happiness is appropriate to its cause – would probably require an argument that refers to concepts of freedom, responsibility, community, and personhood ultimately traceable to a broad religious tradition. I touch on these issues in a later chapter; I cannot pursue them here.

CONCLUSION

Many economists today have lost interest in choice as a kind of moral agency, responsibility, and accountability. In place of *choice* in this moral sense, these economists establish a morally neutral conceptual construct, *preference*, which refers to a passive mental ordering associated

with WTP Man. This chapter has asked whether preference is normative. How would one show that preference-satisfaction in the aggregate or any of its proxy terms – such as "WTP," "welfare," "well-being," "utility," "well-offness," "consumer surplus," "the area under the demand curve," or "benefit" – possesses a normative significance, that is, a connection to an independently definable and socially cognizable conception of the right or the good?

I have argued that the conceptual framework of the Invisible Hand and Economic Man suffices to explain why the government may intervene when markets fail to allocate resources in ways helpful to the performance of the economy, which is to say, in ways broadly responsive to competitive or equilibrium prices. Moral, aesthetic, spiritual, and ethical goods – ranging from rights against the trespass of pollution to the protection of endangered species and pristine vistas – cannot be captured by this conceptual framework because the social commitments or principles involved concern the self-respect or dignity of the society and not the performance of its economy. A principle of cost-effectiveness and a principle of diminishing returns, however, apply even to noneconomic goods. Accordingly, we often need to know about the lowest price at which a good could be supplied – as distinct from the highest price it could fetch in the absence of competition.

Our political theory, founded on concepts such as equity, liberty, and autonomy, requires that people should have the greatest freedom consistent with the like freedom of others to make choices through and on behalf of economic, legal, and political institutions. Economists can play a useful role by helping society to define property rights in common pool resources and to design legal and political processes so that people can coordinate their actions in more transparent and less costly ways. The Invisible Hand then may lead to prosperity and peace. Choice is an activity; individuals are agents; they are not sites where preference or WTP may be found.

Whatever preferences we may ascribe to the lottery winner, they led him nowhere and made no claim on social recognition. There is no way to associate his preferences or preference per se with any good, such as happiness, that society has a reason to value or individuals have a reason to want. By postulating WTP as an objective measure of value, a vanguard party of economists empowers itself to second-guess market outcomes – to treat any as a "failure" – in favor of their own metaphysics, morals, and personal convictions. Their science then tells society what is valuable and thus what to do. The difference between welfare

economics and communism, then, may be an elusive one. I do not take up the question of whether environmental economics, insofar as it is based on conceptual constructs such as Kaldor-Hicks efficiency and WTP Man, may succeed as a positive science, that is, a science that makes testable predictions. I question only whether environmental economics may present itself as a normative science, that is, as a science of valuation.

Chapter 5

Can We Put a Price on Nature's Services?

In 1962, the Drifters, a popular rock 'n' roll group, sang:

> At night the stars put on a show for free,
> And darling, you can share it all with me . . .
> Up on the roof . . .

Nature provides many products and services that we, like the Drifters, enjoy for free. But, as Thomas Paine said about liberty, "What we obtain too cheap, we esteem too lightly." Ecologists point out that "the goods and services that nature provides in support of an economy – such as the cycling of nutrients for the production of renewable resources (like fish and forest products), the pollination of flowering plants, and the regulation of climate – are free."[1] We may therefore esteem them too lightly.

Many ecologists and ecologically minded economists suggest that we would appreciate and protect nature more if we attached market prices to the products and services it provides.[2] According to one prominent ecologist, "Moral arguments are not enough – we have to make nature a regular column in our spreadsheets and cost-benefit analyses, so that natural assets are properly valued in our decisions."[3]

THE ARGUMENT OF THIS CHAPTER

In later chapters, I shall try to show that moral, aesthetic, cultural, and spiritual arguments are enough; they provide compelling reasons to preserve the magnificent aspects of the natural world. In this chapter, I shall defend two theses. First, I shall discuss large-scale atmospheric or biospheric processes or forces of nature. Planetary atmospheric systems are what economists sometimes call "lumpy" goods, that is, goods that

cannot be provided incrementally, divided in pieces, or sold in units. Either we protect (or "buy") the whole system or forgo it; there is no way to trade in marginal amounts. Accordingly, political will and legal institutions may be required to transit industry away from technologies that threaten to destabilize the planetary climate. To be sure, the most effective policies to reduce or limit "greenhouse" gases will rely on market forces and incentives; nevertheless, there is no meaningful way to "price" units of the global climate incrementally or at the margin.

Second, I shall discuss those goods – such as arable land – that are or can be sold in incremental amounts and therefore do trade in markets and thus do receive competitive prices. The productive services of nature, such as the ability of fertile soil to grow crops, receive low market prices not because markets fail or because a resource such as fertile soil is a "public good" but because the resource, in this example good cropland, is quite abundant relative to effective demand. This is the case generally. Even when one takes a service for granted – the wind that pollinates cereal crops, for example – one may pay the full market price for it, even if it is zero, because the supply is adequate and free.

I shall begin this chapter by introducing the theory that led John Locke at the end of the seventeenth century to conclude that nature has little if any economic value as he understood that concept. I shall use the context of the labor theory of value – from Locke to Marx – to discuss the prices nature or its products or services command or could command in a competitive market. As I have argued in earlier chapters, price coordinates economic activity in ways that lead to prosperity by providing information about such conditions as scarcity relative to demand. I shall argue that market exchange generally succeeds in setting prices for goods associated with ecosystems, such as farmland, timber, and water. Absent well-known distortions caused by governmental subsidies, markets work well for these commodities, and their prices represent how willing buyers and sellers trade marginal or incremental units of these goods.

In this chapter I ask whether any ecosystem product or service that does not now trade between willing buyers and sellers could do so – that is, if it could receive a competitive market price – if property rights were established or some impediment to exchange were removed. Is there any ecosystem product or service that does not already receive a more or less objective market price – and thus which should receive a "shadow" or imputed price in our spreadsheets and cost-benefit analyses? This

chapter asks, to quote law professor Barton Thompson, "whether there is a more robust and direct role for markets in preserving the environment."[4]

This essay will argue that nature and its services are either (1) of such general and broad importance, such as global atmospheric systems, or so related to pollution (a form or coercion) that the the concept of "marginal utility" or "competitive market price" does not apply to them; (2) actually priced by extant markets; or (3) too plentiful to command a price at the margin ("too cheap to meter"). In other words, I shall argue that the attempt to attach hypothetical market prices to ecological services will fail because these services – if they can be sold in incremental units – have competitive market prices, even if because of the abundance of supply relative to demand, the prices are negligible.

Of course, we depend completely on nature's largess. The appropriate response to dependency, however, is gratitude. You do not respect a gift by inquiring about its price. It is not as if God markets nature to us. This is especially true if nature's services are so plentiful (as they generally are) that they overwhelm demand and are free to all. What would price tell us about plenty? I will argue that it is hard to find instances in which markets would establish prices for environmental goods or services but for "ignorance, institutional inadequacy, and the problems inherent in public goods."[5] By "putting a price on it" we regard nature as a resource to exploit rather than a heritage and an endowment to maintain. This is the most self-defeating path environmentalists can take.[6]

ECOSYSTEM SERVICES AT THE GLOBAL SCALE

Consider first ecosystem services at the global scale. I believe these should often be analogized not to economic goods to which prices may be attached but to the conditions – like liberty, property rights, the enforcement of contract, and so on – that make production possible. No one suggests that liberty should be "priced" though everyone knows it must be protected. To ask how a market would settle prices on legal, political, and social institutions is to pose a foolish question since no market could function without them. It is the same with biospheric processes on which life depends.

Once a political authority has "capped" or limited the amount of pollution that can be emitted and has established initial "allowances" among polluters – a very tall order in itself – these allowances could

trade to encourage their efficient use. Such a regulatory market, if it could ever exist, would not represent voluntary exchange between willing buyers and sellers of ecosystem services. Regulatory markets represent command-and-control regulation made more consumer-friendly.[7] Barton Thompson has written, "Governments superimpose market structures onto these regulatory systems primarily to ensure that the limited rights to pollute, develop wetlands, and divert water are used efficiently, thus minimizing the cost of regulation to the economy."[8]

Governments may create "regulatory markets" – sulfur dioxide under the Clean Air Act provides the usual example – to make command-and-control regulations more cost effective. Thompson comments, "Beyond the odd anecdote, unfortunately, the actual value of pure regulatory markets to environmental preservation remains questionable."[9] So far, experience with attempts to "cap" carbon and trade "allowances" have been fraught with corruption as each player has insisted on having a supersized initial endowment. It would be one thing if carbon "allowances" were sold to the highest bidders and the money invested in clean technologies. It is another thing that the "allowances" are constructed from political whole cloth and allocated accordingly.

Those who propose a "cap-and-trade" policy for carbon emissions might be analogized to the mice in Aesop's fable. In their Council, one mouse proposed "that a small bell be procured, and attached by a ribbon round the neck of the Cat. By this means we should always know when she was about, and could easily retire while she was in the neighbourhood." When a wise old mouse inquired, "But which of us shall bell the cat?" no one had an answer. The old mouse declared, "It is easy to propose impossible remedies." In the same vein, a commentator has observed of carbon "markets," "The problem . . . is that it is anyone's guess whether such trading can work on a global scale."[10]

The principal difficulty that defeats efforts to impose a regulatory market on "greenhouse" emissions lies in finding a suitable, meaningful, and acceptable principle for setting initial allowances.[11] It is now apparent that nations in the European Union emissions "market," for example, gave themselves such huge initial entitlements (the technical term is "hot air") that they have had difficulty enforcing limits. As a result, the supply of "carbon emission rights" exceeds the demand, and as I write this chapter, the price of a one-ton unit plummeted from 30 to 8 euros in two or three days.[12] Economists "assume the can-opener" if they suppose that interested parties can agree on a formula to establish a "cap" and allocate initial allowances.[13]

LOCKE ON THE ECONOMIC VALUE OF NATURE

At the time Europeans began to colonize the New World, John Locke compared land values in Great Britain to land values in America.

> An acre of land that bears here twenty bushels of wheat, and another in America, which, with the same husbandry, would do the like, are, without doubt, of the same natural, intrinsic value. But yet the benefit mankind receives from one in a year is worth five pounds, and the other possibly not worth a penny.[14]

Ecologically minded economists today describe as "ecosystem services" or as "natural capital" what Locke called the "natural, intrinsic value" of land. In 1997, a group of ecological economists estimated the economic value of ecosystem services and related natural capital at between $16 and $54 trillion per year.[15] Locke reasoned on the contrary that the labor accounts for nearly all the benefit land yields. "Labour makes the far greatest part of the value of things we enjoy in this world: And the ground which produces the materials is scarce to be reckoned in, as any, as any, or at most, but a very small part of it."[16] Locke suggested that labor accounts for the economic value of agriculture, while what we call ecosystem services are "possibly not worth a penny."

Locke supported his conclusion in part by defending a labor theory of economic value. For Locke, labor functioned as an essential ingredient that turned otherwise useless materials into useful goods. He wrote, "Land which is wholly left to Nature, that hath no improvement of Pasturage, Tillage, or Planting, is called, as indeed it is, *waste*; and we shall find the benefit of it amount to little more than nothing."[17] Economists following Locke, including Ricardo and Marx, endorsed the idea that the amount of labor inherent in an object determines its economic value. Because Karl Marx saw economic value as an inherent or intrinsic quantity and located it in the contribution of labor, he like Locke concluded that natural materials obtain value only when mixed with labor. "The purely natural material in which human labor is objectified . . . has no value."[18]

It would be hard to find an economist today – especially an environmental economist – who endorses a labor theory of economic value. Environmental and ecological economists, however, generally accept the idea that economic value represents or refers to an intrinsic or inherent essence. They may adopt one of two different conceptions of the normative factor that makes one good more valuable economically than another. The welfare economists I criticize in this book hold that the

satisfaction of preference ranked by willingness to pay (WTP) is inherently or intrinsically valuable, that is, "preferences do contain their own normative content."[19] Ecological economists, in contrast, locate the source or nexus of value in the natural world, for example, in free energy, net primary productivity, emergy, exergy, or some other factor thought to be essential to production.

Ecological economists might follow Nicholas Georgescu-Roegen in arguing that the essential value-giving limit on production has to do with the fund-flow of low-entropy resources;[20] they might agree with Paul Ehrlich and others that net primary productivity (the product of photosynthesis) constrains economic growth;[21] or they may refer to various forms of "natural capital."[22] It makes no difference, however, whether you agree with Locke or Marx that labor is the normative element, with welfare economists who equate "benefit" with preference or WTP, or with ecological economists who develop concepts such as emergy to define what is intrinsically economically valuable. What is important is not how these positions differ but what they have in common, that is, a commitment to the idea that economic value is a measurable quantity – whether physiological (labor), psychological (WTP), or material (low entropy resource flows).

In this book, I have argued that nature has no economic value. The reason is not that nature does not benefit us in every way – of course it does – but that nothing has economic value. I have argued that the phrase "economic value" has no reference. Economists from Locke to Marx thought the term referred to the input of labor, but it is hard to find anyone who propounds this view seriously today. Ecological economists use the term to refer to a construct, such as "emergy," "low entropy resource flows," or something of that sort I do not presume to understand. (It probably took a lot of emergy to write this book, for example, but this is unlikely to affect its sales.) Welfare economists equate "economic value" with WTP – but as I have argued, WTP is not normative and refers to nothing of value. The term "economic value" has no tenable, defensible, normative definition.[23]

Nothing (including ecosystem services) has any economic value because the term "economic value" cannot be made meaningful – defined in terms of an essence, ether, or entity that has normative content. As an intrinsic value WTP has no standing. References to proxy terms such as "benefit," "well-offness," or "welfare" make definitional circles back to WTP itself. Invocations of WTP do not connect the concept "economic

value" with any goal or objective society as a whole has a reason to pursue. The concept of WTP connects with nothing but itself or to ostensibly normative concepts, such as "well-being," arbitrarily defined in terms of it. The economist, therefore, has no role to play in "valuing" goods, whether in terms of surplus labor, consumer surplus, exergy surplus, or what-have-you surplus. The concept of "economic value" or "valuation" is empty, arbitrary, or oxymoronic and refers to nothing that has value in itself or from a social point of view.

I agree, then, with the Austrian school of thought that believes economists should focus on two concerns. The first is to explain the nuances of Smith's Invisible Hand, in other words, "how within a specific set of institutional arrangements the power of self-interest can spontaneously generate patterns of social order that simultaneously achieve individual autonomy, generalized prosperity, and social peace."[24] To understand the Invisible Hand is to recognize that goods do not exist in fixed or static amounts to be allocated to and consumed by those who "value" them most. Instead, in the appropriate competitive conditions – conditions in which price signals convey information about such things as scarcity – economic activity is creative and dynamic. The second task is to throw cold water on utopian schemes by reminding their partisans of how feckless, horrid, recalcitrant, truculent, exasperating, and depressing human nature truly is.

LOCKE AND THE PRICE OF LAND

Even though Locke adopted a labor theory of value, he was sensible to the role of prices in allocating resources. Simply as a matter of accounting for profits and losses in terms of prices paid and received, Locke found that natural materials traded at very small amounts relative to the price of labor and technology. He pointed out that excellent cropland was free for the taking in many places in the world, such as in regions of Spain (at the time) and in the "inland vacant places of America."[25] Locke wrote of land in America that one cannot "acquire to himself a property to the prejudice of his neighbour, who would still have room for as good and as large a possession (after the other had taken out his) as before it was appropriated."[26]

Land was so plentiful relative to demand that the price of the marginal acre was minimal. Starting in 1863 under the Homestead Act, the U.S. government gave a quarter-section (160 acres) free to anyone who would

farm it for five years. Labor commanded a scarcity price; land was free. By 1900, about 600,000 farmers obtained about 80 million acres of land under the act.

According to Locke, if the price of fertile land is negligible, as it was in America, the economic value of food "must all be charged on the account of labour, and received as an effect of that."[27] Locke reasoned that of the prices we associate with agricultural commodities, "nine-tenths are the effects of labour. Nay, if we . . . cast up the several expenses about them . . . we shall find that in most of them ninety-nine hundredths are wholly to be put on the account of labour."[28] In the production of commodities, "Nature and the earth furnished only the almost worthless materials as in themselves."[29]

The price structure of agriculture has changed little since Locke's time. "The cost of labor is the biggest part of the total food marketing bill," the U.S. Department of Agriculture (USDA) has reported year after year.[30] According to a 2004 USDA publication, "Nineteen cents of every dollar spent on U.S.-grown food goes to the farmer for the raw food inputs, while the other 81 cents covers the cost of transforming these inputs into food products."[31] Of the 19 cents, land – the rent on the natural resource – represents perhaps one or two pennies.

In 2004, a typical acre of fertile soil in the American heartland sold at the average price of $1,780, at least a quarter of which can be attributed to the distorting effect of subsidies, according to USDA figures.[32] Farmers who are paid – as a way to control surplus – not to grow crops bid up the price of land where not to grow them. Without these distortions, the prices of (or rentals for) cropland land in the United States would constitute about one-tenth of the farmer's expenses and thus less than 2 percent of the price of food. This is consistent with Locke's calculation that only one part in a hundred of the prices of agricultural products can be credited to the natural properties of the land, while 99 percent must be credited to labor and the tools it applies.

In *The Curse of American Agricultural Abundance* (2003), Willard Cochrane, a leading agricultural economist, argues that it would be more economical and efficient if the government stopped paying tens of billions in subsidies every year to prop up cropland values. Land would then revert back to prairie in the American West much as it has returned to forest in the East.[33] Cochrane suggests that "large parts of the Great Plains should be converted into a fenceless 'buffalo commons.'"[34] In the absence of government subsidies, farmland in the United States will continue its return to the natural condition and the negligible economic

value it had in Locke's time. Locke was right. Because of its abundance relative to demand, fertile cropland continues to furnish only "almost worthless materials as in themselves," which can be obtained for almost nothing.

Every real estate broker can recite the three factors that control the price of an acre of land: location, location, and location. In 1840, Johann Von Thuenen showed that land values – or the "rents" farmers can extract from they land they farm – are higher the closer the land is located to cities even if the uses of the land are the same.[35] Transportation costs will diminish the economic value of land, however fertile, that is far away from markets. Nothing has changed in 250 years since Von Thuenen wrote. The price of land (as Henry George noticed) has a lot to do with where the railroad (or metro) is built. The economic value of land still depends on its location, that is, on its convenience to highways, schools, restaurants, theaters, and society generally – its proximity to the amenity of urban living as opposed to what Karl Marx called the idiocy of rural life.[36]

Today, an acre of farmland commands the very highest price if it can be taken out of row crops and planted instead to shopping malls and condominiums. According to the USDA, "survey data indicated that agricultural land with a potential for immediate development (expected land use if sold) was valued at more than $5,700 per acre."[37] To rent a ten-by-five foot parking space in Manhattan, New York, you must pay more than you would pay to rent a hundred acres of good farmland near Manhattan, Kansas.[38] Economic returns to nature from agriculture are negligible, just as Locke thought.

In recent years, prices for land have risen somewhat in response to huge subsidies the government is now beginning to pour into the production of ethanol to be used to supplement petroleum in combustion engines. At this time, as much or nearly as much fossil fuel is required to produce and ship an equivalent amount of energy in the form of ethanol. Accordingly, subsidies to ethanol production buy few returns to the environment.[39] The prospect of genetically engineered microbes capable of converting cellulosic biomass introduces the possibility of converting huge landscapes, now forested, into fast-growing poplar plantations, switchgrass operations, and other novel crops. If agriculture turns from producing comestibles to producing combustibles, the outcome for the environment is anyone's guess.

"Truly *sustainable* agriculture in America's future," an agronomist has written, "will include only the very few forms of agriculture that

are compatible with urban life," such as nurseries and turf farms.[40] This may also include the production of fuels useful for transportation. In 1928, humorist Will Rogers recommended another strategy for making farming sustainable. "I tell you turning your land into a golf course is the salvation of the farmer," he said. "The only thing to do with land now is just to play golf on it. Sell your land and caddie."[41]

THE LAUDERDALE PARADOX

In 1819, James Maitland, Lord Lauderdale, reasoned that any good that nature provides plentifully and freely, no one has any reason to purchase. It cannot fetch a price in a competitive market, even where markets for it exist, and so it has no exchange value – this is, no one can get anything in exchange for it. The result is a paradox. The more freely and lavishly nature benefits us, the lower the price the "marginal" unit of a natural product or service will fetch or, to say the same thing in other words, the less exchange value nature will possess.[42]

Manna from Heaven illustrates Lauderdale's paradox. According to Scripture, enough manna fell from Heaven during the Exodus to provide the Israelites with plenty of bread. Accordingly, no one had a reason to gather or hoard more manna than he or she could consume. The Israelites, the Bible tells us, stored up manna to eat on the Sabbath since none fell on that day. Since everyone could easily acquire as much as he wished without charge, the marginal unit of manna could not command a market price. Manna had no economic value (in the sense of a market price or exchange value) except perhaps on the Sabbath when it did not fall from Heaven (Exodus 16: 23–26).

The principal condition for production, exchange, and therefore economic value, Lauderdale argued, is scarcity. He defended two principles:

1. That things [with desirable qualities] are alone valuable in consequence of . . . existing in a certain degree of scarcity.
2. That the degree of value which every commodity possesses, depends upon the proportion betwixt the quantity of it and the demand for it.[43]

For Lauderdale, "economic value" should be understood in terms of what Adam Smith called "value in exchange" or what can be obtained in exchange for that good. Lauderdale thought that value thus defined can be located at the intersection of supply and demand for the

incremental unit of that good, that is, at its price in a competitive market. Economic theory suggests that competition drives consumer prices down to producer costs. Goods that cost the least to produce – no matter how beneficial they may be to the consumer – will fetch the lowest prices, especially if supply vastly exceeds demand.

Market price or "value in exchange" does not correlate with benefit – however one understands that concept. That you inhaled a lot of air yesterday, for example, does not make the air you breathe any less beneficial today. As long as the air you breathe is abundant and free, however, its price is zero. It lacks value in exchange; that it is beneficial, even exigent, does not determine its price. Benefit does not correlate with price but may even vary inversely with it: for example, the best things in life are free.

Advances in technology, by driving down the production costs of a good, lower its competitive market price. The consumer pays less for his or her next purchase but may obtain the same or a greater benefit. Any phone call may soon be free – the Internet already allows this – and thus it will have no market price. The benefit of a call to 911, to your bookie, or to your broker remains the same. When the antibiotic Cipro lost its patent, generic equivalents appeared at a tenth of the price. The "next" prescription may do just as much good even if it costs ten times less.

Today the music industry is full of fear and loathing because potential consumers are ripping and burning songs for free for which they paid big bucks a few years ago. The entire industry, which once earned billions, may go bankrupt because no one will buy what he or she can acquire gratis. People enjoy the music – now on their iPods – more than ever, but they use the money they spent on music to purchase other things. The price the music fetches in a competitive market is zero; the "value in exchange" is zero; but the benefit is as great as ever. The music industry, of course, cannot stay in business if its product cannot fetch a price – if everyone gets as much as he or she wants for free. Nature can benefit everyone freely, however, without worrying about creating scarcity by policing intellectual and other property rights. It has no operating costs.

THE SUPPLY OF FRESH WATER

Consider a scenario in which Heaven rains manna in huge quantities but does not distribute it in equal amounts everywhere. The price of

manna would vary with its distance from the deposits. This is consistent with the Von Thuenen model in which location is everything. What has value – what is scarce relative to demand – is not the manna, which is superabundant, but either (1) residential real estate close to the sources of manna or (2) the labor and technology needed to transport manna to where it is consumed.

Fresh water is a resource that nature provides through the hydrological cycle in vaster quantities than humanity can use. The sun evaporates water from the oceans, the wind moves the clouds to land, and the distilled water precipitates like manna over the Earth, but in some places more than in others. Overall, humanity uses about 2,100 km^3 of fresh water a year – one-fiftieth of the amount that precipitates over land. The runoff from rain that is accessible – rainwater that is collected behind dams or in lakes, rivers, or aquifers near large human populations – equals slightly more than one-tenth of the total rainfall on land or 12,500 km^3 annually. This provides ten times more water than the average European and three times as much as the average American consumes.[44]

For the residents of New York City, like those of many municipalities, abundant, pure, clean rain water falls like manna from Heaven; it has little "exchange" value. City residents must pay, however, for expensive dams, reservoirs, pipes, and tunnels, in other words, capital improvements, to gather and deliver the water from upstate sources, primarily the Catskill watershed. People who live in the watershed are required (and subsidized) to build septic systems because nature will not treat sewage for them. Since the 1920s, the city has chlorinated its water in part to kill fecal bacteria and other pathogens associated with the fecal wastes produced by 350 vertebrate species that thrive in the Catskill region, including huge populations of deer, beaver, and waterfowl. In the reservoirs, "the background contamination from wildlife populations is apparent."[45]

Let us suppose for a moment that over time the Catskill watershed ecosystem

> became overwhelmed by sewage, industrial and agricultural runoff to the point that the water quality in the city fell below EPA drinking water standards. An economic analysis provided costs of two alternatives for restoring water quality. The cost of purchasing and restoring the watershed so that it could continue to provide the service of purification and filtration was calculated to be $1 billion. The cost of building and maintaining a water purification and filtration plant

was $6–8 billion in capital costs, plus annual operating expenses of $300 million. The City has opted to buy and restore the watershed, i.e., to let nature work for people.[46]

According to this suburban legend, New York City authorities determined that "preserving habitat in the watershed and letting the ecosystem do the work of cleansing the water" was worth the price of buying up land and development rights in the watershed.[47] Accordingly, the city floated a bond issue to "use the proceeds to restore the functioning of the watershed ecosystems responsible for water purification."[48]

If any of this had actually happened, it could offer an example of a willing buyer (New York City) who purchased land or development rights and thus put a market price on an ecosystem service, namely, on the ability of natural habitat and biodiversity to disinfect and purify water.[49] The story is constantly invoked because it provides a clear and compelling example of an economic "return" to nature. That the story represents a fiction or fabrication does not matter because it demonstrates the "correct" academic theory.[50] Thompson has correctly cautioned that the hope that the downstream users of watersheds would bargain to keep those landscapes undeveloped may easily be overestimated. "One should have a healthy dose of skepticism regarding how often water companies, local governments, and other entities will find it worthwhile to preserve watershed lands."[51]

FISH AND FIBER

What about fish captured in the wild? Economists use the concept of resource rent, developed by Ricardo in 1817, to measure the value of fisheries. The rent on a natural resource is the amount left over when the costs of exploiting a resource are deducted from the revenues it brings. In theory, the resource rent approximates the maximum the owner of the resource could charge for its use.[52]

To estimate the resource rent of wild populations of diverse kinds of fish, resource economists typically begin with a model that relates the total costs of exploiting the resource, including a normal return on investment, to the total revenue computed as the dockside price of fish per pound times the number of pounds of fish caught.[53] In this model, the difference between the costs paid and revenue obtained represents the economic value or rent on the resource. When the fishing industry attains profitable levels of effort, new boats will be attracted to the

resource, quickly moving the industry beyond the sustainable yield of the fishery. At this "open access equilibrium point," the total cost coincides with the total revenue and resource rents are dissipated. Governmental financial transfers to the fishing industry (subsidies) push the fishing effort even beyond the open access equilibrium and thus boost the total costs of fishing farther out beyond the point where the catch is worth more than the cost. The point where the costs stand today.

Fisheries experts often lament that "the main problem is that in the process of the expansion of fishing effort, resource rent has been completely dissipated. It has gone to finance the overexpansion of the fishery."[54] At fault are subsidies paid by many nations to support their fishing fleets in competition with the fleets of other nations. In 1999, a representative year, Organization for Economic Cooperation and Development (OECD) countries alone paid about $6 billion to subsidize their commercial fishing fleets. Some nations, such as Finland, paid far more in subsidies than the fish it sold brought in revenues; other countries, such as the United States, paid subsidies in excess of 25 percent of the total revenues.[55] Under these distorted conditions, capture fishing operates at a deficit supported by taxpayers. Potential resource rents are more than dissipated; the natural capital or ecosystem service realizes an economic loss.[56]

Even if the capture fishing industry optimized its effort, whatever resource rent it earned would be ephemeral. Capture fisheries must compete with aquaculture, which offers lower costs, reliable year-round supplies at huge volumes, uniform and consistent quality, just-in-time delivery, traceability, proximity to markets, and virtually every other competitive advantage imaginable. "By the year 2030," according to the Food and Agriculture Organization, "aquaculture will dominate fish supplies and less than half of the fish consumed is likely to originate in capture fisheries."[57] Aquaculture accounts for over a third of the fish humans consume, and over the next two decades, according to the *Washington Post*, fish farming will largely "replace the last commercial food-gathering system based on hunting wild animals."[58]

The future of the fish industry lies with transgenic fish genetically engineered for rapid growth, disease resistance, inexpensive feeds, and table appeal.[59] Genetically engineered varieties are now in development for at least thirty-five commercial species.[60] The next few decades will see a rapid decline in capture fishing as the large fleets of the past are replaced by intensive, biotechnology based, vertically integrated,

closed-system, highly capitalized industrial aquaculture, controlled – as the hog and poultry industries are controlled – by a few multinational corporations. It is hard to see how capture fisheries, already subsidy dependent, can survive competition from aquaculture except in special cases, as when for aesthetic or spiritual reasons people prefer "wild-caught" rather than farmed fish. Where ecosystem services and wild stocks are inexpensive and superabundant, the economic return to nature is negligible. Where they are not, technology quickly develops to capture economic rent by making cheap and inexpensive resource flows, such as genetic information and plentiful organic matter, do the work of more expensive ones.

The transition from hunting and gathering in the wild to plantation-based industry, expected to occur in fisheries over the next two decades, has largely taken place in forestry. According to a report in *Issues in Science and Technology*, "The United States today finds itself in a world of timber surpluses and increasing competition." Industrial tree plantations are rapidly underpricing and out-producing wild forests. "Particularly important has been the expanded use of intensively cultivated, short-rotation tree plantations in temperate and subtropical regions of the Southern Hemisphere. These 'fiber farms' have proved to be extraordinarily productive."[61]

When farming declined, the region east of the Mississippi reforested. In a fine article, nature writer Bill McKibben celebrates the resurrection of the Eastern forests to their pre-Columbian expanse. He quotes a Forest Service official who wrote that the forest of the East and South "has come full circle. By the 1960s and 1970s, the pattern of forest, fields, and pastures was similar to that prior to 1800, its appearance much like it must have been prior to the American Revolution."[62] A survey of fifty nations in the boreal and temperate world found results similar to those of the eastern United States. In the 1990s, the forest biomass in every one of these countries increased.[63]

So much timberland now exists in the United States and so much inexpensive pulp and paper can be shipped in from South America – a 10 percent tariff followed by stiff quotas has reduced the glut of lumber easily imported from Canada – that big firms are selling off their forest holdings to conservation groups, speculators, developers, and individuals. The firms may invest some of the proceeds in high-technology plantation operations in Brazil and other southern nations, where trees can be genetically engineered for quality and growth. In 2004, International

Paper announced its decision to sell off 5.1 million acres of timberland in the United States, an area larger than Massachusetts. In separate deals arranged by the Nature Conservancy and the Conservation Fund, the company sold a million acres for aesthetic preservation.

The demand for forests as objects of love and appreciation seems more robust than the demand for them as sources of timber. "Based on market components," said David Liebetreu, International Paper's vice president for forest resources, ''our forestlands are worth a lot more to other people than they are to us.''[64] According to a newspaper account, urbanites "are looking for play forests and country home sites."[65] The aesthetic properties of a forest make it desirable. A forest appraiser involved in these land transfers opined, "It used to be that timber production was the primary objective for someone buying timberland, but today, recreation and investment is their main motive."[66]

The transition we are seeing from capture fishing to aquaculture and forestry to silviculture is unsurprising. Environmental economists such as John Krutilla had noted decades ago that advancing technology has "compensated quite adequately for the depletion of the higher quality natural resource stocks."[67] If an ecosystem service – such as the provision of wild turkeys – becomes scarce, advances in technology supply substitutes and drive prices down. A hundred million turkeys appear on dining tables on Thanksgiving without anyone firing a shot. It is hard to think of a renewable resource the price of which has increased over the past decades. Krutilla observed that "the traditional concerns of conservation economics – the husbanding of natural resource stocks for the use of future generations – may now be outmoded by advances in technology."[68]

Biotechnology can even create better products at lower prices – wood, for example – than intact natural ecosystems. Transgenic trees offer the same advantages – fast growth, cold-hardiness, uniform and predictable quality, disease resistance – as transgenic fish. According to Roger Sedjo, "High-yield plantation forestry has the potential to meet the world's industrial wood needs while simultaneously protecting existing natural forests and thereby conserving their environmental values."[69]

INSECTS

In his famous "Canticle of the Creatures," St. Francis of Assisis praises God for the work of "Father Sun" and "Sister Moon." One might ask if praising God for the diurnal rotation of the Earth properly "values" this

gift to us. Why not put a "price" on the work of the sun and the moon; why not compute our WTP for the force of gravity that keeps us all from floating off into space? In "St. Louis Blues," Bessie Smith wailed, "I hate to see the evening sun go down." Maybe she did. We would be willing to pay a lot, however, not to see it coming up.

One could not imagine a more fatuous, deluded, and irrelevant pastime than to try to compute the losses that would occur if gravity dwindled in power, the moon no longer lit the night, or the sun refused to shine. Since none of these scarcities is in the cards, it is a waste of time to worry about them. I want to argue that this is generally true of the ecological services to which many environmentalists seek to attach economic values. It serves as little purpose to consider what losses would occur in the absence of the labor of insects, for example, as what losses would occur in the absence of the force of gravity, the sun, microbes, photosynthesis, and so on and on.

Everyone recognizes the "vital ecological services provided by insects."[70] The important or relevant question is whether any of these services is scarce enough – whether the demand for it so exceeds the free supply – that it could conceivably generate a competitive market price.

Consider, first, the pollination of crops, which "is perhaps the best-known ecosystem service performed by insects."[71] To associate an economic value with this service we could try to estimate the price that an incremental unit of it would fetch in a competitive market. To see how this could be done, consider the basic cereal crops: wheat, rice, and maize or corn. These are all wind pollinated. If you take bellows to Kansas and offer to blow pollen around the fields, you will not be hired. There is no demand for additional wind. In this example, pollination has a zero price because there is so much of it anyone can have all he wants for nothing. One cannot overestimate our dependence on the wind – an instance of solar energy – in carrying pollen between plants. The economic value of this service in the sense of competitive market price, however, equals what you could earn with your bellows – nothing.

The same analysis applies to insect pollinators if they function as ubiquitously and freely as the wind. One could as meaningfully try to estimate what society would pay – or how much it would lose – if it had to find some substitute for insects (in insect-pollinated crops) as for wind (in wind-pollinated crops). In a study of the economic value of the ecological services provided by insects, John Losey and Mace Vaughan have written, "We base our estimations of the value of each service on

projections of losses that would accrue if insects were not functioning at their current level."[72] To show how price is relevant, however, one must demonstrate the prospect of scarcity – in other words, the prospect that someone might be interested in purchasing the next or incremental unit of the service. Instead, ecological economists tend to associate value with benefit – and by ignoring the question of scarcity, they abandon any meaningful relation to price.

A good way to determine whether agricultural production is ever limited by the human-caused decline of pollinators is to find out if beekeepers are hired to employ their hives to provide pollination services nature once supplied. The prices beekeepers receive for the pollination services of their bees could be ascribed to the loss of a natural service if, indeed, native or natural pollinator populations had declined. It is extremely difficult to get data, however, that tell what rents may be paid to apiarists to make up for a lost ecosystem service rather than to provide a service nature never supplied.[73] The leading paper in the field notes that even when the local decline of a pollinator has affected production (of blueberries in New Brunswick, for example), "it did not affect the overall market price for blueberries because that was set elsewhere by broader, regional effects." The essay observes bleakly that "the economic impacts of pollinator declines have not been well recorded" and pleads for more data.[74]

Losey and Vaughan point out that dung beetles decompose (often by burying) the waste produced by cattle on the range, "resulting in significant economic value for the cattle industry."[75] They estimate this "economic value" as the losses the industry would incur in the absence of dung beetle activity. No one suggests, however, that dung beetles are becoming scarce. If you set up a stand on a highway in Texas advertising "Dung Beetles for Sale," it is doubtful that anyone would stop but the police. You would do as well with your beetle business in Texas as with your bellows business in Kansas.

In fact, if you permit me to anthropomorphize, I would suggest that the cattle industry pays the beetle for its work. Indeed, the cattle industry has created dung beetle Heaven. Any rancher within the natural range of the beetle can acquire as many as he or she wants or can use by making a direct exchange with the beetle itself. The beetle works for dung. The farmer provides the dung; the beetle provides the decomposition. What's not to like – if you are a dung beetle? You can have a big family. It's the same with the pollinating insects who visit the flowers of fruits, nuts, and vegetables to acquire the nectar or pollen or whatever

it is they seek. They are paid for their work – and supported in vast numbers by the farmer's compensatory planting of crops. Indeed, one could argue that the farmer is just the pollinator's way of making another pollinator.

Ecological economists view the work of the insectivorous classes (along with that of nature's other servitors) as Marxist economists regard the work of the laboring classes. Both the insect worker and the human worker, on this general approach, produce the "surplus" value captured by the agriculturalist or the capitalist, respectively. What is a dollop of dung, a *nosh* of nectar, or a worker's wage in comparison to the value these laborers add to the product of capitalism – the surplus value that accrues to the capitalist but is truly earned by the laboring masses (in this instance, of insects)? The sentimentally appealing but intellectually empty effort to ascribe economic value to nature's services may at bottom constitute little more than the labor theory of value *redivivus*. Marx had a recommendation: the workers of the world should unite to throw off their chains. What recommendation do ecological economists offer the laboring insectivorous classes?

BIODIVERSITY

What about the economic value of biodiversity? Biodiversity represents nature's greatest largess or excess since species appear nearly as numerous as the stars the Drifters admired, except that "scientists have a better understanding of how many stars there are in the galaxy than how many species there are on Earth."[76] Worldwide the variety of biodiversity is effectively infinite; the myriad species of plants and animals, not to mention microbes that are probably more important, apparently exceed our ability to count or identify them. The "next" or "incremental" thousand species taken at random would not fetch a market price because another thousand are immediately available, and another thousand after that. No one has suggested an economic application, moreover, for any of the thousand species listed as threatened in the United States.[77] To defend these species – or the next thousand or the thousand after that – on economic grounds is to trade convincing spiritual, aesthetic, and ethical arguments for bogus, pretextual, and disingenuous economic ones.[78] As David Ehrenfeld has written,

> We do not know how many [plant] species are needed to keep the planet green and healthy, but it seems very unlikely to be anywhere near the more than

quarter of a million we have now. Even a mighty dominant like the American chestnut, extending over half a continent, all but disappeared without bringing the eastern deciduous forest down with it. And if we turn to the invertebrates, the source of nearly all biological diversity, what biologist is willing to find a value – conventional or ecological – for all 600,000-plus species of beetles?[79]

The disappearance in the wild even of agriculturally useful species appears to have no effect on production. The last wild aurochs, the progenitor of dairy and beef cattle, went extinct in Poland in 1742, yet no one believes the beef industry is threatened. The genetic material of crop species is contained in tens of thousands of landraces and cultivars in use – rice is an example – and does not depend on the persistence of wild ancestral types. Genetic engineering can introduce DNA from virtually any species into virtually any other – which allows for the unlimited creation of biodiversity.

A neighbor of mine has collected about 4,000 different species of insects on his two-acre property in Silver Spring, Maryland. These include 500 kinds of Lepidoptera (mostly moths) – half the number another entomologist found at his residence.[80] When you factor in plants and animals, the amount of "backyard biodiversity" in suburbs is astounding and far greater than you can imagine.[81] Biodiversity has no value "at the margin" because nature provides far more of it than anyone could possibly administer. If one kind of moth flies off, you can easily attract hundreds of others.

The price of a building lot in suburban Maryland, where I live, is a function of its proximity to good schools and to Washington, D.C. The thousands of kinds of insects, weeds, and microbes that nature lavishes on the typical suburban lot do not increase its price. No one wants to invest to see if any of these creatures contains a cancer-curing drug, although a raccoon in my attic did test positive for rabies.[82] No one thinks that property values are a function of biodiversity; no one could suppose that a scarcity of critters looms that might create a competitive advantage for housing lots that are more generously endowed with deer, opossums, muskrats, raccoons, birds, or beavers. (A neighbor who has a swimming pool plays unwilling host to a beaver who at night jumps off the diving board into the pool, swims around, and jumps out again.) The astronomical variety of biodiversity is thrown in with every residential acre. Buy an acre or two, and an immense amount of biodiversity is yours for nothing.

OBJECTIONS

To suggest that ecosystem services possess only a negligible "exchange value" or market price is to invite at least the following four objections. First, one may earnestly assert that ecosystems "act to purify air and water, regulate the climate and recycle nutrients and wastes. Without these and many other ecosystem goods and services, life as we know it would not be possible."[83] The team that pegged nature's services at tens of trillions wrote, "The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth's life-support system."[84] Bromides such as these, however edifying, tell us nothing about competitive price or exchange value, which is a measure of scarcity not dependency.

I understand, of course, that when economic development changes a landscape, for example, when a university such as Stanford takes the place of a savanna, some of the ecosystem services the landscape once provided will be lost. No one would suggest, however, that in view of the diminished ecosystem services, the landscape be restored and the offending university removed. What is needed is an example of an ecosystem service that is worth more in market terms than the privately built housing, schools, hospitals, and farms because of which that service diminished or declined.[85]

For example, one could speculate that downstream towns vulnerable to flooding – New Orleans is an example – could conceivably pay farmers upstream to let their lands flood during the rainy season (thus delaying or forgoing planting their crop) to approximate the ecosystem service – in this instance, retaining water – the forests, fields, or wetlands once supplied. This sort of brokering might be worthwhile to attempt at least as an experiment. Researchers have found instances in which towns have purchased land in flood plains to mitigate flooding,[86] although on inspection, these examples may be dubious, in part because of huge financial incentives from the federal government and in part because flooding occurred anyway that might have been prevented by infrastructure such as levees. The literature cites examples, but when one follows the footnotes, one often finds much less there than one might hope.[87]

Consider a second objection to my argument. The Nature Conservancy and other groups raise and spend enormous amounts to acquire and retire for aesthetic and ethical reasons "the last great places," as

the Conservancy calls them. The appreciation of the spiritual, moral, and aesthetic aspects of nature – an obligation to protect undeveloped places – is exactly the kind of commitment environmentalists share and should act on. Aesthetic and moral value, however, is not to be confused with economic value, even though it requires funding. It would be a mistake to say that natural areas have value because people are willing to pay to preserve them – as if WTP were the locus or source of value. Rather, people contribute to organizations like the Conservancy because they recognize the beauty and glory inherent in nature and a duty to protect the aesthetic, moral, historical, and religious value of particular places.

A third objection is obvious. Nothing has been said here about minerals, such as diamonds and gold, which are obviously scarce relative to demand and thus have a high value in exchange. These goods, however, are priced competitively, more or less, and there is little need for government officials to second-guess these markets. The argument here would not apply to diamonds and other minerals, in any case, but to goods associated with the functioning of today's ecosystems, such as clean water. It would not apply to petroleum since it is not supplied by living ecosystems.

Fourth, one may object that the argument presented here extends only to exchange value, competitive market price, or the intersection of supply and demand. If ecosystem services are plentiful and free (like manna) they will have little value at the margin. No way of conceiving "economic value" other than in terms of competitive market price, however, allows one to compare the "marginal utility" of ecosystem services with that of ordinary consumer goods, which are "valued" at competitive market prices. A group of ecological economists has wisely written that the real test "of whether an ecosystem service will facilitate conservation is not whether academics can valuate it, but whether someone – or some organization – is able and willing to do what is necessary to secure it."[88]

Everyone agrees, of course, with platitudes about how dependent we are on Nature's lavish beneficence. Everyone imagines the wonderful time the Drifters enjoyed up on the roof and under the boardwalk down by the sea. Nature plentifully and freely sustains us, comforts us, and inspires us. We recognize that the preservation of the beauty, complexity, and integrity of the natural world represents an aesthetic opportunity, a spiritual duty, and a moral obligation. Large-scale atmospheric

systems, such as those that regulate climate, demand political will for their protection. They cannot be marketed or "priced" at the margin any more than liberty. From the perspective of economic value in the sense of a competitive market price, however, Locke was right. "Nature and the Earth furnished only the almost worthless materials as in themselves."

Chapter 6

Do We Consume Too Much?

A cartoon by Roz Chast in the *New Yorker* depicts two monk-like figures on a street, each carrying a sign. One sign reads: "The End of the World Is at Hand for Religious Reasons." The sign carried by the other declares, "The End of the World Is at Hand for Ecological Reasons." In a recent issue of *Conservation Biology*, David Orr observed "an interesting convergence of views between conservation biologists and religious fundamentalists" because "both agree that things are going to hell in the proverbial handbasket." Yet conservationists and religious fundamentalists (to use Orr's appellation) do not agree entirely. It is only the conservation biologists, at least those Orr identifies, who believe that the end is near. They describe today's booming global economy as Armegeddon – as a "hike through the Book of Revelation."[1]

Many environmentalists believe that the world has entered the "Last Days" or that the Apocalypse looms because they subscribe to the Malthusian theory that as population and consumption increase, resources inevitably diminish and become exhausted.[2] Conservation biologists declare that "whether by climate change, biotic impoverishment, catastrophic pollution, resource wars, emergent diseases, or a combination of several, the end is in sight, although we can quibble about the details and the schedule."[3]

For many decades, these environmentalists have repeated the warning that "human demand is outstripping what nature can supply – even though the great majority of human beings have not even approached the extraordinary American level of resource consumption." They deplore the "human overshoot of the Earth's carrying capacity."[4]

Christians, however, do not generally believe the end is near but that we have an opportunity as well as a responsibility to care for Creation.[5] While environmentalists speak in terms of catastrophe and

collapse – they engage in the rhetoric of survival – Christians continue to emphasize redemption and renewal. In 2005, Richard Cizik, then leader of the 30-million-member National Association of Evangelicals, told the *New York Times*, "There's a certain gloom and doom about environmentalists. They tend to prophecies of doom that don't happen."[6]

OVERCONSUMPTION – ETHICS OR ECONOMICS?

Do we consume too much? To some, the answer is self-evident. If there is only so much food, timber, petroleum, and other material to go around, the more we consume, the less must be available for others. The global economy cannot grow indefinitely on a finite planet. As populations increase and economies expand, natural resources must be depleted; prices will rise, and humanity – especially the poor and future generations at all income levels – will suffer.[7]

Other reasons to suppose we consume too much are less often stated though also widely believed. Of these the simplest – a lesson we learn from our parents and from literature since the Old Testament – may be the best: although we must satisfy basic needs, a good life is not one devoted to amassing material possessions; what we own comes to own us, keeping us from fulfilling commitments that give meaning to life, such as those to family, friends, and faith. The appreciation of nature also deepens our lives. As we consume more, however, we are more likely to transform the natural world, so that less of it will remain for us to learn from, communicate with, and appreciate.

During the nineteenth century preservationists forthrightly gave ethical and spiritual reasons for protecting the natural world. John Muir condemned the "temple destroyers, devotees of ravaging commercialism" who "instead of lifting their eyes to the God of the mountains, lift them to the Almighty dollar."[8] This was not a call for better cost-benefit analysis: Muir described nature not as a commodity but as a companion. Nature is sacred, Muir held, whether or not resources are scarce.

Philosophers such as Emerson and Thoreau thought of nature as full of divinity. Walt Whitman celebrated a leaf of grass as no less than the journeywork of the stars: "After you have exhausted what there is in business, politics, conviviality, love, and so on," he wrote in *Specimen Days*, and "found that none of these finally satisfy, or permanently wear – what remains? Nature remains."[9] These writers thought of nature as a refuge from economic activity, not as a resource for it.

Today many biologists say we are running out of resources and they seek to "price" services ecosystems provide. Predictions of resource scarcity appear objective and scientific, whereas pronouncements that nature is sacred or has intrinsic value can appear embarrassing in a secular society. One might suppose, moreover, that prudential and economic arguments may succeed better than moral or spiritual ones in swaying public policy. This is especially true if the warnings of resource depletion, global famine, and plummeting standards of living are dire enough – and if many scientists vouch for them.

In the 1970s, prominent scientists saw mankind's relationship to the environment as a zero-sum game; they wrote that anything people did – to build houses, schools, or hospitals, to farm, to create new plants and animals, indeed, even to cure disease – was bad for nature, bad for the environment, and thus bad for humanity. The Back Bay in Boston, the Foggy Bottom in Washington, D.C., and hundreds of other masterpieces of architectural design and urban living – virtually anywhere humanity can live decently – has required such actions as the filling of malarial swamps, the clearing of woods, or the damming of rivers – all examples of the degradation of nature. If humanity is defined as distinct from and apart from the natural world, logically every human action disrupts and degrades it. In 1993, a group of fifty-eight of the world's scientific academies issued a statement arguing that humanity and the natural environment are necessarily on a collision course. According to this statement, "Environmental degradation has primarily been a product of our efforts to secure improved standards of food, clothing, shelter, comfort, and recreation for growing numbers of people."[10]

"In an agricultural or technological society," two scientists said in a much-cited article in 1971, "each human has a negative impact on his environment."[11] Progress in knowledge or technology, these authors wrote, had already exhausted the possibility of economies of scale with respect to most resources. Because of the growth of population and affluence, "we are on the diminishing returns part of the most important curves."[12]

Predictions of resource depletion, food scarcity, and falling standards of living, however, may work against our moral principles and intuitions. Consider the responsibility many of us feel to improve the lot of those less fortunate than we. By declaring consumption a zero-sum game, by insisting that what feeds one mouth is taken from another, environmentalists may offer a counsel of despair. Must we abandon the hope that those who are now poor can enjoy better standards of living?

Indeed, the Malthusian proposition that the Earth's population already overwhelms the planet's carrying capacity – an idea associated for forty years with mainstream environmentalist thought – may make us feel guilty but strangely relieves us of responsibility. If there are *too many people* some must go. Why not them?[13]

A different approach, which is consistent with our spiritual commitment to preserve nature and with our moral responsibility to help each other, rejects the apocalyptic narrative of environmentalism. The alternative approach suggests not so much that we consume less but that we invest more. Environmentalists could push for investment in technologies that increase productivity per unit of energy, get more economic output from less material input, recycle waste, provide new sources of power, replace transportation in large part with telecommunication, and move from an industrial to a service economy. Technological advances of these kinds account for the remarkable improvements in living conditions most people in the world have experienced in the last decades – and this was the period over which environmentalists had predicted the steepest declines. They also account for the preservation of nature – for example, the remarkable reforestation of the eastern United States. We have a great distance still to go – but the pockets of oppression and destitution that persist do not prove the impossibility of further progress.

BUST OR BOOM?

In the 1970s, a group of intellectuals, primarily biologists, supported the Malthusian view that humanity had already exceeded the carrying capacity of the Earth. In 1970, Paul Ehrlich predicted that global food shortages would cause 4 billion people to starve to death between 1980 and 1989, 65 million of them in the United States. In *The End of Affluence* (1974), Paul and Anne Ehrlich wrote that "before 1985 mankind will enter a genuine age of scarcity in which many things besides energy will be in short supply." Crucial materials would near depletion during the 1980s, the Ehrlichs predicted, pushing prices out of reach. "Starvation among people will be accompanied by starvation of industries for the materials they require."[14]

These ideas created great excitement – a bandwagon effect – at the time. Ehrlich himself appeared about twenty times on the Johnny Carson show. In a best-selling 1972 study, *The Limits to Growth*, the Club of Rome predicted that the world would effectively run out of gold by

1981, mercury by 1985, tin by 1987, zinc by 1990, petroleum by 1992, and copper, lead, and natural gas by 1993, occasioning drastic price increases.[15] Similar warnings, representing what may have been the scientific consensus of the time, poured forth in widely read studies, including *Small Is Beautiful* (1971), the *Global 2000 Report* (1980), and the annual *State of the World* reports by Lester Brown and the Worldwatch Institute. Apocalyptic pronouncements brought celebrity, prizes, grants, and honors. The direr the prophecy, the higher the lecture fee. Skeptics or "contrarians" were shunned.

The authors of some of these studies have released new books with the same message. Paul Ehrlich's *One with Nineveh* (2004) repeats the warning, according to *Booklist*, that "an escalating human population places ultimately unsustainable demands on the natural resources necessary for survival."[16] Gus Speth, chief author of *Global 2000*, issues the jeremiad in a new version, *Red Sky in the Morning* (2004). In *Limits to Growth: The 30-Year Update* (2004), the Club of Rome team renews its warning "that if a profound correction is not made soon, a crash of some sort is certain. And it will occur within the lifetimes of many who are alive today."[17] In *Plan B: Rescuing a Planet under Stress* (2003), Lester Brown reiterates that "our claims on the earth have become excessive." Unlike the first editions, these "updates" are not best sellers. The environmental best seller at the time was Michael Crichton's *State of Fear,* a diatribe *against* environmentalism. The book describes an Orwellian dystopia that environmentalists create by converting the pursuit of science into the quest for power. These environmental leaders maintain a regime of terror by branding any kind of intellectual honesty, much less dissent, as a betrayal of science and reason.

Why have the "updates" of the warnings of the 1970s not sold as well? The predictions proved far off base. Indeed, researchers had long questioned the apocalyptic narrative. The World Resources Institute, in a 1994–1995 report, referred to "the frequently expressed concern that high levels of consumption will lead to resource depletion and to physical shortages that might limit growth or development opportunity." Examining the evidence, however, the institute said that "the world is not yet running out of most nonrenewable resources and is not likely to, at least in the next few decades."[18] A 1988 report from the Office of Technology Assessment concluded, "The nation's future has probably never been less constrained by the cost of natural resources."[19] Advancing technology and increasing wealth, far from destroying the planet,

helped to clean up the air and water – in the United States to the lowest levels of pollution ever recorded.[20]

Far from vindicating the environmental narrative of inevitable decline and collapse, the last fifty or sixty years have seen a remarkable improvement in standards of living except in those areas, particularly in Africa, in which oppression, corruption, and civil war deprive people of the blessings of technological advance and global prosperity.[21] According to an authoritative report, "Global economic activity increased nearly sevenfold between 1950 and 2000. Despite the population growth . . . average income per person almost doubled during this period."[22] The same report notes that Malthusian fears about global food shortages are unfounded. It notes that

> our ability to provide sufficient food and to do so in increasingly cost-effective ways has been a major human and humanitarian achievement. It is all the more remarkable given that the past 50 years have seen the global population double, adding more mouths to be fed than existed on the planet in 1950. And according to most projections, it appears likely that growing food needs can be met in the foreseeable future.[23]

At the world level, life expectancy at birth has risen from about thirty years a century ago to forty-seven in 1950, fifty-eight in 1975, and sixty-five years today; it is expected to increase to seventy-four years by 2045.[24] Access to clean potable water has also improved globally over the past fifty years although – as with food and longevity – many people lack adequate access to water in nations locked in civil war and plagued with poverty, corruption, and oppression.[25]

The apocalyptic narrative is logically irrefutable – as is any prophecy that is easily postponed. The better things get, the worse they shall become. (In a later chapter, I draw an analogy between today's environmental jeremiads and those issued by seventeenth-century Puritan preachers who railed against the "sweetening" of life in New England and warned of the wrath to come.) The concept of "overshoot" explains away or accommodates any amount of progress – making the apocalyptic prophecy immune to empirical evidence. Paul Ehrlich, when he lost his famous bet with Julian Simon about the price of a basket of minerals (which declined over a decade), dismissed the results. "The bet doesn't mean anything. Julian Simon is like the guy who jumps off the Empire State Building and says how great things are going so far as he passes the 10th floor," Ehrlich said.[26]

The idea that increased consumption will inevitably lead to depletion and scarcity, as often as it is repeated, is mistaken both in principle and in fact. It is based on five misconceptions. The first is that we are running out of nonrenewable resources, such as minerals. The second is that the world will run out of renewable resources, such as food. The third contends that energy resources will soon run out. The fourth misconception argues from the "doubling time" of world population to the conclusion that human bodies will bury the Earth. The fifth misconception supposes the wealthy North exploits the impoverished South. These misconceptions could turn into self-fulfilling prophecies if we believed them – and if we therefore failed to make the kinds of investments and reforms that have improved standards of living in most of the world.

ARE WE RUNNING OUT OF NONRENEWABLE RESOURCES?

While commodity markets are volatile – with petroleum especially sensitive to political conditions – the prices of minerals generally declined between 1980 and the terrorist attack on September 11, 2001. From 1980 to 1990, for example, the prices of resource-based commodities declined (the price of rubber by 40 percent, cement by 40 percent, and coal by almost 50 percent), while reserves of most raw materials increased.[27] They increased because technologies greatly improved exploration and extraction – for example, the use of bacteria to leach metals from low-grade ores. Reserves of resources "are actually functions of technology," one analyst has written. "The more advanced the technology, the more reserves become known and recoverable."[28]

If price is the measure of scarcity, then metals and minerals, with the exception of the politically driven vagaries of petroleum markets, have become more plentiful over the past decades. According to a 2004 World Bank report, the price of its index of minerals and metals (in 1990 dollars) fell from a high close to $160 in 1965 to a low of about $80 – a decline of 50 percent – in 2001.[29] One reason for this persistent decline is that plentiful resources are quickly substituted for those that become scarce and the price of which therefore rises. Analysts speak of an Age of Substitutability and point, for example, to nanotubes, tiny cylinders of carbon whose molecular structure forms fibers a hundred times as strong as steel, at one-sixth the weight.[30] As technologies that use more-abundant resources do the work of those dependent on less-abundant ones – for example, ceramics in place of tungsten, fiber optics in place of

copper wire, aluminum cans in place of tin ones – the demand for and the price of scarce resources decline.

One can easily find prior instances of substitution. During the early nineteenth century whale oil was the preferred fuel for household illumination.[31] A dwindling supply prompted innovations in the lighting industry, including the invention of gas and kerosene lamps and Edison's carbon-filament electric bulb.[32] Whale oil has substitutes, such as electricity and petroleum-based lubricants. Whales are irreplaceable.

The more we learn about materials, the more efficiently we use them. The progress from candles to carbon-filament to tungsten incandescent lamps, for example, decreased the energy required for and the cost of a unit of household lighting by many times. Compact fluorescent lights are four times as efficient as today's incandescent bulbs and last ten to twenty times as long.[33] Comparable energy savings are available in other appliances: refrigerators sold in 1993 were 23 percent more efficient than those sold in 1990 and 65 percent more efficient than those sold in 1980, saving consumers billions in electric bills.[34] Robert Solow, a Nobel laureate, says that if the future is like the past, "there will be prolonged and substantial reductions in natural-resource requirements per unit of real output." He asks, "Why shouldn't the productivity of most natural resources rise more or less steadily through time, like the productivity of labor?"[35]

Amory Lovins, the director of the Rocky Mountain Institute, has described a new generation of ultralight automobiles that could deliver the safety and muscle of today's cars but with far better mileage – four times as much in prototypes and ten times as much in projected models.[36] Since in today's cars only 15 to 20 percent of the fuel's energy reaches the wheels (the rest is lost in the engine and the transmission), and since materials lighter and stronger than steel are available or on the way, no expert questions the feasibility of the high-mileage vehicles Lovins describes.

Computers and cameras are examples of consumer goods getting lighter and smaller as they get better. It is said that some "singing" chips on birthday cards contain more computing power than the massive 1976 Cray supercomputer, which the United States tried to keep out of the hands of the Soviets.[37] Improvements that extend the useful life of objects also save resources. Platinum spark plugs in today's cars last for 100,000 miles, as do "fill-for-life" transmission fluids. On average, cars bought in 1993 have a useful life more than 40 percent longer than those bought in 1970.[38]

A World Resources Institute study measured the "materials intensity" of our economy – that is, "the total material input and the hidden or indirect material flows, including deliberate landscape alterations," required for each dollar of economic output. "The result shows a clearly declining pattern of materials intensity, supporting the conclusion that economic activity is growing somewhat more rapidly than natural resource use."[39] The Organization for Economic Cooperation and Development, an association of the world's industrialized nations, has proposed that its members strive as a long-range goal to decrease their materials intensity by a factor of ten.[40] This is feasible as the world converts from a resource-intensive industrial to an information-driven service economy.[41]

Communication illustrates the trend toward lighter, smaller, less materials-intensive technology. Just as telegraph cables replaced frigates in transmitting messages across the Atlantic and carried more information faster, glass fibers and microwaves have replaced cables – each new technology using less materials but providing greater capacity for sending and receiving information. Areas not yet wired for telephones are expected to leapfrog directly into cellular communications.[42]

Peter Drucker and other management experts argue that any modern economy depends more on the progress of technology than on the exploitation of nature. Although raw materials will always be necessary, knowledge has become the essential factor in the production of goods and services. Of course, no one believes that economic growth – or technological and scientific progress – will automatically lead to environmental improvement. It only provides the means; we must gather the moral, cultural, and political will to pursue the end.[43] "Where there is effective management," Drucker has written, "that is, application of knowledge to knowledge, we can always obtain the other resources."[44] In other words, the limits to knowledge are the limits to growth.

WILL THERE BE ENOUGH FOOD?

A prominent agricultural economist, Gale Johnson, wrote in 2000, "People today have more adequate nutrition than ever before and acquire that nutrition at the lowest cost in all human history, while the world has more people than ever before – not by a little but by a lot."[45] This happened, he argued, because "we have found low-cost and abundant substitutes for natural resources important in the production process."[46] The price of food and feed grains, in real dollars (adjusted for inflation) has declined by half from what it was fifty years ago in international

markets.[47] Contrary to the apocalyptic narrative invoked by many environmentalists,[48] at the global level "soil loss and degradation are not likely to represent a serious constraint on agricultural production." Agronomist Vernon Ruttan notes, "Water and wind erosion estimates are measures of the amount of soil moved from one place to another rather than the soil actually lost."[49]

From 1961 to 1994 global production of food doubled.[50] "The generation of farmers on the land in 1950 was the first in history to double the production of food," the Worldwatch Institute reported. "By 1984, they had outstripped population growth enough to raise per capita grain output an unprecedented 40 percent."[51] From a two-year period ending in 1981 to a two-year period ending in 1990 the real prices of basic foods fell 38 percent on world markets, according to a 1992 United Nations report.[52] In the developing world, the production of food outpaced population growth, almost tripling between 1948–1952 and 1994–1996.[53] In spite of growing populations and increasing average incomes, since 1950, the "real price of food commodities has decreased by 75 percent."[54]

The world produces enough cereals and oilseeds to feed a healthful vegetarian diet adequate in protein and calories to 10 billion people – a billion more than the number at which demographers predict world population will peak later this century.[55] If, however, the idea is to feed 10 billion people not healthful vegetarian diets but the kind of meat-laden, artery-clogging, obesity-causing gluttonous meals that many Americans eat, the production of grains and oilseeds may have to triple – primarily to feed livestock.[56] If that is the goal, the trends are auspicious. Conceivably, if everyone had the money to pay for food at current prices, the world could produce enough beef and donuts to fatten everyone for the slaughter of diabetes, cirrhosis, and heart disease.

Farmers worldwide could double the acreage in production, but this should not be necessary. Increasing productivity will flow from the "agricultural revolution driven by biotechnology – a field that we define as including advanced genetics and genomics, bioinformatics, genetically modified plants, and tissue culture."[57] The Worldwatch Institute points out that "there are vast opportunities for increasing water efficiency" in arid regions, ranging from installing better water-delivery systems to planting drought-resistant crops.[58] "Scientists can help push back the physical frontiers of cropping by developing varieties that are more drought resistant, salt tolerant, and early maturing. The payoff on the first two could be particularly high."[59] Biotechnology introduces "an entirely new stage in humankind's attempts to produce more crops and

plants."[60] The Gene Revolution takes over where the Green Revolution left off. [61]

Before we all head to Morton's to tuck into a double filet mignon, sauce béarnaise – followed quickly by postprandial stupor and a triple-bypass – we should acknowledge three problems for this optimistic account. First, the essential input to agriculture is money. Money is not spread evenly over the Earth; it is concentrated in the wealthier nations. According to the *Millennium Ecosystem Assessment*, "Despite rising food production and falling food prices, more than 850 million people still suffer today from chronic undernourishment."[62] Many of the poorest countries, such as Chad and Congo, possess more than enough excellent agricultural land but lack social organization and investment. Institutional reform – responsible government, peace, the functioning of markets, the provision of educational and health services – in other words, development, is the appropriate response to poverty and therefore malnutrition.[63]

Second, the question of how much land will be used to produce combustibles rather than comestibles – fuel rather than food – is a matter for speculation. As things stand, U.S. government subsidies paid for ethanol, which is produced largely from maize, have boosted production from about 175 million gallons in 1980 to 3.9 billion gallons in 2005. As of 2006, the United States had the capacity to produce 5.4 billion gallons per year of corn-based ethanol; if subsidies remain in place, another 6 billion gallons of capacity already under construction will come online in 2008.[64] The economics are complex, indeed bewildering. Ethanol is more cheaply and efficiently produced from cane than from maize; it is less expensive to bring by ship to New York from canefields in Brazil than by truck from cornfields in Kansas. (To produce and deliver corn-based ethanol often requires the use of a nearly equivalent amount of energy from fossil-based fuels.)[65] The government now pays huge subsidies to cotton farmers, thus closing our markets to cotton produced in less developed countries. If the government paid these farmers to produce cane instead of cotton (the same land is often suitable to both) this might be a sensible (and therefore probably a politically impossible) strategy to improve the well-being of developing countries with cotton to sell and to make the United States more energy self-sufficient.

In 2005, the U.S. Department of Agricuture (USDA) found that switchgrass and other cellulosic crops coupled with genetically engineered microbes to process them could provide a far less expensive and less energy-intensive feedstock than maize for biofuels. The same report

concluded that available farm, forest, and pasture land, while still meeting demand at current prices for food, feed, and export commodities, potentially could yield additionally more than 1.3 billion dry tons per year of biomass, enough to displace more than 30 percent of the nation's current consumption of petroleum.[66] No one can say at this time, however, where the economy and technology of biofuels are headed.

Third, as the *Assessment* observes, "Among industrial countries, and increasingly among developing ones, diet-related risks, mainly associated with overnutrition, in combination with physical inactivity now account for one third of the burden of disease."[67] (By comparison, "worldwide, undernutrition accounted for nearly 10% of the global burden of disease.")[68] To make 9 billion people obese, biotech-based agriculture would have to convert the Earth to a feedlot for human beings. Farmers can now provide a healthful diet for that many people on less acreage than they use today – thus sparing land for nature.[69] In other words, we can spare nature by sparing ourselves.[70]

By locking themselves into the Malthusian rhetoric – by predicting impending worldwide starvation and using the plight of the very poor as evidence of it – environmentalists ignore and even alienate groups who emphasize the quality and safety rather than the abundance of food and who understand that undernutrition represents a local rather than a global problem. The discussion has moved from the question of whether the Earth sets "limits" to the question of how to get wealthy people to eat less and poor people to eat more.[71] Animal rights advocates deplore horrific animal feedlot operations and related factory-farm methods required to overfeed people. Environmentalists have obvious allies in advocates of human development, public health, and animal rights. To have any credibility, however, environmentalists must lose the apocalyptic narrative.

ARE WE RUNNING OUT OF ENERGY?

Probably the most persistent worries about resource scarcity concern energy. "The supply of fuels and other natural resources is becoming the limiting factor constraining the rate of economic growth," a group of experts proclaimed in 1986. They predicted the exhaustion of domestic oil and gas supplies by 2020 and, within a few decades, "major energy shortages as well as food shortages in the world."[72]

In the past few years (as of this writing) a cornucopia of studies has been published with titles like "*Beyond Oil: The View from Hubbert's Peak*;"

"*The End of Oil: On the Edge of a Perilous New World*;" "*Out of Gas: The End of the Age of Oil*;" and "*The Party's Over: Oil, War and the Fate of Industrial Societies*."[73] These books generally work with the current guesstimate that 2 trillion barrels of oil – enough to last eighty years – exist in the ground and could be recovered at something like today's prices.[74] As oil expert Daniel Yergin has written, "fears that the world is running out of oil . . . have recurred since as far back as the 1880s. But global output has actually increased by 60 percent since the 1970s, the last time the world was supposedly running out of oil."[75] The supply of oil is determined by a plethora of market as well as political forces – for example, how much firms invest in discovering new fields, recovering more oil from old ones, and increasing refining capacity.[76] In view of the price changes that can be expected to reduce demand and improve incentives to deliver supply, Yergin summarizes, "the image of the 'peak' should give way to the 'plateau,' – a plateau that, given what is known today, is still several decades away."[77]

The fossil or carbon-based fuel that is most abundant is coal, and some of the largest reserves of it are found in the United States. These will last for more than a century. In this respect, no global shortages of hydrocarbon fuels are in sight. "One sees no immediate danger of 'running out' of energy in a global sense," writes John P. Holdren, a professor at Harvard University. He concludes that "running out of energy resources in any global sense is not what the energy problem is all about."[78]

Holdren is correct. The real energy problem is twofold. First, the burning of hydrocarbon fuels contributes to the threat of global warming and climate change. In 1958, the concentration of carbon dioxide (CO_2) stood at 315 parts per million (ppm). Today, it has reached 380ppm, which is about one-third higher than the historical norm over 400,000 years. Levels of CO_2 are increasing fast enough that in four or five decades, unless something is done, concentrations will be twice as great as historic levels.[79] Since the planetary climate is apparently already changing in response to current CO_2 loadings, many scientists consider the situation urgent. The global energy problem has less to do with depleting resources than with controlling emissions. The narrative of resource depletion and energy starvation that dominated the environmental rhetoric of the 1970s and 1980s has not prepared us well to sieze the opportunities, including clean-coal technology and nuclear energy, available or under development to reduce or limit the release of "greenhouse" gases.

New York Times columnist Thomas L. Friedman has argued that the only way to bring energy efficiency and clean energy production down to prices that China and other developing countries can afford "is by mobilizing free-market capitalism." As a result, environmentalists must cease to identify the enemy as economic growth and as the capitalism that underlies it. According to Friedman, "To a degree, the market is already at work on this project – because some venture capitalists and companies understand that clean-tech is going to be the next great global industry."[80] Rather than thinking in terms of "cutting back," Friedman argues, we must envision "a new cornucopia of abundance for the next generation by inventing a whole new industry."[81]

The second problem has to do with geopolitical stability, in other words, world peace. Friedman observes that oil-rich states tend to be the least democratic – and the wealthier the ruling class gets, the more tyrannical, truculent, obstructive, and dangerous it becomes.[82] The petrocracies destabilize global balances of power while holding oil-dependent states hostage. The deeper problem lies in the possible overreaction or hysteria of politicians in the United States who – incited by fears of running out of oil or of competing for it with China and other developing countries – will engage in military misadventures, confrontations, and hostilities, alienating the rest of the world and undoubtedly fulfilling their own awful prophecies.

While the food problem is best understood as local – giving the very poor access to nutrition – the energy problem is global. The principal concern is not the supply of energy but whether nations, especially the United States, indulge themselves in disasterous quick-fixes, such as trade wars or invasions, or whether they make the long-term investments in technology and efficiency that can make everyone better off while while responding (as well as adapting) to climate change.

Although leading environmentalists have focused on scarcity issues, they also join nearly everyone else in deploring the effects of the consumption of carbon-based fuels on the political as well as atmospheric climate. In an essay I described in the first chapter, Michael Shellenberger and Ted Nordhaus have argued that the environmental community while bewailing these problems has offered virtually no solutions for them.[83] Is this because we environmentalists cannot bring ourselves to accept the possibility that markets can be creative, that competition can lead to innovation? Are we wedded to the rhetoric of the zero-sum game?

When oil prices spiked in the early 1970s as a result of the Arab embargo imposed in response to U.S. foreign policy the economy adjusted. From 1973 to 1986, energy consumption in the United States remained virtually flat while economic production grew by almost 40 percent. Compared with Germany or Japan, this was a poor showing.[84] The Japanese, who tax fuel more heavily than do Americans, use only half as much energy as the United States per unit of economic output. (Japanese environmental regulations are also generally stricter; if anything, this improves the competitiveness of Japanese industry.) The United States wastes hundreds of billions of dollars annually in energy inefficiency. By becoming as energy efficient as Japan, the United States could expand its economy and become more competitive internationally. [85]

To provide leadership and direction – rather than simply reiterate their apocalyptic projections – environmentalists should advocate investment in some mix of power-producing climate-sparing technologies. There is a smorgasbord of suggestions. Mark Jaccard argues that the use of coal – of which there are ample reserves – can be made "sustainable" through the application of gasification techniques that capture and sequester carbon while yielding cleaner forms of energy such as electricity and synthetic fuels. He contends this can be done economically.[86] Amory Lovins, among others, has described commercially available technologies that can "support present or greatly expanded worldwide economic activity while stabilizing global climate – and saving money." He observes that "even very large expansions in population and industrial activity need not be energy-constrained."[87]

Lovins and other experts contend that pollution-free energy from largely untapped sources is available in amounts exceeding our needs.[88] Geothermal energy – which makes use of heat from the Earth's core – is theoretically accessible through drilling technology in the United States in amounts thousands of times as great as the amount of energy contained in domestic coal reserves. Tidal energy is also promising.[89] Analysts who study solar power may agree with Lester Brown that "technologies are ready to begin building a world energy system largely powered by solar resources."[90] In the future these and other renewable energy sources may be harnessed to the nation's system of delivering electricity. Joseph Romm and Charles Curtis have described advances in photovoltaic cells (which convert sunlight into electricity), fuel cells (which convert the hydrogen in fuels directly to electricity and heat, producing virtually no pollution), and wind power. According to these

authors, genetically engineered organisms used to ferment organic matter could, with further research and development, bring down the costs of ethanol and other environmentally friendly "biofuels" to make them competitive with gasoline.[91]

If many opportunities exist for saving energy and curtailing pollution, why have we not seized them? One reason is that low fossil-fuel prices remove incentives for fuel efficiency and for moving to other energy sources. This may change. Another reason is that government subsidies for fossil fuels have amounted to many billions of dollars a year since the 1980s, whereas support for alternatives has dwindled. As prices for petroleum increase, the prospect of progress becomes more plausible. "At heart, the major obstacles standing in the way [of a clean-energy economy] are not technical in nature," the energy consultant Michael Brower has written, "but concern the laws, regulations, incentives, public attitudes, and other factors that make up the energy market."[92]

ARE THERE TOO MANY PEOPLE?

In the 1970s, the population crisis was easy to define and dramatize. The Malthusian logic of exponential growth or "doubling times," so forcefully presented in books such as *The Population Bomb* (1968) and *The Population Explosion* (1990), proved that the "battle to feed all of humanity is over," and analogized the spread of population with cancer. "A cancer is an uncontrolled multiplication of cells; the population explosion is an uncontrolled multiplication of people. . . . The [surgical] operation will demand many apparently brutal and heartless decisions. The pain may be intense. But the disease is so far advanced that only with radical surgery does the patient have a chance of survival."[93]

By emphasizing the exponential mathematics of population growth – as if people were cancerous cells whose reproductive freedom had to be controlled by radical surgery – environmentalists made four mistakes. First, they missed the opportunity to endorse the belief that people should have all – but only – the children they want. The goal of assisting parents worldwide to plan for their children might appeal to "family values" and thus to social conservatives in a way that concerns about "too many people" did not. Efforts to improve the status of women – a key factor in fertility – may enjoy more political support and may be more effective than conventional fertility-control policies.

Second, by inveighing against economic growth – by demanding a small economy for a small Earth – environmentalists alienated potential

allies in the development community. Leading environmentalists explicitly rejected "the hope that development can greatly increase the size of the economic pie and pull many more people out of poverty." This hope expresses "basically a humane idea," Paul Ehrlich wrote, "made insane by the constraints nature places on human activity."[94]

Development economists replied that a no-economic-growth approach in the developing world "will deprive entire populations of access to better living conditions and lead to even more deforestation and land degradation."[95] Amartya Sen among other scholars pointed out that insistence on the Malthusian belief that nature puts narrow constraints on human activity diverts attention from the real causes of malnutrition, namely, poverty and political powerlessness. The Malthusian approach, Sen has argued, leads to complacent optimism because food production at the global level is more than adequate. With such "misleading variables as food output per unit of population, the Malthusian approach profoundly misspecifies the problems facing the poor of the world," which have to do with local conditions not with global constraints. "It is often overlooked that what may be called 'Malthusian optimism' has actually killed millions of people."[96]

Third, by invoking "doubling times" as if that concept could be as meaningfully applied to people as to tumors, environmentalists ignored science and reason, that is, everything demographers knew about the transition then under way to a stable global population. As people move to cities – where children are not needed to do agricultural labor – and as they are assured their children will survive (so they can have fewer), and as the status of women improves, families become smaller. World population growth, which resulted from lower mortality not higher fertility, had been decelerating since the 1950s and dramatically after the 1970s. The United Nations now predicts the global population (the "medium variant" projection) to stabilize at 2050 at 9.1 billion and to peak at 9.2 billion in 2075.[97] Most demographers believe that population will stop increasing during this century and then decline slowly to perhaps 8.4 billion in 2100.[98]

In almost all developed countries today fertility has fallen below 2.1 births and is expected to decline. European women have on average 1.4 births. According to the Population Reference Bureau, as of 2002, fertility fell "below replacement level in 33 less developed countries – mostly in Latin America and the Caribbean and parts of Asia – and is declining steeply in many others."[99] Most people live "in countries or regions in which fertility is below the level of long-run replacement."[100]

Fourth, the environmental community has yet to respond to the principal moral problem that confronts population policy – one that involves longevity not fertility.[101] The number of people sixty years or over will increase from 606 million in 2000 to nearly 1.9 billion by 2050. According to a United Nations report, "By 2050, the number of older persons (60 years and older) in the world will exceed the number of young (under the age of 15) for the first time in history."[102] In several countries, such as Japan, people sixty-five years of age and older already are more numerous than those under fifteen; by 2030, residents sixty-five years and over will outnumber those under fifteen in nearly every developed country – and by a 2:1 ratio in Japan and several European nations. In those countries by 2030 the median age will be fifty-two and grandparents will outnumber grandchildren under eighteen years of age.

Anyone interested in "doubling times" or "exponential growth" may consider the following statistics. Between 1950 and 2000, the number of people sixty years of age and older on the planet tripled; by mid-century, it will triple again to almost 2 billion older persons.[103] In industrialized countries the number of centenarians has doubled every decade since 1950. The UN reports, "The growth rate of those 60 or older will reach 2.8 percent annually in 2025–2030." According to the Population Reference Bureau, "The number of Chinese ages 65 and older is projected to swell from 88 million in 2000 to 199 million in 2025 – and to 349 million in 2050." In many countries, those eighty or over (the "elderly") constitute the fastest-growing segment of the population. In 1900, 374,000 people in the United States had attained the age of eighty; today, 10 million Americans are elderly; by 2030, that number is expected nearly to double, making huge demands on younger workers, whose labor may be needed and incomes taxed to pay for their care.

Environmentalists confront population growth with an entrance strategy, that is, birth control. Bill McKibben's *Maybe One: A Case for Smaller Families* (1999) now sets the pace. Even with one child per couple, however, world population will continue to increase if families reach four, five, or more generations. Environmentalists need to develop an exit strategy. A book with the title *Maybe Eighty: A Case for Shorter Life-Spans* could provide one approach to the question environmentalists must confront.

The problem is no longer Malthus – it's Methuselah. What do environmentalists say about this? Oddly the writers of the 1960s and 1970s in the updated versions of their original studies – published thirty to forty years later – say little. As long as environmental leaders argue there are

"too many people" without suggesting how long a life should last, they seem self-serving. They appear to comprise a vast and growing gerontocracy outraged that younger people whom they may need to take care of them presume to bring their own babies into their world.

DOES THE NORTH EXPLOIT THE SOUTH?

William Reilly, when he served as head of the Environmental Protection Agency in the administration of Bush the elder, encountered a persistent criticism at international meetings on the environment. "The problem for the world's environment is your consumption, not our population," delegates from the developing world told him. Some of these delegates later took Reilly aside. "The North buys too little from the South," they confided. "The real problem is too little demand for our exports."[104]

The delegates who told Reilly that the North consumes too little of what the South produces have a point. "With a few exceptions (notably petroleum)," a report from the World Resources Institute observes, "most of the natural resources consumed in the United States are from domestic sources."[105] Throughout the later decades of the twentieth century, the United States and Canada were the world's leading exporters of raw materials.[106] The United States consistently leads the world in farm exports, running huge agricultural trade surpluses. The share of raw materials used in the North that it buys from the South recently stood at a thirty-year low; industrialized nations trade largely among themselves.[107] The World Resources Institute reported that "the United States is largely self-sufficient in natural resources." Again, excepting petroleum "and a few other industrial minerals, its material flows are almost entirely internal."[108]

Subsidies paid to American farmers add to our budgetary deficits and national debt while making it impossible for producers in developing countries to build their own economies in peaceable ways. According to one reliable estimate, the cost of these subsidies to American consumers and taxpayers "has totalled over $1.7 trillion. The harm to agricultural producers abroad, including many developing countries, does not help U.S. foreign policy."[109] Because of enormous farm subsidies, now defended in the name of energy security or environmental responsibility, the production of corn in the United States reached 10.7 billion bushels in 2006, the second highest yield ever recorded.[110] Much of this product will be pushed on foreign markets or converted into ethanol

that could be less expensively imported from sugarcane fields in Brazil and other tropical countries.

Sugar provides an instructive example of how the North excludes – rather than exploits – the resources of the South. Since 1796 the United States has protected domestic sugarcane against imports.[111] American sugar growers, in part as a reward for large contributions to political campaigns, have long enjoyed a system of quotas and prohibitive tariffs against foreign competition.[112] American consumers paid about three times world prices for sugar in the 1980s, enriching a small cartel of U.S. growers. *Forbes* magazine has estimated that a single family, the Fanjuls, of Palm Beach, reaps more than $65 million a year as a result of quotas for sugar.[113]

The sugar industry in Florida, which is larger than in any other state, makes even less sense environmentally than economically.[114] It depends on a publicly built system of canals, levees, and pumping stations. Fertilizer from the sugarcane fields chokes the Everglades. Sugar growers, under a special exemption from labor laws, import Caribbean laborers to do the grueling and poorly paid work of cutting cane.[115]

As the United States tightened sugar quotas (imports fell from 6.2 to 1.5 million tons annually from 1977 to 1987), the Dominican Republic and other nations with ideal environments for growing cane experienced political turmoil and economic collapse. Many farmers in Latin America, however, did well by switching from sugar to coca, which is processed into cocaine – perhaps the only high-value imported crop for which the United States is not developing a domestic substitute.[116] By importing cane, if in the form of ethanol, the United States could do more than its foreign policy has achieved in stabilizing many societies in the Southern Hemisphere.

Before the Second World War the United States bought 40 percent of its vegetable oils from developing countries. After the war the United States protected its oilseed markets – for example, by establishing price supports for soybeans.[117] Today the United States is a leading exporter of oilseeds, although until recently it imported palm and coconut oils to obtain laurate, an ingredient in soap, shampoo, and detergents. Even this form of "exploitation" may cease. In 1994 farmers in Georgia planted the first commercial crop of a high-laurate canola, genetically engineered by Calgene, a biotechnology firm.[118]

About 100,000 Kenyans make a living on small plots of land growing pyrethrum flowers, the source of a comparatively environmentally safe insecticide of which the United States has been the largest importer.

The U.S. Department of Commerce, however, awarded $1.2 million to a biotechnology firm to engineer pyrethrum genetically. Industrial countries will synthesize pyrethrum and undersell Kenyan farmers.[119]

An article in *Foreign Policy* observed that the biotechnological innovations that create "substitutes for everything from vanilla to cocoa and coffee threaten to eliminate the livelihood of millions of Third World agricultural workers."[120] Vanilla cultured in laboratories costs a fifth as much as vanilla extracted from beans, and thus jeopardizes the livelihood of tens of thousands of vanilla farmers in Madagascar.[121] In the past, farms produced agricultural commodities and factories processed them. In the future, factories may "grow" as well as process many of the most valuable commodities – or the two functions will become one. As one plant scientist has said, "We have to stop thinking of these things as plant cells, and start thinking of them as new microorganisms, with all the potential that implies" – for example, that cells could be made to grow in commercially feasible quantities in laboratories in the North, not fields in the South.[122]

The North not only balks at buying sugar and other crops from developing countries; it also dumps its excess agricultural commodities, especially grain, on them. After the Second World War, American farmers, using price supports left over from the New Deal, produced vast wheat surpluses, which the United States exported at concessionary prices to Europe and then the Third World. These enormous transfers of cereals to the South, institutionalized during the 1950s and 1960s by U.S. food aid, continued during the 1970s and 1980s, as the United States and the European Community vied for markets, each subsidizing agricultural exports.[123]

Grain imports from the United States "created food dependence within two decades in countries which had been mostly self-sufficient in food at the end of World War II," the sociologist Harriet Friedmann has written. Tropical countries soon matched the grain gluts of the North with their own surpluses of cocoa, coffee, tea, bananas, and other commodities. Accordingly, prices for these exports collapsed as early as 1970. The prices of coffee, sugarcane, natural rubber, and cocoa all declined by between 77 and 86 percent between 1980 and 2002.[124] These declines caught developing nations in a scissors. As Friedmann describes it, "One blade was food import dependency. The other blade was declining revenues for traditional exports of tropical crops."[125]

It might be better for the environment if the North exchanged the crops for which it is ecologically suited – wheat, for example – for crops

easily grown in the South, such as coffee, cocoa, palm oil, and tea. Contrary to common belief, these tropical export crops – which grow on trees and bushes, providing canopy and continuous root structures to protect the soil – are less damaging to the soil than are traditional staples such as cereals and root crops.[126] Better markets for tropical crops could help developing nations to employ their rural populations and to protect their natural resources. Allen Hammond, of the World Resources Institute, points out that "if poor nations cannot export anything else, they will export their misery – in the form of drugs, diseases, terrorism, migration, and environmental degradation."[127]

Many of the rural poor, according to the environmental consultant Norman Myers, "have no option but to over-exploit environmental resource stocks in order to survive" – for example, by "increasingly encroaching onto tropical forests among other low-potential lands."[128] Myers observes that the principal agents of tropical deforestation are refugees from civil war and rural poverty, who are forced to eke out a living on marginal lands. According to Myers, slash-and-burn farming by displaced peasants accounts for far more deforestation than all commercial uses of forests combined. Most of the wood from trees harvested in tropical forests – that is, those not cleared for farms – is used locally for fuel. The likeliest path to protecting the rain forest is through economic development that enables peasants to farm efficiently on land better suited to farming than to forest, and to purchase kerosene and other fuels.[129]

These poorest of the poor, Myers has written, "are causing as much natural-resource depletion as the other three billion developing-world people put together."[130] Peasants who try to scratch a living from an inhospitable environment, according to Myers, "are often the principal cause of deforestation, desertification, and soil erosion" and the "extinction of species."[131] These people "can be helped primarily by being brought into the mainstream of sustainable development, with all the basic needs benefits that would supply."[132]

Many environmentalists have argued that economic activity, affluence, and growth automatically lead to resource depletion, environmental deterioration, and ecological collapse. Yet greater productivity and prosperity – which is what economists mean by growth – have become prerequisite for feeding urban pollutions and protecting sensitive ecological systems such as rain forests. Otherwise, destitute people who are unable to buy food and fuel will create pollution and destroy forests. Without economic growth, which also correlates with lower fertility,

the environmental and population problems of the South will only get worse. For impoverished countries facing environmental disaster, economic growth may be the one thing that is sustainable.

WHAT IS WRONG WITH CONSUMPTION?

Any of us who attended college in the 1960s and 1970s took pride in how little we owned. We celebrated our freedom when we could fit all our possessions – mostly a stereo – into the back of a Beetle. Decades later, middle-aged and middle-class, many of us have accumulated an appalling amount of stuff. Piled high with gas grills, lawn mowers, excess furniture, bicycles, children's toys, garden implements, lumber, cinder blocks, ladders, lawn and leaf bags stuffed with memorabilia, and boxes yet to be unpacked from the last move, the two-car garages beside our suburban homes are too full to accommodate the SUV. The quantity of resources, particularly energy, we waste and the quantity of trash we throw away (recycling eases our conscience) add to our consternation.

We are distressed by the suffering of others; the erosion of the ties of community, family, and friendship; and the loss of the beauty and spontaneity of the natural world. These concerns reflect the most traditional and fundamental of American religious and cultural values. Even if predictions of resource depletion and ecological collapse are mistaken, it seems that they should be true to punish us for our success and our sins.

Perhaps a feeling of guilt drives environmentalists to adopt their vision of impending Apocalypse, in the form of imminent resource depletion, starvation, and ecological collapse. In contrast, religious communities – especially mainstream Evangelical and other Christian groups – emphasize stewardship toward the Earth for the very long run.[133] In fact, more than forty major Christian groups, including Evangelicals, today pursue missions they describe as environmental conservation or caring for Creation.[134] A recent *New York Times* headline states, "Evangelical Leaders Swing Influence behind Effort to Combat Global Warming."[135]

If the environmental community joined with mainstream religious groups in preaching a narrative of hope rather than one of futility and imminent demise, the environmental movement would find itself in a better position to work with charitable organizations to relieve the lot of the poorest of the poor. There is a lot of misery worldwide to relieve. As bad as the situation is, however, it is improving, remarkably so in regions where people can be secure in their persons and property,

that is, where they are not victims of crime, war, and corruption. *The Millennium Ecosystem Assessment* summarizes, "The overall global pattern of human well-being, therefore, is one in which aggregate levels are continuing to increase at historical rates, although a large number of individuals appear to be stuck at very low levels of well-being."[136] It adds, "Nations with lower trade barriers, more open economies, and transparent government processes tend to have higher per capita growth rates."[137]

The imposition of a market economy on traditional cultures in the name of development – the idea that everyone can and should always produce and consume more – may create problems as well as opportunities. A market economy may dissolve the ties to family, land, community, and place on which indigenous peoples traditionally rely for their security. Thus projects intended to relieve the poverty of indigenous peoples may, by causing the loss of cultural identity, engender the very powerlessness they aim to remedy. Pope Paul VI, in the encyclical *Populorum Progressio* (1967), described the dilemma confronting indigenous peoples: "either to preserve traditional beliefs and structures and reject social progress; or to embrace foreign technology and foreign culture, and reject ancestral traditions with their wealth of humanism."[138]

The same sort of conundrum confronts wealthy societies. No one has written a better critique of the assault that commerce makes on the quality of our lives than Thoreau provides in *Walden*. We are always in a rush – a "Saint Vitus' dance," as he called it.[139] Idleness is suspect. Americans today spend less time with their families, neighbors, and friends than they did in the 1950s. Juliet B. Schor, an economist at Harvard University, argues that "Americans are literally working themselves to death."[140] A fancy car, video equipment, or a complex computer program can exact a painful cost in the form of maintenance, upgrading, and repair. We are possessed by our possessions; they are often harder to get rid of than to acquire.

That money does not make us happier, once our basic needs are met, is a commonplace overwhelmingly confirmed by sociological evidence. Paul Wachtel, who teaches social psychology at the City University of New York, has concluded that bigger incomes "do not yield an increase in feelings of satisfaction or well-being, at least for populations who are above a poverty or subsistence level."[141] This cannot be explained simply by the fact that people have to work harder to earn more money: as I mentioned in an earlier chapter, even those who hit jackpots in lotteries often report that their lives are not substantially happier as a

result.[142] Well-being depends on health, membership in a community in which one feels secure, friends, faith, family, love, and virtues that money notoriously cannot buy.

Economists in earlier times predicted that wealth would not matter to people once they attained a comfortable standard of living. "In ease of body and peace of mind, all the different ranks of life are nearly upon a level," wrote Adam Smith, the eighteenth-century English advocate of the free market.[143] In the 1930s the British economist John Maynard Keynes argued that after a period of expansion, accumulation of wealth would no longer improve personal well-being.[144] Subsequent economists, however, found that even after much of the industrial world had attained the levels of wealth Keynes thought were sufficient, people still wanted more. From this they inferred that wants are insatiable.[145]

Perhaps this is true. But the insatiability of wants poses a difficulty for standard economic theory, which posits that humanity's single goal is to increase or maximize wealth. If wants increase as fast as income grows, what purpose can wealth serve?[146]

Whether or not economic growth is sustainable, there is little reason to think that once people attain a decent standard of living, continued growth is desirable. Economist Robert H. Nelson wrote that it is no longer possible for most people to believe that economic progress will "solve all the problems of mankind, spiritual as well as material."[147] Environmentalists will not make convincing arguments as long as they frame the debate over sustainability in terms of the physical limits to growth rather than the moral purposes it may serve. Even if technology overcomes the physical limits nature sets on the amount we can produce and consume, it does not automatically create moral, spiritual, or cultural progress. Environmentalists defeat themselves by denying the power of technology to solve problems of economic scarcity. If the debate were couched not in economic but in moral or social terms – if it centered on the values we may serve rather than the resources we may exhaust – environmentalists might more easily win the argument.

MAKING A PLACE FOR NATURE

According to Thoreau, "a man's relation to Nature must come very near to a personal one."[148] For environmentalists in the tradition of Thoreau and John Muir, stewardship is a form of fellowship; although we must use nature, we do not value it primarily for the economic purposes it serves. We take our bearings from the natural world – our sense of

time from its days and seasons, our sense of place from the character of a landscape and the particular plants and animals native to it. An intimacy with nature ends our isolation in the world. We know where we belong, and we can find the way home.

In defending old-growth forests, wetlands, or species, we make our best arguments when we think of nature chiefly in aesthetic and moral terms.[149] Rather than having the courage of our moral and cultural convictions, however, we too often rely on instrumental arguments for protecting nature, in the process attributing to natural objects more economic value than they have. By imputing to an endangered species an economic value or a price much greater than it fetches in a market, we "save the phenomena" for economic theory but do little for the environment. When environmentalists make the prices come out "right" by imputing market demand to aspects of nature that in fact have moral, spiritual, or aesthetic value, they confuse themselves and fail to convince others.

There is no credible argument that all or even most of the species we are concerned about protecting have any economic significance or that they are essential to the functioning of the ecological systems on which we depend. (If whales went extinct, for example, the seas would not fill up with krill.) David Ehrenfeld, a biologist at Rutgers University, points out that the species most likely to be endangered are those the biosphere is least likely to miss. "Many of these species were never common or ecologically influential; by no stretch of the imagination can we make them out to be vital cogs in the ecological machine."[150]

Species may be profoundly important for cultural and spiritual reasons, however. Consider the example of the wild salmon, whose habitat is being destroyed by hydroelectric dams along the Columbia River. Although this loss is unimportant to the economy overall (there is no shortage of farmed salmon), it is of the greatest cultural significance to the Amerindian tribes that have traditionally subsisted on wild salmon, and to the region as a whole. By viewing local flora and fauna as a sacred heritage – by recognizing their intrinsic value – we discover who we are rather than what we want. On moral and cultural grounds society might be justified in making economic sacrifices – removing dams, for example – to protect remnant populations of the Snake River sockeye, even if, as critics complain, hundreds or thousands of dollars are spent for every fish.

Even those plants and animals that do not define places possess enormous intrinsic value and are worth preserving for their own sake. What

gives these creatures value lies in their histories, wonderful in themselves, rather than in any use to which they can be put. Biologist E. O. Wilson elegantly takes up this theme: "Every kind of organism has reached this moment in time by threading one needle after another, throwing up brilliant artifices to survive and reproduce against nearly impossible odds."[151] Every plant or animal evokes not just sympathy but also reverence and wonder in those who know its place, properties, and history.

In *Earth in the Balance* (1992) Al Gore, then a senator, wrote, "We have become so successful at controlling nature that we have lost our connection to it."[152] It is all too easy, Gore wrote, "to regard the earth as a collection of 'resources,' having an intrinsic value no larger than their usefulness at the moment."[153] The question before us is not whether we are going to run out of resources. It is whether the theory of welfare economics is the appropriate context for thinking about environmental policy.

Even John Stuart Mill, one of the principal authors of utilitarian philosophy, recognized that the natural world has great intrinsic and not just instrumental value. More than a century ago, as England lost its last wild places, Mill condemned a world

> with nothing left to the spontaneous activity of nature; with every rood of land brought into cultivation, which is capable of growing food for human beings; every flowery waste or natural pasture ploughed up; all quadrupeds or birds which are not domesticated for man's use exterminated as his rivals for food, every hedgerow or superfluous tree rooted out, and scarcely a place left where a wild shrub or flower could grow without being eradicated as a weed in the name of improved agriculture.[154]

The world has the wealth and the resources to provide everyone the opportunity to live a decent life. We consume too much when market relationships displace the bonds of community, compassion, culture, and place. We consume too much when consumption becomes an end in itself and makes us lose affection and reverence for the natural world.

Chapter 7

Is an Environmental Ethic Compatible with Biological Science?

In 2005 the discovery of an ivory-billed woodpecker *(Campephilus principalis*) caused a national celebration. Donald Kennedy, the editor of *Science* magazine, spoke for millions of others when he testified in an editorial to "the personal excitement and pleasure this discovery has brought me." Kennedy acknowledged that "some will say, 'It's only a bird.'"[1] Why is the survival of this bird or any species – especially a species with no economic use – important? The ivory-billed woodpecker is a product of evolution, that is, random mutation and natural selection. It exists as a result of accident and not of design or purpose. Why does it cast a spell over us?

Scientists had declared the ivory-billed woodpecker extinct. A prominent ecologist had written five years earlier, "Its presence today in the sterile, industrial forestlands of the South, however wonderful a thought, would be as out of place as a buckskin-clad settler with a musket in the streets of modern-day Atlanta."[2] When the woodpecker reappeared, the same ecologist wrote that "those not under the spell of this charismatic species might well wonder what all the fuss is about."[3]

What is all the fuss about? If evolution proceeds without purpose, meaning, design, or direction – if the existence of this or any species is simply an accident that just as well might not have occurred – why should we care about this bird or about any wild creature except insofar as we can find a use for it? If the woodpecker serves no purpose – the economy and the Big Woods survived its apparent absence – why does its reappearance call for national celebration?

THE LURKING INCONSISTENCY

As Herman Daly has observed, biologists who "on Mondays, Wednesdays, and Fridays" propound the purposeless mechanism of natural selection to their students "devote their Tuesdays, Thursdays, and Saturdays to pleading with the U.S. Congress and the public to enact policies to save this or that species." These biologists believe with equal intensity and conviction that the evolution of a species such as the ivory-billed woodpecker is a pointless, unintended accident and that we have a duty to preserve it. According to Daly, these biologists "are in the grip of an inconsistency."[4]

Daly points, in fact, to two different inconsistencies, one metaphysical, the other normative. The metaphysical inconsistency raises the venerable problem of how "free will" or "purpose" could appear except inside of shudder quotes – to indicate that they are merely apparent – in a world of universal causal determinism. According to Daly, if one accepts the neo-Darwinian mechanistic explanation of the origin of the human mind, what we experience as purpose "must, in the view of mechanism, be an 'epiphenomenon' – an illusion which itself was selected for because of the reproductive advantage it helped to confer on those under its influence." Indeed, one can point to prominent evolutionary biologists, such as E. O. Wilson, who have written that free will is an illusion, albeit a useful illusion, because the belief "in free will is biologically adaptive."[5]

Daly argues that if biological science denies the possibility of moral freedom and thus human purpose, conservation biologists cannot consistently advocate policies that are plainly purposive. If, for example, choice and free will are illusory, as Daly believes the neo-Darwinian mechanistic framework presents them, what can it mean to say that humanity can or ought to choose sustainable policies or make any choices in a moral sense? "The purposeful nature of environmental policy is in total contradiction with the purposeless nature of biological science, at least the current neodarwinian orthodoxy."[6]

The normative inconsistency is more vexing. Let us suppose that people can have purposes even if human beings (like other creatures) do not exist as a result of purpose. Let us suppose that because of accidents or contingencies consistent with natural selection, human beings acquired capabilities "that were almost certainly not selected for" but which allowed them "to frame 'purposes' – to do things for reasons or to act with 'free will' – in ways other animals have not."[7] Let us assume

for the sake of argument, in other words, that unlike everything else in nature (as far as we know) human beings mutated in some wondrous way that gave them free will and the power to choose and pursue ends. That humanity chooses and pursues ends, indeed, is evident. The *Guinness Book of Records* describes many projects human beings have freely chosen and successfully undertaken, for example, to pack into a telephone booth as many of themselves as possible and to build the world's largest ice cream cone.

Even if we assume from a metaphysical standpoint that human beings choose and pursue "purposes," however, what could possibly justify from a normative standpoint the particular goal of preserving a species like the ivory-billed woodpecker? The bird, like any other species, represents a mere accident of random mutation and natural selection, that is, a contingent path-dependent event that as well might not have happened. How is saving all sorts of species in order to conserve biodiversity any more justified or obligatory than, say, saving bits of thread to roll the world's largest ball of string, if that is what people choose to do? If nature has no purpose, is it more obligatory or justified to conserve species than matchbook covers or Cabbage Patch Dolls?

Economic, instrumental, or prudential arguments are not relevant to this question, which goes to ethical obligation not economic utility.[8] The economy did just as well when the ivory-billed woodpecker was thought to be extinct; the joy that appropriately greeted its reappearance cannot be explained in economic terms. For the sake of argument, however, let us stipulate (as the lawyers say) that the ivory-billed woodpecker does not harbor any cancer-curing drug and is not a keystone species supporting the stability of an ecosystem. This stipulation would make no difference at all to those who celebrate the rediscovery of the bird and recognize both a moral opportunity and responsibility for its preservation. Its value – obvious and compelling – has nothing to do with any use it may serve.

Daly asserts that the goals of conservation are inconsistent with the assumptions of neo-Darwinian biology for both metaphysical and normative reasons. He argues that neo-Darwinians "assert (a) that choice is an illusion, and (b) that even if it were not illusory, the criteria by which one chooses are arbitrary"[9] He argues that biological science offers conservationists a means but neither a reason nor a justification to protect biodiversity. A justification for all the fuss about the ivory-billed woodpecker must come from elsewhere, but, as Daly suggests,

"neodarwinists do not accept 'elsewhere.'"[10] How can we reconcile, then, neo-Darwinism and conservation?

I shall argue here that easy answers to this question – for example, the idea that God created nature but used the mechanisms of evolution to do so – are completely unsatisfactory.[11] Neo-Darwinians believe species result from accident and contingency and not from design or purpose (however the purpose is achieved). Does value entail or imply purpose? If it does, then neo-Darwinism, by denying purpose in nature, would seem to exclude value (other than economic use) in the natural world.

THE TWO MAGISTERIA

To respond to these questions, many scientists follow philosopher David Hume in drawing a sharp division between facts and values. In 1972 the National Academy of Sciences adopted this position. It resolved that "religion and science are . . . separate and mutually exclusive realms of human thought whose presentation in the same context leads to misunderstanding of both scientific theory and religious belief."[12]

According to this approach, the world of fact, which science studies, excludes discussion of values beyond adherence to those virtues, such as intellectual honesty and willingness to believe one can be wrong, that are essential to inquiry. Biologists who take this position believe they investigate the way the world is but abjure as biologists any claim about the way the world ought to be. As Michael Rosenzweig has written, moral convictions about the value of biodiversity arise outside of biological science. "The words 'good' and 'bad' constitute value judgements and so lie beyond the bounds of science. . . . Were exotic species to reduce diversity by 30%, no ecologist could test whether that loss of species would be a bad thing."[13]

S. J. Gould defends the idea of a wall between science and religion and thus between fact and value. He recognizes, however, that a two-nation or two-magisteria solution, as he calls it, is as problematic as a policy framework for the environment as it is as a peace strategy for the Middle East. "This resolution might remain all neat and clean," he states, "if the nonoverlapping magisteria of science and religion were separated by an extensive no man's land. But, in fact, the two magisteria bump right up against each other, interdigitating in wondrously complex ways along their joint border."[14]

To see the "joint border" Gould describes, consider the defense of the U.S. Endangered Species Act (ESA). After victories in the 1994 election, a group of radical Republicans, in their "Contract with America," introduced into Congress a bill intended to eviscerate the ESA by requiring that it could not be used to protect habitat unless compensation for lost development rights were paid to affected landowners. To the defense of the ESA sprang the Christian Environmental Council of the Evangelical Environmental Network, which issued an "Evangelical Declaration on the Care of Creation." They sent out "environmental starter kits" to 1,200 churches and lobbied those in Congress who drew support from Christian voters. By arguing that every species belongs to God's plan, the religious community kept the ESA intact.[15]

How would the strategy of the two magisteria apply in this case? One might argue that from the perspective of religion, nature constitutes a Chain of Being in which every species embodies God's plan. From the perspective of science, species come and go without design or purpose. Which perspective is correct? Biologists oppose the evangelical Christians who wish to teach Intelligent Design in the public schools. Should they endorse the same groups when – in support of the ESA – they teach the same lesson in Congress? Should conservation biologists have strictured Congress that species like the ivory-billed woodpecker are merely accidents, the results of blind chance, and are not part of any divine purpose or plan? Should they have said the nation has no obligation to preserve biodiversity but should simply satisfy efficiently the arbitrary interests and preferences of individuals? If the ivory-billed woodpecker represents the glory of God, one understands why the editor of *Science* felt so much pleasure and excitement at its rediscovery. Why all the fuss, however, if all the bird represents is a pointless accident of natural history?

THE ENLIGHTENMENT PARADOX

These questions are not new. They were familiar before Darwin, for example, in the writings of materialists, atomists, and mechanists from Lucretius to Hobbes. The scientific advances of the Enlightenment, particularly the physics of Isaac Newton and Robert Boyle, suggested that the causal determinism of nature is not consistent with the possibility of freedom, value, and purpose. According to Boyle, the universe functions like a mechanism, with all causality internal to it, so that one must refer

to one natural fact to explain another. "The whole universe (the soul of man excepted) [is] but *a great Automaton, or self-moving engine*. . . . So that the world being but, as it were, a great piece of clockwork, the naturalist, as such, is but a mechanician."[16]

As this statement suggests, one way to provide a place for value or purpose in a world of causal fact is to make human beings exceptional by asserting they possess souls. The idea of human exceptionalism – the belief that the soul anchors free will in a world of universal causal determinism – provides a metaphysical framework for the "two magisteria" Gould advocates. According to Gould, "The net of science covers the empirical universe: what is it made of (fact) and why does it work this way (theory). The net of religion extends over questions of moral meaning and value."[17]

This division does not make the problem go away. If human beings belong to nature – if the laws of nature apply to us as to everything – we are not free. Nature is all one. There would be no soul, free will, or second magisterium. Questions of meaning and value could not arise because they presuppose a free will – an ability to act independently of causal determinism, that is, outside of nature. One can act responsibly only if one can act freely; if one is caught in the toils of universal determinism and causality, one has no more freedom or choice than a clock or a falling leaf. On the other hand, if human beings have souls and are capable of free will and purpose, why just us? Value, purpose, and meaning may suffuse all nature. "If we are part of nature, then so is purpose," Daly writes; "if purpose is not part of nature then neither, in large part, are we."

The two-magisteria strategy – like the Enlightenment doctrine of human exceptionalism – fails because it requires us to think in a different way about ourselves than the way we think about the rest of the world. From the perspective of natural science, this seems entirely arbitrary. Why say that some special power invested freedom in human beings but that meaningless processes produced the ivory-billed woodpecker? Maybe the bird is closer to God than we. It looks to be. It is impossible without a leap of faith – or without begging the question – to divide the world into different kinds of substance, as the two-magisteria approach implies, so that some things in the universe are endowed with freedom, purpose, meaning, and intrinsic value while others are not.

Darwin did not change the contours of the problem; he only made them more salient. Not only are human beings, as Hobbes and Locke understood, implicated in the causal web that orders all things, but

as Darwin showed there is no dividing or divining point in history at which humanity entered nature. "Man is the result of a purposeless and natural process that did not have him in mind," George Gaylord Simpson explained.[18] Indeed, a purposeless and natural process has nothing in mind. How, then, can nature be normative, that is, worthy of respect and protection?

To account for the normative in evolutionary terms – for example, by telling a just-so story to attribute morality to an evolutionary advantage – is not to explain moral freedom but to explain it away. It is to reduce the feeling or the belief that we are free to a sort of an adaptive deception; it is to suggest that those who are fooled into thinking they are moral beings enjoyed greater reproductive success than those who were free of any such illusion. The belief that morality was adaptive a million years ago, however, does not justify morality today when competing groups of humans – or gene pools – have access to weapons of mass destruction. In a world where nice guys finish last – evolutionists such as Thomas Huxley saw natural selection that way – perhaps the gene pools with big bombs can get an advantage over those with big hearts. If understood or explained as an adaptation, morality functions at best as a vestigial trait, like the appendix or coccyx, we must get rid of (as Nietzsche thought) in order to be really free.

THE FUNDAMENTAL MISTAKE OF NATURAL THEOLOGY

The lurking inconsistency – the problem of thinking of the ivory-billed woodpecker as a meaningless accident in a pointless series of historical contingencies and as a spiritual icon of immense ethical and aesthetic importance – results from an error characteristic of natural theology and from which biologists may not have completely shaken themselves. The mistake is to assume that what is at issue – what we disagree about – concerns God's *causal* connection to the natural world. Once one mistakenly regards the controversy as centered on causality, one has to conclude that, if the religious folks are correct, divine intention directs nature's way. Scientists, in contrast, must argue that miracles do not occur, that God does not intervene in the course of events, and therefore his presence is not felt. Once one poses the value question in terms of God's causal role in nature, if one then denies that role, it is hard to imagine how one could consistently find nature to have value – other than an economic use – and thus why one would care about preserving many species.

The idea that God authored the world – and that God's existence can be proven by the intricacy or perfection of its design – is the belief William Paley popularized in *Natural Theology* (1802), a book Darwin studied, admired, and refuted. The central idea of God's causal responsibility for the organization of the world is much older, of course, and was given a more persuasive and compelling statement a century earlier by John Ray in *The Wisdom of God Manifested in the Works of Creation* (1691). This book – far more than Paley's – influenced American cultural and religious history. It provides a lot of the material on which Cotton Mather (1663–1728) draws in his massive tome, *The Christian Philosopher* (1721), a parade of erudition Mather published in part as an exercise in vanity to show he was worthy of his membership in the Royal Society.[19]

Mather uses the term *philosopher* to mean natural philosopher or scientist; we should understand his title to refer to the Christian scientist. The stated purpose of the book is to demonstrate the harmony between science and religion. Mather introduces the volume by declaring that his book "will demonstrate, that *Philosophy* is no *Enemy*, but a mighty and wondrous *Incentive* to *Religion*" by exhibiting "the Works of the Glorious GOD in the Creation of the World." The argument proceeds by restating the established tenets and findings of science at the time – for example, Newton's Laws of Motion – and then attributing them to divine authorship. "These are Laws of the Great GOD, who formed all things. God is ever to be seen in these Everlasting Ordinances."

Natural theology of this kind, which proves the existence of God by assuming he is the cause of what happens in nature, encountered two devastating problems even in the eighteenth century and long before Darwin. First, if God could operate causally in nature, then one might interpret – as Puritans up through the time of Cotton Mather readily did – every tempest, shipwreck, or drought as a divine warning or retribution. If God intervened in nature, moreover, so might Satan. Cotton Mather, notably in his *Memorable Providences, Relating to Witchcraft and Possessions* (1689) shows how quickly the idea of divine intervention in nature leads to superstition and oppression. In *The Wonders of the Invisible World* (1693), Mather documented the events of the Salem witch trials. Fortunately, by the time of the next generation of Puritans, including Jonathan Edwards, "witchcraft and the preternatural had almost disappeared from clerical attention." Jonathan Edwards and his contemporaries downplayed God's causal role in nature. They regarded as "a

bit of an embarrassment" sermons that "interpreted natural events or objects as providential warnings or punishments."[20]

Yet if God does not intervene in nature, how is his presence seen or known? How can mechanism – the great Automaton, the self-moving engine, or the clockwork Boyle described – allow for purpose? The relentless materialistic logic of the Everlasting Ordinances made it clear to Edwards as well as Newton that once nature operates under its own principles, the designer, if there was one, fades into the *deus ex machina* of the Deists, who abandons the world, or the *deus absconditus* of Luther, who hides himself from it. After God dropped off the universe, he left no forwarding address. The "Everlasting Ordinances" operate in a world without purpose. If God bound himself to these rules, there is nothing he or we can do to change their consequences or their direction.

The proposal that God may have thrown in the mechanisms of evolution before he fled may offer a sop to Creationists but changes nothing. If the universe is ruled by mechanism, it is empty of meaning. We would do better, then, to alter nature for the sake of our need or convenience than to protect it for the sake of its aesthetic or spiritual significance. And we might often do better to design new species – as breeders and biotechnologists – than to preserve old ones. Why else had God placed nature under the "Eternal Ordinances" but to hand over to humanity the role of the great mechanician? Benjamin Franklin quipped that in America "God Almighty is a mechanic," reducing Divinity to a metaphor used to attract immigrants to the tinkering trades.[21]

For Jonathan Edwards as for others the question was, "What role could be left for God to play in a world that runs like clockwork?"[22] It was clear to Edwards that the "Everlasting Ordinances" – as Cotton Mather described the laws of motion – did not explain how God could play a redemptive role in Creation. The argument from design central to natural theology appears not only to be inconsistent with the findings of evolutionary biology but also to be counterproductive from the perspective of religion. By limiting the work of God to issuing the Eternal Ordinances or to setting the mechanisms of nature in initial motion, the argument from design vindicates if anything the materialism of Lucretius and Hobbes.

Evolutionary biologists today miss this crucial point. They never weary of castigating the notion of Intelligent Design – or the argument from design associated with natural theology – as bad science. So it is. To make intellectual progress, I would argue, the important point to

understand is not that Intelligent Design is bad science but – far worse and far more relevant – that it is bad theology.

PROFITS IN THE WILDERNESS

In a much-discussed essay, Lynn White argued in 1967 that "Christianity bears a huge burden of guilt" if today science and technology "are out of control." White wrote that "first, viewed historically, modern science is an extrapolation of natural theology and, second, that modern technology is at least partly to be explained as an Occidental, voluntarist realization of the Christian dogma of man's transcendence of, and rightful mastery over, nature."[23] Lynn White shows that natural theology, insofar as it emphasizes the causal fabric of nature, empowers those who understand its principles to enrich themselves in the name of religion. The causal argument of natural theology, which emphasizes design, gives godlike powers to the technologist who, unlike God, does intervene in the world today – to make nature make money.[24]

The thesis White presented applies nicely to the early generations of Puritans who believed that God – by designing the world according to principles we could discover through the instrument of reason – prepared nature for our use and domination. These Christians believed that "tis naturall Theology, that men should be industrious in naturall Phylosophy." Seventeenth-century Puritanism in this respect brought medieval scholasticism up to date by introducing elements of Baconian and Cartesian science. "A genuine reading of the book of nature," advised a textbook popular in seventeenth-century America, "is ascension to the mind of God, both theoretical and practical."[25]

At the start, Puritans saw no contradiction in the piety that led them to apply the "Everlasting Ordinances" to alter Creation for human convenience. Puritan ministers, such as Increase and Cotton Mather, called upon their followers to use reason to discover for their benefit the principles by which God designed the world. Cotton Mather wrote, "To study the nature and course, and use of all Gods works, is a duty imposed by God on all sorts of men; from the King that sittith on the Throne to the Artificer."[26] It was clear to these preachers that knowledge was power: by understanding the Everlasting Ordinances society could improve nature by domesticating and transforming it for human use.

By the third or fourth generation, however, the rapidity and rapacity with which eighteenth-century Americans cleared land, cut forests,

planted fields, and, in general, applied science and technology to produce wealth caught their ministers off guard. Among other eighteenth-century preachers, Jonathan Edwards fully appreciated the secular tendencies implicit in the empiricism of Newton and Boyle. He denounced his contemporaries' preoccupation with this world – arising from their increasing power over it – and their consequent indifference to the world to come. He found religious meaning in the beauty and sublimity of nature rather than in its mathematical elegance and practical utility. For Edwards, the aesthetic experience, not the scientific investigation, of nature provided the clues, shadows, and images of God's majesty. As Perry Miller wrote, Jonathan Edwards's philosophy was "nothing less than an assertion of the absolute validity of the sensuous."[27]

THE AFFECTIONS OF THE HEART

Puritans, because they followed John Calvin, believed not only that God created the universe but more characteristically that God communicates himself to us in two works, the Bible and the Book of Nature. By arguing that these express religious truth Calvin sought to undermine the authority of the Roman Catholic Church. If God communicates through nature, one can do without scholastic intermediaries. Calvin wrote in *The Institutes of the Christian Religion* (1559) "that in seeking God, the most direct path and the fittest method is, not to attempt with presumptuous curiosity to pry into his essence, . . . but to contemplate him in his works, by which he draws near, becomes familiar, and in a manner communicates himself to us."

Edwards combined (1) the teaching of Calvin that God communicates to us through nature with (2) the doctrine of Locke that perception involves the agreement or correspondence of the ideas in one's mind with their objects the world. Within the Lockean theory of ideas, Edwards reconciled the doctrine of mechanism in Newton and Boyle with the doctrine of redemption in Christianity. He drew a distinction between explanation and communication – the difference between the *causal* and the *expressive* properties of the natural world. This distinction does not depend on theological commitments. One can as well distinguish the descriptive from the expressive qualities of a work of music or art. The aesthetic qualities of an art work, however moving, cannot be reduced to scientific formulas, derived from causal models or principles, or inferred from the conflicting "intentions" interpreters of these works ascribe to their authors.

Edwards distinguished between the faculty of understanding and the faculty of affection – in his most famous analogy, the difference between our ability to describe the physical chemistry of honey and our capacity to experience its sweetness. Within causal explanation (or "speculation" as he wrote) Edwards includes what Gould comprises in the first magisterium – the net of science covering the empirical universe: what is it made of (fact) and why it works this way (theory). By the "sensible," Edwards refers to emotional faculties through which we perceive the moral, affective, and aesthetic properties of the world. "Spiritual understanding consists primarily in a sense of the heart," he wrote, distinguishing it from the kind of understanding at work in empirical science. "Perhaps this distribution of the kinds of our knowledge into Speculative and Sensible, if duly weighed, will be found to be the most important of all."[28]

The idea that one's emotional faculties can function objectively – that they can afford knowledge of the normative properties of the world – is now a familiar theme among contemporary philosophers such as Iris Murdoch.[29] One uses one's faculties of feeling appropriately to perceive and to appreciate the moral and emotional qualities of a person or an event – a tragedy of war, for example, or an act of kindness. Indeed, Murdoch and others in the Aristotelian tradition have argued that by training one's capacity for emotional perception and judgment one increases one's ability to act on the basis of moral knowledge and thus to act freely. The perceptual faculties involved in feeling, these philosophers suggest, when properly trained provide insight into the normative properties of the world and so offer a guide to ethical response and action. To be sure, neither aesthetic nor moral judgment is amenable to scientific proof. It is nonetheless susceptible to criticism, education, improvement, and transforming suggestion.

Edwards defended a pre-Kantian view of nature that distinguished between (1) phenomena that are properly the subject of scientific explanation and of the faculties of understanding and (2) the noumenal order which in a symbolic way presents itself to our capacity for affection. Edwards asserts that "outward creation . . . is so made to represent spiritual things" or to "shadow forth spiritual things."[30] This affection for nature does not itself add to nor contradict biological science, mechanism, or universal causality. A universe which the faculties of understanding perceive as value-neutral and deterministic the emotional faculties may perceive as majestic and beautiful.

A principal problem for this view, of course, is that different people can experience the normative properties of the world differently; for example, each person may respond in his or her own way to the "impulse from the vernal wood" Wordsworth described. This difficulty becomes apparent in the Lockean naïve realism of Emerson who asserted a "radical correspondence between visible things and human thoughts" and believed that "all spiritual facts are represented by natural symbols." Emerson wrote, "Every appearance in nature corresponds to some state of the mind, and that state of the mind can only be described by presenting that natural appearance as its picture." This naïve correspondence theory of truth is worse than solipsistic because the individual disappears entirely: "I become a transparent eyeball. I am nothing. I see all. The currents of Universal Being circulate through me; I am part or particle of God."[31]

Edwards could not possibly endorse this kind of antinomian subjectivity and relativism because he believed that human beings are too mired in sin – error-prone, self-deceived, and ignorant – to "know" God. Edwards recognized, even if Emerson did not, that our affective faculties are partial and impaired. He adopted a neo-Platonic position that allowed us access only to faint "images and shadows of divine things." This sort of restraint, however, does not show that aesthetic judgment is arbitrary. It does show, however, that it is difficult and that it requires the greatest effort to keep one's perception disinterested, that is, free of the influence of the particulars of one's individual life.

For Edwards, the expressive aspects of nature are not easily known – any more than are the expressive aspects of a difficult but profound work of art. In his journal Edwards records his Augustinian effort to separate himself from all the affairs of life – all his worries and ambitions – as he tries to sense in nature faint clues and shadows of spiritual things. Edwards avoided antinomianism by arduously excluding from his attention everything but the particular object in its natural setting. Biologists often give the same kind of disinterested yet passionate attention to the minute particulars of natural history. They must find aesthetic significance in the objects they study – or why else would they study them? The epistemic basis of the affections of the heart depends in part on the effort one makes to exclude everything else but the qualities of the object. Insofar as judgment is disinterested – free of the particular circumstances of the individual – one may plausibly believe it is to that extent not subjective but represents a kind of knowledge.

In a remarkable essay on birding, Jonathan Franzen asks how he can sacrifice all of the pleasures, goods, ambitions, and responsibilities of ordinary life to concentrate on watching birds and adding them to his life list. His answer is as good as one can find: "The only way not to question what I was doing, and why I was doing it, was to do absolutely nothing else." This affection for nature, which is religious in its character though not committed to any theological doctrine, rewards birders by giving them something to think about and to share other than their own lives. According to Franzen, to get into the study of nature was finally to get out of himself. "Only now, when nature had become the place where birds were, did I finally get what all the fuss was about."[32]

THE UNDERLYING SYLLOGISM

The lurking contradiction Daly describes between biological science and a conservation ethic arises because of the following syllogism.

1. Species have no purpose.
2. Whatever has no purpose has no value.
3. Therefore, species have no value.

The assumptions of biological science secure the first premise. God did not create any species as part of a plan. Unlike a fork, which is arranged for a purpose, the ivory-billed woodpecker is a result of accident not design. To be sure, someone might find a use for the bird – to make hats or quill pens, for example. No one would contend, however, that the processes that created the woodpecker had quill pens or feathered hats in mind. In the context of natural history there is no place for purpose or intention.

The second premise is more problematic. It asserts that whatever is created merely by accident rather than by design – whatever is not part of a purpose or plan – has no value. One should acknowledge, of course, that an object however accidental or unintentional might serve some use. We have purposes (to make hats, for example) to which woodpeckers may be put. The first two premises, if true, lead to the conclusion that whatever value nature may have depends on or derives from its consequences for us (i.e., for our preferences or purposes), which may be arbitrary from a normative point of view. This conclusion denies that the value of a species is "intrinsic" in any sense.

From the perspective of an environmental ethic the economic uses of a creature are irrelevant or worse – since economic arguments might favor a sterile industrial forestland over a wilderness, depending on the price of timber. An environmental ethic does not assert that society should preserve natural places and native species just to the extent it is efficient to do so – and should turn them over to loggers or developers when it is not. On the contrary, an environmental ethic (as exemplified by John Muir, for example) asserts that we are obliged to appreciate, respect, and protect the intrinsic properties of nature that are magnificent in themselves and denies that their value depends (as Gifford Pinchot might have argued) only on the economic purposes they may satisfy.

Why must the value of an object, however, depend on purpose – whether the purpose or plan a creator had in mind or the purposes of others who might make some use of it? One might posit just the reverse: to act morally, one may argue, is not to act for a purpose (that is, instrumentally) but simply on principle. The usual example is voting. People who vote in national elections generally understand that their ballot will not decide the outcome – it will have no consequences – but they take the time and trouble to go to the polling place in response to a moral principle or a sense of civic obligation.

At least from a Kantian or deontological perspective, to act ethically – to vote, keep a promise, pay for what one has ordered, or help someone in need – is to respond to principle and not simply or primarily to satisfy a preference. One could say that principled action (in this deontological sense) is purposive (because it is based on a principle one would ascribe as an imperative to anyone in the particular circumstances) but not based on a purpose (because its value does not depend on its consequences). An action would have moral value simply in relation to the principle it exemplifies rather than (as a utilitarian ethic would require) in relation to the uses or goals it may serve.

I propose that aesthetic perception – like moral obligation – opens a gap between value and purpose. If Edwards is correct, the aesthetic value of natural objects consists in part in their power to pull us out of ourselves – to release us from our petty purposes – to put us into communication, in some sense, with a world that is utterly independent of them. (This may be a logical truth, since the "natural" is often defined in the aesthetic sense as the spontaneous or that which humanity does not create or alter.) Aesthetic value in itself, however, cannot command or justify any sort of environmental policy because it attaches to objects – or

to their perceptual characteristics or symbolic significance – and not to actions. It is nevertheless plausible to argue (though beyond the scope of this chapter) that we have a duty to preserve – or at least not casually to destroy – objects of great aesthetic value.

If one adopts a utilitarian or consequentialist morality then one must base value either in the Creator's intention (God's interests or preferences) or in the arbitrary, externally determined, and contingent preferences of individuals. The idea that humanity may be bound by a moral obligation to respect the natural world has no place in a consequentialist morality. If the ivory-billed woodpecker serves no purpose – either for its creator or for those who might make use of it – it can have no value from the perspective of a utilitarian ethic. The "lurking contradiction" Daly locates in conservation biology may result from his own lurking consequentialism.

AESTHETIC VALUE

Let us suppose, then, that value does not entail purpose. If so, human beings may recognize in actions and objects normative properties that do not depend on or imply any purpose (human or divine) in the sense of a goal or an end. Whether or not our perceptual faculties once provided an evolutionary advantage, we may employ them simply for the sake of acquiring knowledge, useful or not. Similarly, our affective faculties, those related to pleasure and pain, which may have had evolutionary origins and advantages, allow us to perceive and appreciate the aesthetic qualities of objects in a disinterested way, for their own sakes, and not for any benefit.

The most familiar example may be the disinterested pleasure we take in great works of poetry, music, and art. If pleasure were the purpose – if it were the source of value – it could be had in a million other ways much more conveniently and at a lower cost. Evolution prepared our pleasure centers for procreation not poetry. Utilitarian philosophers, notably J. S. Mill, distinguish "higher" from "lower" pleasures. Even if there are distinctions to be drawn in the "qualities" not simply in the intensities of pleasures, which I doubt, the important differences among pleasures (or pains) lies not in their qualities but in their appropriateness to their sources or objects. For example, if you take great pleasure in a horrid event, such as the misery of others, this pleasure no matter how "high" its quality does not make the tragedy any better. It only makes you worse.

The "personal excitement and pleasure" Kennedy took in the discovery of the ivory-billed woodpecker was not his purpose or goal; it was not the pleasure or excitement he felt, in other words, that made the discovery valuable for him. Rather, pleasure, excitement, and celebration constitute appropriate responses to aesthetic qualities in nature; otherwise, these feelings may lack merit or worth. We use our emotional faculties – including faculties of pleasure and pain – not to accumulate pleasure but to discern and appreciate aesthetic and normative properties in the world. It is a popular conceit, in any case, that our ability to deploy our faculties of pleasure and pain appropriately rather than just to seek pleasure is what distinguishes us from satyrs and other mythological beasts.

If conservation biologists and others enjoy studying objects in nature, the pleasure they take is not what makes these objects aesthetically valuable. Pleasure when appropriate is the means by which one perceives value. Accordingly pleasure is not the purpose – there is no purpose – in aesthetic experience. This experience is informative; by developing this capacity in ourselves, we come to know and to appreciate more than we did. This is equally true whether we employ our affective faculties to discern the beauty and power of nature or of works of art.

Let us suppose that value does not entail purpose and that humans are able through their affective rather than cognitive faculties to discern normative and aesthetic properties in the natural world. Do these theses help resolve the lurking inconsistency? They would seem to help. Conservation biologists could affirm that as neo-Darwinian evolutionists they understand that the living world is the result of accident not design; as feeling and emotional beings they recognize compelling aesthetic qualities in nature as well as their moral responsibility and free will as human beings. No one can prove that a painting is beautiful; aesthetic value cannot be demonstrated by or reduced to scientific principles. It is no different with the aesthetic properties of nature. These exist as objects of affective judgment which may be shared but not as objects of scientific understanding. As Rosenzweig wrote, no ecologist could test whether the loss of a species is a bad thing.

IS THERE A COMMON GROUND?

I have argued here for a "two faculties" rather than a "two magisteria" view of the relation between science and religion. In this argument, I have relied on a straightforward reading of the Calvinist distinction

between explanation (understanding of the mechanism of nature) and communication (appreciation of aesthetic and spiritual qualities in nature). This distinction, as elaborated by Edwards in terms of the speculative and the sensible in the context of Lockean epistemology, has an impeccable theological provenance. Might it provide a common ground for uniting conservation biologists with evangelical and other religious groups to form a political constituency in support of the Endangered Species Act and other significant environmental policies?

This approach has three advantages. First, one can ignore as jejune the argument associated with natural theology that the design of nature proves the existence of God. Differences in opinion about a God that may long ago have been an efficient cause – the *deus ex machina* and *deus absconditus* – are not relevant to environmental policy or possibly even to theology. Asking whether God designed nature (and what mechanisms he may have used) is like asking whether the Bard of Avon wrote the works of Shakespeare. It is a historical question of antiquarian interest. The dramas and sonnets might have been written by the proverbial million monkeys tapping randomly at keyboards; the greatness of *Hamlet* and *Lear* would not change.[33]

Whether or not God created the world, conservation biologists and faith communities may agree that subsequent events are to be explained by natural not supernatural causes. That nature is subject to scientific principles – the Everlasting Ordinances, for example – is a proposition many religious groups accept. That nature is expressive – that one can and should approach it with aesthetic feeling not simply scientific understanding – is a thesis congenial to both evangelical Christians and conservation biologists.

Second, conservation biologists should understand that they have little to tell many Christians about the lowly and insignificant place humanity occupies in the scheme of things. No tract will ever beat Edwards's "Sinners in the Hands of an Angry God" in detailing how loathsome and despicable humanity appears in God's sight. In his theological writings Edwards is clear that God could not possibly have created the world on our behalf or for our benefit, for that would make him our servant rather than the other way round. "God cannot so properly be said to make the creature his end."[34] Edwards quotes passage after passage of Scripture to show that God created the world to express his own glory and not for our sake. This Protestant theologian – and no better exists – would agree with George Gaylord Simpson

that ultimately man is a result of a "process that did not have him in mind."

Third, our laws, institutions, and habits of mind – everything on which our social order relies for justification – depend on the belief that a moral difference between right and wrong exists and that human beings are able and obliged to act on this difference. Evolutionary biology must either make room for this belief – and for the notion of free will it entails – or lose its credibility.[35] For example, if moral decisions and judgments were illusory, biologists would be well advised to plagiarize, falsify data, destroy evidence, and do whatever else it takes advance their careers. The virtues of scientific inquiry make no sense other than in the broader context of free will and moral obligation. Neo-Darwinians do not dissolve or dispose of moral imperatives – they only make themselves ridiculous – by spinning just-so stories that "explain" moral freedom or responsibility as a once-adaptive but now incapacitating mutation, like sickle-cell disease.

The approach suggested here offers a way to reconcile neo-Darwinism with the fact of human freedom. Biologists may pursue a deterministic and thus predictive account of human action although they may never succeed in finding it. On this side of the phenomena scientific explanation must suffice. However, in our aesthetic experience – Kennedy and the ivory-billed woodpecker come to mind – we apprehend in nature normative properties that are not implicated in the causal net of science but which are objects of shared experience and discovery nonetheless.

The advances of natural science, from Newton on, show us that the natural world is amazingly well constructed for the purposes of our understanding or for what Edwards called our speculative faculties. There is no reason that this should be so – that nature should be governed so mathematically, for example – but it is so. One can also argue that nature is beautifully constructed for our aesthetic faculties or for what Edwards called the dispositions and affections of the heart. The delight both biological scientists and evangelical Christians – along with many others – have taken in the announced discovery of the ivory-billed woodpecker attests to this.

It is hard to know what to make, however, of our ability to perceive in nature aesthetic qualities or properties that appear entirely normative, to play no causal role, and (unlike epiphenomena) to resist explanation by or reduction to causes. In the *Birth of Tragedy*, Nietzsche wrote that

"it is only as an aesthetic phenomenon that existence and the world are eternally justified."[36] Jonathan Edwards (in the pre-Kantian reading given to him here) and later Immanuel Kant thought otherwise. Aesthetic experience takes us to the other side of the phenomena – to what Kant called the noumena – where the moral and the aesthetic have a common root.

Chapter 8

Settling America *or* the Concept of Place in Environmental Ethics

According to an ancient story, a tourist marveled at the creeping bent and bluegrass lawns of Oxford, England. He asked a passing groundskeeper for the secret. The groundskeeper replied, "First you level it and seed it and water it; then you roll it for about 800 years – and there you are."[1]

Like many stories that have the advantage of not being true – a cool climate and good soil conditions deserve the credit – this one points to an important cultural lesson. Europeans tend to perceive the natural as part of their cultural heritage whether in the meticulously kept lawns of Oxford, in the grazed hills of the Lake District in Cumbria, in the well-kept 865 hectares of the Bois de Boulogne near the western edge of Paris, or in the sedulously managed Black Forest in southwest Germany. Europeans believe that to cultivate nature – tending it as farms, vineyards, even lawns – is to respect, know, and revere it. As Simon Schama has argued, landscapes dominated by culture, such as urban streams and city parks, "have always made room for the sacredness of nature." Domestication may express "not the repudiation, but the veneration, of nature."[2]

For many American environmentalists, in contrast, nature and culture appear to be separate things, so that to domesticate, cultivate, or manage a wild landscape is to turn it from the sacred to the profane. Nature qua nature must not be managed but follow its spontaneous course. Bill McKibben has written in *The End of Nature*,

> What happens in here I control; what happens out there has always been the work of some independent force. . . . In our modern minds nature and humanity are separate things. It is this separate nature I am talking about when I use the word – nature.[3]

Are nature and humanity separate things? Do they respond to different forces, obey different rules, or follow different directions? If they do, it would be meaningful to say that humanity can disrupt the workings of nature, trammel the community of its life, or deflect it from its normal course.[4] If on the other hand one considers human beings simply as one species among many, their activity could no more than that of beavers or bears disturb the ecosystem or push nature off its chosen or appropriate path. In that event, humanity cannot escape complicity or participation in nature; everything is both cultural and natural.

Thoreau engaged this question when he wondered (in the Bean Field chapter of *Walden*) if there is any real difference between a weed and a cultivated plant – or if he merely made "invidious distinctions with his hoe." To discriminate between the wild and the cultivated, Thoreau answered, is to respond to values not facts. "These beans have results which are not harvested by me. Do they not grow for woodchucks partly?"[5]

THE CONCEPT OF PLACE

In 1864, Vermont naturalist George Perkins Marsh in his classic study *Man and Nature* cast nature as the "earthly home" of human beings, thereby including all humanity in a global community.[6] Marsh understood that if there is any response to scarcity, it has to be found in technology. He saw that "the multiplying population and impoverished resources of the globe demand new triumphs of mind over matter."[7] Yet, while technology may supplement nature, it should not separate us from nature. Nature must remain normative. Liberty Hyde Bailey, the great Cornell horticulturalist, took up this theme early in the twentieth century. He remarked, "We shall conceive of the earth, which is the common habitation, as inviolable. One does not act rightly towards one's fellows if one does not know how to act rightly toward the earth."[8]

A. Nature versus the Environment

What is it, then, to "act rightly toward the earth"? The answer depends most of all on what we mean by the "earth." We might refer either (1) to nature apart from humanity or (2) to the environment including the structure imposed by human beings. If we mean nature in the first sense, i.e., Creation, then we think of the Earth as the world excluding us – the

world insofar as it is not affected by human activity. Treating the Earth rightly may then entail leaving it alone. We may value nature, then, not because of the good it does us but because it is good in itself – a good it may possess because of its divine provenance.

On the other hand, we may think of the Earth as our environment, in other words, as our life-support system and as the material basis for economic activity. In that context, to act rightly toward the Earth is to allocate resources efficiently. The point of environmental policy would not be to protect nature for its own sake but to maximize the long-run benefits nature offers humankind. The appropriate principle is no longer reverence but sustainability – the maximization of human welfare over the very long run.

These two principles – reverence for nature and the efficient long-run utilization of its resources – characterize two different approaches to environmentalism. Along these lines, it is customary to distinguish the preservation movement, which sought to protect nature for its own sake, from the conservation movement, which sought to manage nature to increase the benefits it provides.[9] These two traditions have run their courses; neither seems relevant to the problems we have to solve. Indeed, the concepts of *Nature* and of *the environment* both fail to capture what we value in nature and what we wish to create and protect in the environment.

B. America on the Move

Much of what we deplore about the human subversion of nature – and fear about the destruction of the environment – has to do with the loss of places we keep in shared memory and cherish with instinctive and collective loyalty. It has to do with a loss of diversity and paradoxically an attendant loss of identity. The diversity of places allows us to distinguish one from another and so tell where we are. We find security when we rely on the characteristic aspects of places and communities we know well. The concept of place mediates between the ideas of nature and of the environment and captures what may be most important in each.

What may worry us most is the prospect of becoming strangers in our own land, of never quite settling into it, of being no more at home here than anywhere. The prospect that a person of European, African, or Asian descent, no matter for how many generations in this country, can never be native to it – never become a "native American" – must

be an unsettling one. It commits people forever to the vagrancy of the frontier, to a footloose and pioneering spirit that strikes a claim and then moves on.

What Gertrude Stein is reputed to have said about her birthplace, Oakland – "There's no there there" – she later applied to America as a whole: "Conceive of a space that is filled with moving."[10] Our politicians promise to "get America moving again," but Americans are always on the move. "We are in urgent need of understanding places before we lose them, of learning how to see them and to take possession of them."[11] We take possession of places by being possessed by them and by their history – and not simply by trying to absolve ourselves of history, as Americans are wont to try to do. Our environment erodes because we do not set roots in it.

The heroes and antiheroes of our literature – Natty Bumppo, Wild Bill Hickok, Ahab, Huck Finn, Jay Gatsby, and the Lone Ranger – exemplify freedom and autonomy. None of them stay put very long; they are always going from rather than to; they seem forever on the lam. Our environmental crisis is a result of our constant motion – our national St. Vitus' Dance, as Thoreau called it. Wallace Stegner concludes:

> American individualism, much celebrated and cherished, has developed without essential corrective, which is belonging. Freedom, when found, can turn out to be airless and unsustaining. Especially in the West, what we have instead of place is space. Place is more than half memory, shared memory. Rarely do Westerners stay long enough to share much of anything."[12]

C. Place and Placelessness

Commentators tell us that Americans lack a sense of or affection for places: they do not settle anywhere, but move on, always going to somewhere or something new. The historian Frederick Jackson Turner predicated the development of the American national character on the existence of the frontier – "an area of free land, its continuous recession, and the advance of American settlement westward."[13] The mobile home, the chain store, the fast-food stand, and the commercial strip turn placelessness into a way of life.[14] "In this country, at this moment," writes artist Alan Gussow, "we are very conscious of man as a violator of his environment, a destroyer of the earth's lovely places."[15]

Placelessness and transience triumph in uniformity – the replication everywhere of the standardized surroundings from which one has just fled. This is not just America's problem: it is worldwide. Global unity,

we are told, presages global uniformity. Local cultures cannot stand up to forces unleashed by the global economy: "forces that demand integration and uniformity and that mesmerize the world with fast music, fast computers, and fast food – with MTV, Macintosh, and McDonald's, pressing nations into one commercially homogeneous global network: one McWorld tied together by technology, ecology, communications, and commerce."[16]

The term "McWorld" is novel, but the thought is old. Consider this statement:

> Variety is disappearing from the human race; the same ways of acting, thinking, and feeling are to be met with all over the world. This is not only because nations work more upon each other and copy each other more faithfully, but as the men of each country relinquish more and more the peculiar opinions and feelings of a caste, profession, or a family, they . . . become more alike, even without having imitated each other.[17]

In this way, Alexis de Tocqueville described in 1830 the effect of democracy on diversity. He thus anticipated the analytic argument Karl Polanyi offered in *The Great Transformation* a little more than a century later. Polanyi understood production as an interaction between mankind and nature; he conceived economic liberalism in terms of a self-regulating system of barter and exchange. For Polanyi, this system of global markets dissolves the connection between productivity and place, that is, between the economy and the characteristics of local communities. Once humanity in the form of labor and nature in the form of land became subject to price, such as wages and rents, they had to conform themselves to markets rather than markets to them. The forces of production and consumption wear down the particularities of places and the differences among communities; they relate supply and demand in one abstract universal system of exchange.

The story Polanyi told in his famous book is now a familiar one. When labor and land were separated from ways of life and subjected to the laws of supply and demand, the atomistic or granular competition of individuals supplanted organic relations between human communities and their natural surroundings.[18] Polanyi continues:

> Such a scheme of destruction was best served by the application of the principle of freedom of contract. In practice this meant that the non-contractual organizations of kinship, neighborhood, profession, and creed were to be liquidated since they claimed the allegiance of the individual and thus restrained his freedom. To represent this principle as one of non-interference, as economic

liberals are wont to do, was merely the expression of an ingrained prejudice in favor of a definite kind of interference, namely, such as would destroy non-contractual relations between individuals and prevent their spontaneous reformation.[19]

What is remarkable about this passage is Polanyi's ability to identify the root philosophical contradiction – one that arises within liberal political theory – that makes us at once pursue and yet deplore the destruction of the organic connection between productivity and place. Liberals seek to strengthen that connection in the name of protecting diversity, that is, by supporting the ability of many different religious and ethnic communities to maintain their ties to particular places and ways of life. Yet liberals, by emphasizing the freedom of individuals to make their own bargains in markets that are open on the same terms to all, also embrace an ideal of "arms length" autonomy that undermines traditional social relationships essential to cultural diversity.[20] The ideals of freedom and autonomy conflict with those of diversity and community – and in America this conflict underlies our St. Vitus' dance. The conflict between the autonomy of the individual and the sustainability of a given community – obvious in education, family, and health policy – affects environmental policy as well.

D. Nature Is Not a Place

The concept of place is distinct from that of Nature, insofar as places are cultural artifacts and Nature exists as an iconic abstraction apart from culture and in distinction to it. The Romantic imagination, which interpreted Nature as a book of divinely authored moral messages and symbols, never counted the ways it is useful to mankind. It never took the natural environment so neat or at so short a range. Unlike Thoreau, who always wrote of the concrete and particular when describing the natural world, Emerson invoked the abstract and the universal. The Transcendentalist, he wrote, "does not deny the sensuous fact . . . ; but he will not see that alone." Instead, the Transcendentalist looks to the other side of phenomena or looks behind them to the spiritual lessons they teach. Thus, riding the Chautauqua circuit, Ralph Waldo Emerson gave well-attended lectures on the concept of Nature – and only in the aspect of a lecture topic did he look to the natural world for anything as ordinary as a living.

Emerson fixed his attention not on "the world piece by piece, as the sun, the moon, the animal, the tree; but the whole, of which these are the shining parts."[21] Against this kind of holism, we appreciate Thoreau's wonderful oxymoron – he traveled widely in Concord. "The old coat that I wear is Concord," Thoreau wrote to a friend in New Bedford, "it is my morning robe and my studygown, my working dress and suit of ceremony, and my night-gown after all."[22] Thoreau's insistence on fronting particular facts – on finding nature in himself rather than vice versa – has served us better than Emerson's penchant for dissolving particulars in the breath of abstractions and universals. It has provided an American template for a sense of place.[23]

In his eulogy for Thoreau, Emerson chided him because he did not – as he might have done – build cities as the "head of American engineers." Thoreau did something more important: he created memories that tied people to places, in this instance, by leading children as "the captain of a huckleberry-party."[24]

E. The Environment Is Not a Place

The concepts of environment and place are far from interchangeable, and the differences in their meanings are profound. Consider, for example, the planetary support systems we threaten by putting too much carbon dioxide and other "greenhouse" gases into the air. We sometimes speak as if the planet itself had a respiratory system, as if its biospheric organs were continuous with our own lungs, kidneys, or livers. We may view the environment in this way as if it were plumbing; we bother ourselves about it as we do about our own health, when we think it needs repair. The environment in this sense is not a place or even a collection of places; rather it constitutes a sort of global infrastructure.

Alan Gussow points out:

> There is a great deal of talk these days about saving the environment. We must, for the environment sustains our bodies. But as humans we also require support for our spirits, and this is what certain kinds of places provide. The catalyst that converts any physical location . . . into a place, is the process of experiencing deeply. A place is a piece of the whole environment that has been claimed by feelings.[25]

If we turn from the planetary to the local environment, then we think more in terms of natural resources than of biospheric systems. In the

past, nearby natural resources defined places. Consider, for example, fishing and watermen communities. The whaling villages of New Bedford and Nantucket, as Melville describes them in *Moby Dick*, once created a powerful sense of community and of place, even though those who frequented them were voyagers. Plainly, the character of these places had everything to do with a particular natural resource, namely, whales or fish, and therefore with the relationship between these communities and the natural environment.

The demise of the whaling industry illustrates the problem communities face in preserving the ways of life that depend on their proximity to natural resources. The problem that threatens these communities is often not that resources run out; rather, the problem is that advancing technologies either glut or otherwise transform markets. The market for whale oil, for example, is not what it was. This is not because of a shortage of whales – a failure to manage the stock on a sustainable basis – but because of the availability of cheaper and more efficient forms of energy for illumination.

The fishing industry of New England – like the whaling industry before it – may be displaced by technological inventions elsewhere, whether by fish factories like those that now fabricate chickens, or by the direct culture of fish tissue in vitro. This industry will then go the way of every other in New England, for example, the textile industry, a victim not of the poor management of resources but of technological change. The rivers that once powered the mighty textile industry in Lowell, Fall River, and Pawtucket have not dried up, though the industry has; in search of cheap labor it went to the South and then abroad. The southern New England farms that once fed Boston and Providence have reverted to woods or been planted to split levels and condominiums. This has not caused food shortages. Fish farms in Louisiana and Idaho run in catfish and trout. Vegetables of all kinds arrive year-round from California, Florida, Ecuador, and Chile. Clothing piles up from Malaysia and China. Real estate has become expensive; standards of living have improved; the resource-based industries of New England, however, have diminished.

How, then, have the people and communities of New England maintained themselves? How do families still live in them? New England remains sustainable – though few of its nature-based industries have lasted in place. How is this possible? Not many New Englanders farm or fish commercially. How has the population grown and survived?

These communities have survived because their cultural and social institutions proved sustaining and sustainable – churches, schools and universities, town meetings, libraries, governments, families, and all kinds of associations. While these have kept up with the times, the basic structures and philosophies underlying them may not have changed very much in 250 years. They still emphasize respect for autonomy and diversity – balancing the rights of individuality and the strengths of community.

If you want to understand what makes the economic use of environmental resources sustainable – if you want to know how places survive the vagaries of the global market – then look to the relationships, cultural and political, of the people in them. Look for affection not for efficiency as the trait with which people treat their surroundings. Where family and community ties are strong, where shared memories and commitments root citizens to places, people can adapt to changing conditions, and they will do so in ways that respect nature and conserve the environment.

F. Places Exist in the Memory and in the Mind

One way to illustrate the difference between the Emerson's Romantic sense of Nature and the concept of place would be to contrast the currents of Universal Being, which Emerson describes, with those of the Mississippi River, which can be much more problematical, especially if you are hauling a load of pig iron. The useful knowledge of the currents the river pilot acquires does not come by way of moral transcendence or, for that matter, by way of scientific inference. It comes from practice – from achieving a practical harmony between one's purposes and the idiosyncrasies of the river.

In Mark Twain's *Life on the Mississippi*, Horace Bixby, a steamer pilot, tells his trainee: "There's only one way to be a pilot, and that is to get this entire river by heart. You have to know it just like A B C." Bixby adds that piloting is not an empirical science: it contains little that can be inferred from instruments or written up in formulas. As a collection of empirical phenomena, the river has no shape; it is Heracitean. When the trainee complains that there are too many facts to learn about piloting, Bixby replies: "No! You only learn the shape of the river; and you learn it with such absolute certainty that you can always steer by the shape that's in your head; and never mind the one that's before your eyes."[26]

An engineer and a hydrologist may study the river scientifically, but this would not make them good pilots. On the contrary, their studies support efforts to straighten the river or to control water flows, thereby making good piloting less necessary. The painter and poet also describe the river, but the beauty they see is lost on the pilot. The pilot may ignore the magnificence of the landscape; his attention is fixed on minute telltale particulars to which he responds. Tourists on board also see the river in their own way – as a spectacle. They have no memories to bring back to it; they have not learned it by heart.

Mark Twain illustrates two approaches to nature – one as place, the other as spectacle – by contrasting the ways the pilot and the passengers experience the river. When the trainee finally learns to be a pilot, he exchanges one aesthetic for the other. Though he admits he made a "valuable acquisition" in learning how to read the water, he adds: "I had lost something, too . . . all the grace, the beauty, and the poetry had gone out of the majestic river."[27] Fortunately for passengers, the pilot responds to a sense of place – an ability to read the river – rather than to the spectacle of nature, apparent to them. The pilot trainee goes further: "All the value any feature of it had for me now was the amount of usefulness it could furnish toward compassing the safe piloting of a steamboat."[28]

A natural landscape becomes a place – "a shape that's in your head" – when it is cultivated, when it constrains human activity and is constrained by it, when it functions as a center of felt value because human needs, cultural and social as well as biological, are satisfied in it. The hunter, trapper, angler, or farmer who comes to terms with nature in particular places in pursuit of specific purposes may get to know its local conditions so intuitively that they get built into his reflexes. This contrasts entirely with the attitude of the outsider, for example, the tourist who comes to see a spectacle and for whom

> nothing has a drift or a relation; nothing has a history or a promise. Everything stands by itself, and comes and goes in its turn, like the shifting scenes of a show, which leaves the spectator where he was.[29]

THE ECONOMY OF PLACE

The "shape of a place," such as the pilot's Mississippi, exists in the heads of those who come to terms with local conditions to satisfy a particular purpose or pursue a particular goal. This would not be true of those who can take their industries anywhere, who do not have to commit

themselves to particular places or people, and who thus construe everything in terms of price. The Mississippi steamboats had plenty of these passengers – sharpers at once celebrated and condemned in books like Herman Melville's *The Confidence Man* – who made money by selling, gambling, cheating, and hoodwinking other passengers. In a more respectable version, they shave points on bonds – Sherman McCoy's profession in Tom Wolfe's *The Bonfire of the Vanities* – or speculate on commodity futures and on rates of exchange. Each new bank crisis, stock market crash, procurement scandal, and corporate collapse – the debacle at Enron provides as good an example as any – reminds us that for many traders the world seems like a huge riverboat full of gamblers coming from nowhere and going nowhere, if not to jail. In a global economy where capital flows quickly and in any direction toward any comparative advantage, we must ask what lasts, what is sustainable. No wonder we are swept by fears of an environmental disaster – for who knows if there is a pilot on board with any idea where we are headed?

A. The View from John Sanderson's Farm

To approach the question of what lasts – what is sustainable in an environmental sense – it is helpful to consider the relationship between local communities and natural resources. We can take our bearings from a remarkable article by Hugh M. Raup, who, at the time he wrote it in 1966, was professor of forestry at Harvard and directed the Harvard Forest in Petersham, Massachusetts.[30] In "The View from John Sanderson's Farm," Raup writes that at the time of Emerson and Thoreau, the land that is now the Harvard Forest was farmed intensely and profitably by John Sanderson, whose ancestors had long since completely cleared it of trees, to put the land into pasture and other forms of cultivation. Farmers in southern New England during this period did well, serving growing markets in nearby industrial communities, and they reinvested profits to expand their farming operations. "Their habit of investing much of their capital in the improvement and enlargement of their farms [and] houses and in improving their general living conditions," Raup comments, "argues they looked forward to permanence."[31]

Yet by 1966 farming had virtually disappeared, and all but 15 percent of Petersham was thickly forested. Why? Should we look for the answer in poor farm management practices – for example, did Sanderson and those who followed him fail to farm in sustainable ways? No;

the practices the farmers used were impeccable from the perspective of sustainability. To understand why farming no longer flourishes in Petersham we must look far beyond its borders, for example, to the opening of the Erie Canal in 1830 and the development of the railroads. "The farmlands in the Middle West," Raup observes, "now had access to the eastern markets and could attract eastern capital for their expansion. They produced foodstuffs in far greater quantity and far more cheaply than farmlands in most of the New England states."[32]

The farms in Petersham went out of production between 1850 and 1870; the owners abandoned their acreage, sold to homebuilders, and followed other pursuits. The land reverted to nearly pure stands of white pine – a natural and fortuitous process that itself proved enormously profitable. The years between 1900 and 1920 saw the advent of a huge logging and milling era in southern New England, which produced the containers – boxes, crates, and barrels – in which commodities moved on the railroads and canals.

In this economic context, Harvard in 1908 established its forest and committed it to the principles of sustainable silvicultural management. Foresters carefully tended the seedlings they expected to be sold at a profit sixty years later. "Those [seedlings] that came up the next good seed year, about 1911, would be sold 60 years later, and so on ad infinitum. The foresters looked ahead that far without the slightest hesitation, assuming that people's demands of the early 1900's would continue unabated."[33]

The market for cooperage soon succumbed to cardboard boxes; softwood poured in from Canada and from the West and South underpricing local production. By the 1950s, the town of Petersham had abandoned commercial forestry and started to raise summer houses. It became a bedroom community serving nearby cities, including Worcester, where high-tech start-up industries produced software, pharmaceuticals, and cellular phones. As these industries found their way to Silicon Valley, Dublin, New Delhi, and other venues where returns on investment were greater, retirement communities have sprouted up in or near the town, which also attracts artists and craftspeople. According to the 2000 Census about half the residents over twenty-five years old hold bachelor's and many have advanced degrees. In the magnificent town commons, surrounded by preserved nineteenth-century houses, the Town Hall remains the site of honest town-meeting governance.

Raup draws two conclusions from his anecdotal history of Sanderson's farm. First, he observes that mankind "has shown amazing

capacity for innovation that bids fair to take care of future wants."[34] He argues that technical change and innovation have always shown the naiveté of efforts to conserve or manage resources for the long run; no one has the foggiest idea what technology will be like – or make possible – sixty years from today. Innovation, technical advance, and scientific discovery have changed and will continue to change the resources on which we may in the future rely. The way to prepare for the future is to build up and protect the resources humanity always counts on – which have to do with the social institutions that keep communities in place.

Raup discusses the problem of resource scarcity. He argues, as do many who take prices and other objective measures seriously, "Our most trying problems in this country seem not to arise from scarcities or unduly slow rates of production but from embarrassing surpluses of nearly everything. Not only is this the case now, but it seems to be true also for the foreseeable future."[35] Raup adds that when conservationists

> began talking and writing about "the future" and providing resources for it, their "future" was not on any time horizon visible to a farmer, or manufacturer, or businessman. It was over the horizon and out of sight. It had to be imagined, and realists found they couldn't do this because they knew that change and innovation was going too fast for their systems of calculation.[36]

Second, Raup recognizes the misery, poverty, ignorance, disease, and hopelessness that pervade much of the world. He concludes that man "has not been as clever with distribution as he has with production, nor has he solved many of the basic social problems that have plagued him and his ancestors."[37] According to Raup, the problem of sustainability – the management of a functioning economy in a particular place for the long run – is not primarily a problem of relating human beings to nature, resources, or the environment but to one another. If blessed with just and effective civic and social arrangements and institutions – these are the principal conditions for "sustainability" – future generations will enjoy far better lives than ours – as we have enjoyed standards of living vastly better than those of our ancestors.

B. The Country versus the City

As the economic history of Petersham twisted and turned, the town remained rural: it served urban markets but remained close to nature.

Indeed, by maintaining its rural character, it became attractive to its current residents, who stay there because of its natural amenity and its proximity to jobs. "Their conception of what they wanted from this land was basically aesthetic, and they had an immense influence on the present form and character not only of Petersham but of a great many other towns in the region."[38]

Equipped with cell phones, televisions, automobiles, and the Internet, many Americans hope to have it both ways: to live in pastoral, natural surroundings and still enjoy the excitement of urban culture. If place competes with space and if the Internet turns space into nothing then our choice lies between place and nothing.[39] Americans have developed an aesthetic interest in farms and woodlots – in "play forests" such as the one Raup supervised – that was nearly absent in our culture before the twentieth century.

Now, the question must arise of how it is that Petersham, which has been clear-cut, plowed under, planted, farmed, forested, and developed and then redeveloped since the seventeenth century, counts as "natural" from an aesthetic point of view, while the city of Worcester, thirty miles south on Route 122, does not. How has one retained its place in nature or the natural environment, while the other seems to be located in McWorld?

The environmental historian William Cronon asks this question by comparing the rural landscape of the Wisconsin farm where he was raised to the museums and skyscrapers of neighboring Chicago. To Cronon as a child, the preference for nature "came easily – my love of nature and the pastoral countryside, my dislike for the city, and, beneath them, the romanticism which had schooled me in such perceptions."[40] When he grew older, Cronon became aware of the cultural sources of those intuitions. He reflects:

> The more I learned the history of my home state, the more I realized that the human hand lay nearly as heavily on rural Wisconsin as on Chicago. By what particular twist of perception, I wondered, had I managed to see the plowed fields and second-growth forests of southern Wisconsin – a landscape of former prairies now long since vanished – as somehow more "natural" than the streets, buildings, and parks of Chicago?[41]

Cronon recognizes that the fields, pastures, corrals, woodlots, stables, barns, and granaries that characterize the Wisconsin agricultural landscape represent as drastic a change from earlier landscapes as anything

one might find in Chicago itself. "Why had I seen some human changes as 'natural' . . . but not the other changes . . . ? How could one human community be 'natural' and the other not?"[42]

The answer to this question, which Cronon asks at the outset of his elaborate natural history of Chicago, appears in summary about 250 pages later, after he has shown that that the central dynamic of industry is to eliminate the connection between productivity and place. According to Cronon's account, Chicago at the beginning grew because of its location in relation to natural resources and markets. It stood geographically at a point where the immense resources of the Midwest, particularly farm and forest commodities, could be processed and reshipped east. Before the invention of the refrigerated railroad car, for example, cattle and hogs had to be moved alive from farms, say, in Nebraska and Kansas, to a central butchery point where the meat could be packaged and sent speedily by train to be eaten in New York, Philadelphia, and Boston.

With the introduction of mobile refrigerated units – first railroad cars and then diesel trucks – the geographical reasons that made Chicago hog butcher to the world disappeared. (Much the same happened with the lumber industry earlier as a result of advances in transportation as well as in milling equipment.) By the 1880s, operators in cities farther west, for example, Kansas City and Omaha, could butcher and pack beef and pork and send it under refrigeration anywhere. "All the Chicago packers saw the logic of this analysis; it was, after all, the logic of capital."[43] Swift and Armour transferred their operations to Kansas City, Omaha, St. Joseph, and other cities of the Great Plains. By the 1930s, meat packing in Chicago had become a dwindling industry; by 1960, no major packer operated there: "Ten years later, the stockyards closed altogether. The familiar odor of manure vanished, and the strange silence of abandonment fell over the animal pens. Grass began to grow amid the ruins."[44]

"The point of corporate meat-packing," Cronon concludes, "had been to systematize the market in animal flesh – to liberate it from nature and geography."[45] Corporate headquarters remained for a time in Chicago – and the Mercantile Exchange and the Board of Trade took up residence there – but any of these could as well have been in Fort Worth or Philadelphia. Since few people use "snail mail" to place orders, a commodity exchange hardly needs a geographical address; transactions transpire over an electronic network accessible to anyone anyplace. It is hard to

imagine why a major business now in Chicago would be there because of its proximity to natural resources.

The stockyards Upton Sinclair described in his 1906 novel, *The Jungle*, whatever else you might say about them, were located in Chicago for reasons that had to do with nature and natural resources. When the refrigerator car and other innovations made it possible for corporations to produce meat products anywhere and deliver them virtually anywhere, Chicago lost its geographical advantage and to that extent lost its relation to nature. The packing plants in Omaha and St. Joseph – like the Union Stockyard in Chicago – are likewise temporary way stations in the ceaseless flow of capital. No one knows how long they will remain where they are. Eventually, in vitro tissue culture may transform any organic matter to fish, flesh, or fowl. Whether it fabricates cocoa or bacon, vegetable oil or cheese, biotechnology may entirely cut the link between product and place, making capital the only input that matters.

Cronon comments:

> Once within the corporate system, places lost their particularity and became functional abstractions on corporate charts. . . . The cattle might still graze amid forgotten buffalo wallows in Montana . . . but from the corporate point of view they could just as well have been anywhere else. Abstract, standardized, and fungible, their lives were governed as much by the nature of capital as by the nature that gave them life. It was perhaps nothing more than simple justice that the city which had remade them in this way should be subject of the same alchemy. In losing control of its corporate meat-packing hinterland, Chicago's stockyard fulfilled the logic of its own birth.[46]

We are now in a position to attempt to answer to Cronon's initial question: What makes his family farm "natural" and Chicago "artificial"? The answer cannot be found in the resemblance either of these bears to the plains and savannas that preceded them, since on that basis there is little to choose between them. Instead, the distinction between the two kinds of places lies in differences between the kinds of memories we invest in them. An area is "natural" insofar as the people who live there remember and respond to its natural history – insofar as they recognize as meaningful the role nature and geography play in determining the character of the places where they live and the reasons they live in those places. In other words, a place is "natural" not because nature is separate and independent from human activity but because it is visibly and sensibly integrated with it.

C. The Wilderness Narrative

Earlier chapters of this book defended the idea that environmentalists – to restore their credibility – must give up the apocalyptic narrative. In the past, environmentalists have argued that growth in population and consumption will automatically and necessarily lead to calamity; they said that humanity and nature were on a collision course and that the economy had already overshot the carrying capacity of the earth. Prosperity, they argued, is not sustainable. These environmentalists told us that the Earth set physical limits – whether in net primary productivity, or low-entropy resource flows, or arable land, or something of that sort – so that economic growth would inevitably lead to collapse. Denying that ingenuity can substitute more for less abundant resource flows to do the same work, they argued that natural resources are fixed and finite so that increasing consumption *must* inevitably and obviously lead to depletion and scarcity.[47]

No one believes or proposes, of course, that "future increases in knowledge will, more or less automatically, alleviate or even eliminate future environmental problems."[48] Many environmentalists have come to recognize, however, that increases in knowledge and advances in technology make economic growth and prosperity – even for those as yet excluded from it – at least physically possible. Everyone accepts the truism, however, that even "if knowledge is becoming a more important factor of production . . . and even if this allows more-developed economies to achieve a higher rate of economic growth, this is not automatically good news for the environment."[49] Investment, appropriate policy, and leadership are plainly required – none of which would be helpful or worth trying if the physical limits imposed by the natural world simply doomed further economic growth. It may be time for environmentalists – again to restore their credibility – to reconsider not only the resource-depletion narrative but the wilderness narrative as well. In its least defensible version, this narrative takes as a premise "that nature, to be natural, must also be pristine – remote from humanity and untouched by our common past."[50]

According to environmental historian William Cronon, the wilderness myth entails a flight from history and therefore from responsibility. "The flight from history that is very nearly the core of wilderness represents the false hope of an escape from responsibility, the illusion that we can somehow wipe clean the slate of our past and return to the tabula

rasa that supposedly existed before we began to leave our marks on the world."[51]

Today, no one would have the hubris to announce "the end of nature" in the sense of what is pristine or untouched because nature in that sense "ended" centuries ago. Historians – most recently Charles Mann in his superb study *1491* – have shown that for centuries little or nothing in the environment has existed that is free of human influence.[52] If by the "natural" we mean "pristine" or "timeless," then the term "natural environment" expresses an oxymoron; no environment is completely "natural" in that sense. Even the Northwestern Hawaiian Island Coral Reef Ecosystem Reserve, appropriately designated a national monument by President George W. Bush, has a human as well as natural history, notably as the site of the crucial World War II Battle of Midway. What makes the area important is the memory it embodies and sustains – the memory encoded in both human and in natural history.

Any conception of the natural that tries to exclude human influence or activity seeks to escape history altogether; therefore it constitutes the opposite of the concept of place, which mixes cultural and natural history and is full of memories of both. It is the interplay of the cultural and natural in history that identifies an environment as a particular place – and by giving us something to remember gives us something to protect.[53] By insisting that the "nature" we should protect must exclude humanity – by insisting on the wilderness narrative – environmentalists paradoxically excuse humanity from responsibility for the nature with which they have long interacted and which they experience and know.[54] "Idealizing a distant wilderness too often means not idealizing the environment in which we actually live, the landscape that for better or worse, we call home."[55]

The important thing is that we preserve memory, the historical reference, the causal connection with what has gone before – so that we know a place in terms of its past and not simply in comparison to other places like it. For the environmentalist, this past includes the particularities and idiosyncrasies that are written by nature's moving hand. Of anyone who is concerned with "sustainability," we should ask, "What is to be sustained?" Memory, appropriate memory, is what must be sustained.[56]

Chapter 9

Natural and National History

Of the hundred or so persons who landed with the *Mayflower*, November 11, 1620, at Plymouth, William Bradford tells us that more than half died in the first two or three months, "especially in January and February, being the depth of winter and wanting houses and other comforts."[1] The natural environment, as Michael Wigglesworth described it in 1662, was a "Devil's den":

> A waste and howling wilderness
> Where none inhabited
> But hellish fiends and brutish men
> That devils worshiped.[2]

The Bible represents wilderness as otherness – the desert into which Moses and the Israelites wandered, where Christ struggled with Satan, where prophets such as Elijah and John the Baptist fled, and from which voices arose presaging grave events.[3] Bradford and the Pilgrims, John Winthrop and those who migrated to New England during the latter part of the seventeenth century, the fur traders, and after them the hunters, the soldiers, the homesteaders, the empire builders – all learned what we would learn if we visited, even for a short while, an uncivilized place: that nature – and nature meant the wilderness for those people – is

> . . . marvelous, fantastic, beautiful; but it is also terrifying, it is also profoundly sinister. There is something in what, for lack of a better word, we must call the character of great forests . . . which is foreign, appalling, fundamentally and utterly inimical to intruding man.[4]

From the moment when Bradford stepped from the *Mayflower* into a "hideous and desolate wilderness," the attitude of the American toward

nature was, to quote the historian Roderick Nash, "hostile and his dominant criteria utilitarian. The *conquest* of the wilderness was his major concern."[5] Enlightenment science, moreover, supported this conquest by reducing nature to law-governed Newtonian processes. The initial impact of the empiricism of Newton, Locke, and Boyle was to secularize and desacralize the natural world. The metaphysical *other* became the scientific *object*. Karl Marx wrote, "Nature becomes . . . purely an object for men, something merely useful, and is no longer recognized as a power working for itself."[6]

The Puritans who followed the Pilgrims to America after 1630 looked on the wilderness with dread and thanked God every time some of it was destroyed. They also understood that when forests go down, profits go up; and they thanked God for that as well. "I think it fair to say" the great American historian Perry Miller has written, "that the founders had no qualms about doing harm to nature by thrusting civilization upon it." He continues, "They reasoned in terms of wealth, comfort, amenities, power, in terms which we may conveniently call, though they had not been derived from Bentham, 'utilitarian.'"[7]

THE COVENANT AND THE DREAM

Except for Thanksgiving and Longfellow's popular tale about John Alden, the Pilgrims gave us little to remember.[8] Unlike the later Puritans who came with the Great Migration of 1630, the followers of William Bradford left England to escape persecution rather than to run a spiritual "errand into the wilderness."[9] And so it is with the landing in Salem, June 12, 1630, of John Winthrop and his group of immigrants, or perhaps with his speech "A Model of Christian Charity" aboard the *Arbella*, that Americans' consciousness as a nation began.

In his lay sermon, Winthrop told his people that they came to America not to get a better station in life but to form a better community "both civil and ecclesiastical"; that God had appointed them to do so and "wee are entered into a covenant with him for this work"; and that according to the covenant, if "wee shall . . . embrace this present world and prosecute our carnall intentions seeking greate things for our selves and our posterity, the Lord will surely breake out in wrathe against us . . . and make us knowe the price of the breache of such a covenant." If, on the contrary, they did the work and so built a just commonwealth, God would reward them: "He shall make us a prayse and glory, that men shall say of succeeding plantations: the lord make it like that of

New England: for wee must consider that wee shall be as a Citty vpon a Hill, the eies of all people are upon us."[10]

Needless to say, Winthrop was entirely mistaken. His people failed to do what he thought was the work of God in America – and yet they achieved an enormous prosperity. The American dream replaced the Puritan covenant. The Puritans had not intended to become prosperous, and yet they did; prosperity, as John Higginson told the Massachusetts General Court in 1663, had become a remarkable fact of life. In his inaugural sermon, he said:

> When the Lord stirred up the spirits of so many of his people to come over into the wilderness, it was not for worldly wealth or better livelihood for the outward man. The generality of the people that came over professed the contrary. Nor had they any rational grounds to expect such things in wilderness. Thou God, hath blessed His poor people and they have increased from small beginnings to great estates. . . . Look upon your towns and fields, look upon your habitations shops and ships and blessings of land and see. Have I been a wilderness to you? We must need answer, no Lord thou has been a gracious God, and exceeding good even in these earthly blessings. We live in a more comfortable and plentiful manner than ever we did expect.[11]

At first, Puritans accepted Winthrop's suggestion that their prosperity came as a reward for their labors. By 1660, however, they followed Higginson in citing God's free benevolence. Finally, in the 1670s, the continued "sweetening" of life in New England could only be regarded as evidence that God did not know what was going on there. Even Higginson included a warning in his sermon. In words much quoted thereafter, he reminded the court that they were "originally a plantation of Religion, not a plantation of trades. Let merchants and such as are increasing cent per cent remember this."[12]

The warnings increased in severity; sermons took on the form of jeremiads, which they were called; and every shipwreck, flood, or drought was recognized as an omen that at last God's vengeance was on its way. When King Philip's War (1675) failed, for all its horror, to make God's will known to his people, the ministers formed a synod and published as its *Result*, in methodical fashion, the crimes against which they had declaimed for years in their jeremiads. Although some of the sins mentioned there are solid even by today's standards, there was a clear emphasis on the connection between the first, a "cooling of former life heate in spiritual communion," and the tenth, an "inordinate affection to the world."[13]

Looking back at these events, we can surmise that the land speculation, dissension, inflation, lessening of religious ardor, and other complaints listed by the synod were not sins but necessities. They represent the attempt of a second and third generation to deal with the social problems their fathers, immersed in the political and theological disputes that had brought them from England, had not confronted or even expected. The jeremiads, the halfway covenants, the revivals, and the like did not restrain as much as exorcise these activities. By offering a ritual mea culpa, the young people could get on with the business of life.

But still beneath this was the fact – unacknowledged at the time but always sharply felt – that New England had lost its audience. Cromwell and the Independents, in whose cause the Puritans had come to America, grew more concerned about improving their army than their theology, and when they noticed the Americans at all, it was only to tell them that their zeal was an embarrassment, because they themselves had determined upon a course of toleration. Consequently, the settlers of New England were left with a sense of having a mission – but no idea what it was or from whom; a covenant – but no assurance of God's interest in or understanding of its terms; and a national identity – but no concept of what that was or who or where they were.

When their religious errand failed and a secular social order materialized, although there was an abundance of individual success, Americans began to question whether they any longer had a mission of such importance that it merited tearing down a wilderness. They began to ask whether they were corrupting their environment – but only after they discovered that their environment had corrupted them. They would have to make their own history and gather their own memories in this both hostile and hospitable place. As Perry Miller put it, "Having failed to rivet the eyes of the world upon their city on the hill, they were left alone with America."[14]

America was the wilderness, but what was that? How would a Puritan people describe it? As their history suggests, they were not utilitarian in a philosophical sense; on the contrary, their Protestant background would have made them resist a pleasure–pain philosophy. They justified their power over nature in terms of the spiritual and social purposes to which it could be put. While they did reason about their environment in terms of wealth, power, comfort, and amenity, they valued these advantages not as ends in themselves but as means to, or as rewards for, religious accomplishments; and if they taught themselves to pursue

happiness, it was supposed to be happiness within a new social order and not individual success for its own sake.

THE END OF AN ERRAND

The introductory chapter of this book began with a *New Yorker* cartoon in which a Puritan on his way to America ruminates on the market for real estate.[15] Decades before the cartoon appeared, Perry Miller commented that as soon as Southampton and Land's End had sunk on the horizon behind him, Governor John Winthrop "suddenly realized that he was sailing not toward another island but a continent, and that once there the problem would be to keep the people . . . from following the lure of real estate into a dispersion that would quickly alter their character."[16]

New England Calvinists understood the value of land as real estate but had little sense of its value as place. If you go to the Southwest, you will see mountains and rivers that were sacred to the Pueblo, the Navaho, and other native peoples. Go abroad and you will visit the mosques, mounts, monuments, and mausoleums sacred to the religions of the world. The New England Puritans came to erect a "Citty vpon a Hill" – not on a particular hill but on that abstract pedestal where "the eies of all people" would look upon them. The "Citty vpon a Hill" lacked an address; it was as abstract, unearthly, and universal as Augustine's City of God.

The important thing to note, as Miller explains, is that the covenant theology broke down precisely because it kept Americans from taking root in their newfound land.[17] It broke down because it supposed Americans had a religious ministry to the world but no particular responsibility but to subdue the continent they occupied. "It broke down because it tried, in disregard of experience, in disregard of the frontier and a thriving commerce, to stereotype the image of America, to confine it to the Procrustean bed of a priori conception."[18] People know this "Procrustean bed of a priori conception" today as American exceptionalism – "the set of beliefs that are thought to constitute America's essence and to set it apart; the beliefs that make Americans positive that their nation is superior to all others – morally superior, closer to God."[19]

The spirit of American Zionism that emerged from the Puritan errand into the wilderness, as David Gelernter has explained, rests on two ideas: "a chosen people and a promised land. . . . The chosen people is closer to

God than any other and is held to higher standards. The promised land flows with milk and honey and must be made by its inhabitants into a beacon of sanctity for the whole world."[20] In his First Inaugural Address (March 4, 1801), Thomas Jefferson intoned these ideas by describing the United States as "possessing a chosen country, with room enough for our descendents to the thousandth and thousandth generation." In his Second Inaugural Address exactly four years later, Jefferson explicitly refers to the founding settlers or fathers whom God led, "as Israel of old, from their native land and planted them in a country flowing with all the necessaries and comforts of life."

The obvious revision – from a biblical "land flowing with milk and honey" to a "country flowing with all the necessaries and comforts of life" – expresses a sea change in the American view of the natural environment. The earliest Puritans used biblical images (like the analogy with the ancient Israelites settling Canaan) to define their geographical task of turning a waste and howling wilderness into a land flowing with milk and honey. The religious energies that brought the colonists hither imbued them with an abstract and timeless conception of nature that denied them affection for and attachment to the places they inhabited. By the time of Lewis and Clark and Manifest Destiny, however, the spiritual errand had become redefined as a geographical and economic one. Americans happily went into real estate development – for the sake of the "necessaries and comforts of life" – and they transformed for commercial purposes a landscape they had initially believed God entrusted to them to support a ministry to the world.

The wilderness that had served them had also seduced them, and in destroying it, they destroyed something of their hopes, something of their history, and something of their future as well as of their past. They saw that their prosperity was also an apostasy, their nationalism was also secularism, and their happiness was also emptiness. And when they reasoned in terms of wealth, power, comfort, and amenity, they had nothing to serve but themselves.

In imposing civilization on so vast a landscape, Americans were, in fact, doing what had never been done. They had a mission – if not the one that brought them – and the world watched. They had come to create and attach themselves to new symbols, stories, and beliefs, no longer relying (this is what they told themselves) on the traditions, memories, and myths of their biblical heritage or their European origins. Americans described themselves as the new Adams and Eves having to identify and orient themselves toward a new Eden.[21] Americans started

to describe their relationship to nature in a way that could help them place, identify, and describe themselves.

American history is continuous with the natural history of the American continent; it is a history of what settlers from other continents have done with the wilderness and with farms and cities that arose from the wilderness, and what that experience did to them. Robert Frost described this history impeccably in "The Gift Outright"; Americans, as he wrote, were "Possessing what we still were unpossessed by, /Possessed by what we now no more possessed."

To this experience Americans trace their national character and conscience; because of this experience, which continues always, they share a sense of responsibility to one another and to the land they inhabit. The responsibilities Americans assumed toward their natural landscape have come to counterbalance those they have presumed toward other nations – a geographical mission has long contended with a religious mission in defining American character. As they expanded or "realized" westward, Americans came to understand – though they did not admit it to themselves – that they were not going to make the religious history John Winthrop intended. A geographical history was the only kind of history they could uniquely know or possess.[22]

THE ONLY PARADISE THAT WE SHALL KNOW

The most remarkable difference between the eighteenth-century Protestants and their direct successors, the nineteenth-century Transcendentalists and Romantics, is that writers like Thoreau and Whitman made little or no reference to the afterlife. They were not atheists, but they held no doctrine that told them to expect a better life than this – much less an eternal one. When Walt Whitman wrote "the running blackberry would adorn the parlors of heaven," he did not express a concern, as conservation biologists might do today, that invasive species will follow us into the next world. Instead, he proposed (in *Song of Myself*) that there "will never be any more perfection than there is now/ Nor any more heaven or hell than there is now." In his "Song of the Rolling Earth," Whitman captures the ethos of American environmentalism in language that anticipates that of Aldo Leopold:

> I swear there is no greatness or power that does not emulate those of the earth!
> I swear there can be no theory of any account, unless it corroborate the theory of the earth!

> No politics, art, religion, behavior, or what not, is of account, unless it compare with the amplitude of the earth,
> Unless it face the exactness, vitality, impartiality, rectitude of the earth.

This kind of American environmentalism is not beholden in any way to Natural Theology – to the idea that the construction of nature demonstrates the existence of God. When Whitman wrote that "a mouse is miracle enough to stagger sextillions of infidels," he did not draw on an argument from design; he was not trying to prove the existence of anything higher or better than a mouse. That was miracle enough. Salvation or redemption, according to Whitman, Thoreau, and other writers at the time, requires that we find Heaven below our feet, not over our heads.

The Puritans who came to build a City on a Hill had addressed two audiences, God and the religious factions in England whose wars they had escaped. Apparently neither was listening. By the time of Thoreau, Emerson, and Whitman, Americans found themselves alone with a continent; they had to become their own audience. They had to discover, inspire, or recreate themselves through their interaction with the landscape they inhabited – in other words, by deciding how to see their surroundings. "Where do we find ourselves?" Emerson asks at the start of his essay "Experience." As one scholar observes, the question, "how do we see the world" was the most important question the Transcendentalists asked.[23]

To answer this question, Transcendentalists drew on the Puritan tradition – at least as exemplified by Jonathan Edwards. First, in the spirit of the Reformation, every individual must find his or her own inspiration in the natural world; the way to experience nature is direct and personal, that is, by acquaintance, and only in relation to that experience by scientific study. Science was considered to be more a gathering of observations, that is, natural history, than an appeal to abstraction, or what one would call mathematical modeling today. Indeed, theoretical ecologists today, whose enterprise seems to be one of starting with abstract principles and then trying to deduce the phenomena from them, would seem to have lost touch with empirical science altogether. One prominent ecologist contends, "In studying the logical consequences of assumptions, the theoretician is discovering, not inventing. . . . To the theoretician, models are a part of the real world."[24] This directly contradicts the view of another prominent scientist who wrote that "although nature begins in reason and ends in experience, it is necessary for us to

proceed in the opposite direction, commencing . . . from experience, and by its means investigating the reason."[25]

This contrast in the approach to science – based either in the observation of particulars or in the search for universals – divides scientists today. Empirically minded ecologists and other life scientists employ an "informal causal, inductive, retrodictive, or consequentialist inferences in order to 'make sense' of a particular example or situation."[26] In contrast, theoretically minded scientists, according to historian Stephen Bocking, have "sought to enhance their authority by adopting research methods and equipment used by physicists, such as computer models." Bocking comments that the "consequence of the status accorded to generalized, quantitative knowledge has been the tendency of scientists, especially in newer fields, to seek links with disciplines [notably physics] widely viewed as authoritative."[27] For example, ecologists today may draw on models taken from disciplines such as cybernetics or statistical mechanics to understand the principles they attribute to what they call self-organized complexity. They hope to show that their science can leap beyond the study of particulars – indeed it may ignore them – to reach by sheer deductive contemplation the mathematical Ordinances of the ecological world.[28]

Especially in his *Dissertation on the End for Which God Created the World* Edwards refused to go along with Cotton Mather and others in finding the glory of God expressed primarily in the mechanical or mathematical perfection of the universe. Edwards does not hesitate to use such neo-Platonic terms as "diffuse," "emanate," and "communicate" to describe God's relation to the world. He wrote that "we may suppose, that a disposition in God, as an original property of his nature, to an emanation of his own infinite fullness was what excited him to create the world."[29] The image is not the Aristotelian one – that of God creating the universe out of mere "stuff" that he organizes under universal principles in order to give it form or to make matter into substantial things. Rather, the idea is a Spinozoistic one that God is also the stuff of nature so that the vast diversity of particular objects arises out of the potential for form that is already there.[30]

Thoreau wrote in *The Maine Woods*, "Talk of mysteries! Think of our life in nature, – daily to be shown matter, to come in contact with it, – rocks, trees, wind on our cheeks! the *solid* earth! the *actual* world! the *common sense! Contact! Contact! Who* are we? *where* are we?"[31] Thoreau here approaches the hylomorphism implicit in Edwards's neo-Platonism, that is, the view that matter itself has form or being and is not mere

"stuff" to be shaped by rules, principles, algorithms. The actual world, the solid Earth, may seem to be the only paradise that we shall know.[32]

CALVINISM WITHOUT GOD

If nature is full of symbols, clues, or shadows of divine things, how are they to be understood? Edwards himself tried to blunt the impact of his words about emanation. He argued that God does not communicate himself chiefly for the benefit of man – and therefore that the symbol is in a foreign character, a faint clue and indirection, a shadow on the wall of a cave. Whitman captures this sense of mystery perfectly in describing a patch of grass as

> . . . the handkerchief of the Lord,
> A scented gift and remembrancer designedly dropped,
> Bearing the owner's name someway in the corners,
> that we may see and remark and say Whose?

But take away the Calvinist theology, remove the doctrine of original sin, of which Edwards, of course, was a major exponent, and the idea that God emanates the world and is thus united with it leads to a Spinozistic identification of nature with God and thus flirts (in a most un-Calvinist way) with pantheism. In that case, like responds to like, and we may all become Transcendentalists, immediately interpreting the messages of God. If you think Emerson drew this inane conclusion, you may be right; the theme that flows through him is Jonathan Edwards's old Puritan conviction shorn of original sin and therefore of its theological restraint:

> There is no great and no small
> To the Soul that maketh all:
> And where it cometh all things are;
> And it cometh everywhere.[33]

The easy, all too easy, manner in which the "unfallen" Emerson went about reading the character of God in Nature offended at least some of his contemporaries: Walden Pond, for example, was two miles from Concord center and twelve feet deep, and Moby-Dick was farther away and deeper than that. But whether with the majority of Americans you read Emerson and a slew of Romantics, and thus saw Nature as the paradigm of joyful innocence and God as essentially benevolent, or you chose Melville, Hawthorne, Poe, or, later, Twain and were made aware

of the ancient distances in the deep seas and dark forests, you recognized nature as an aesthetic symbol before you considered it in economic or in scientific terms.

To understand nature as an aesthetic symbol, you had to decide upon its metaphorical character: is it virtuous, independent, mighty, and free, or is it inimical, wrathful, and ambiguous? Now, these qualities belong to nature, if they belong at all, no less than properties of age or chromosome count; metaphorical possession is possession nonetheless.[34] The difference is that conventions for establishing age or chromosome count are well agreed upon in the history of science, while the conventions for determining metaphorical qualities are less well entrenched.

The commonsense properties of an object are settled by ordinary perception – indeed, this is what makes them commonsensical; the metaphorical qualities, or, if you prefer, the aesthetic or expressive qualities, of things are determined primarily by literature, music, and the arts.[35] No wonder the first conservationists – Audubon, Catlin, Cole, Muir, Olmsted – were not pioneers, businessmen, or politicians; they were artists. One could argue, of course, that it is not nature per se that we admire and know but nature as represented in literature and art. This is a truism. Just as we have aesthetic and moral understanding as a result of literary and artistic inquiry, we have scientific understanding as a result of scientific inquiry. Nothing comes uninterpreted; nothing is shorn of language and memory unless it is empty of feeling and desire. By recognizing the expressive features of nature – which are discovered through literature and the arts – one understands the moral dimension of the fact that America has torn down a wilderness. One recognizes the importance of maintaining that memory and the history and character of places that remain.

Writers like Thoreau and Whitman fully appreciated the instrumental aspects of nature; they understood that to use (more than to preserve) nature was also to communicate with and to know the actual world. Thoreau, for example, proudly identified his "daily work" as "making the earth say beans instead of grass,"[36] and Whitman celebrated the feats of the pioneer and the broad-axe. The idea, then, was not to keep Creation whole but to make ourselves better by suiting our actions to the nature we inhabit and that inhabits us. It would be misleading to say, then, that the American Romantics and Transcendentalists thought nature possessed primarily intrinsic value, whatever that concept might mean. It is closer to the truth, as Philip Cafaro has argued, to say that nineteenth-century writers developed an ethic that rested on the practice

of virtue in our treatment of nature – whether we located nature in the landscape or in ourselves.[37]

Ever since Edwards in *The Nature of True Virtue*, published together with his *Dissertation* in 1755, defined true virtue as "benevolence" or "love for being in general" and distinguished it sharply from love or benevolence for the things that pertain to oneself, including beauty, family, country, and the like, we have reason to recognize that our virtue as a people depends to a large extent on our benevolence toward our natural environment as distinct from our efficient (even "sustainable") exploitation of it. Benevolence respects things enough to let them be. It is not indifferent to suffering – pain should be relieved – but it would allow an animal to die, if to feed it would deprive it of its independence and strength. This kind of benevolence appreciates the character of things and allows objects their own integrity by restraining the interference of man. This is a reverence for all things on which we might base an acceptable environmental ethic. It need not invoke a Creator. The problem for Transcendentalism (as it is for environmentalism) is to make the Earth sacred while giving up on the theological idea of God. Environmentalism therefore may be described as Calvinism without God.[38]

THE FALL: FORTUNATE AND UNFORTUNATE

The opinion in New England and New York, as represented, let us say, by Emerson and Thoreau in the one and Melville and Whitman in the other, that nature has sublime qualities that can be read or at least translated into the American national character received support – it was entirely paralleled, in fact – in the writing of Thomas Jefferson and the thinking of the first settlers of Virginia and the South. Although those who lived south of New York tended to visualize America as a garden rather than as a wilderness, and thus their imagery reflects a lower latitude, their emulation of nature was much the same.

"What then is the American, this new man?" wrote Michel de Crèvecoeur, a French-born New York farmer who corresponded with Jefferson and, through his popular *Letters from an American Farmer*, with the world. "He is an American," Crèvecoeur continued, "who, leaving behind him all his ancient prejudices and manners, receives new ones from the new mode of life he has embraced."[39]

That "new mode of life" according to Crèvecouer was, of course, to be bucolic – to embrace the rural life of independent freeholders. Jefferson's distrust of the cities – which he regarded as belonging spiritually to

Europe, wherever they were – is well known, as is his reliance on virtues nourished by the land. In *Notes on Virginia*, Jefferson wrote, "Those who labour in the earth are the chosen people of God, if ever he had a chosen people, whose breasts he has made his peculiar deposit for substantial and genuine virtue." He went on: "Corruption of morals in the mass of cultivators is a phenomenon of which no age nor nation has furnished an example."[40] Of this sentiment, one historian, Leo Marx, has written, "By 1785, when Jefferson issued *Notes on Virginia*, the pastoral ideal has been 'removed' from the literary mode to which it traditionally had belonged and applied to reality."[41]

The pastoral ideal presented as much an a priori scheme as did the covenant theology of Winthrop, and one that fitted reality as badly; apparently, cultivators are no less susceptible to corruption than the same number of merchants. Worse than that, they could not remain cultivators; once the tide of civilization, as it is always called, moved west, those who moved with it had to become woodsmen, hunters, traders, soldiers, or whatever was needed to turn an inhospitable environment into a more comfortable, if more ordinary, place to live. They would have to reinterpret America's religious errand in this new frontier. The images of Arcadia were of no use to them. The aphorisms of Emerson reflect a man on the Chautauqua circuit, not the Oregon Trail.

Those who moved west in their successive waves – to keep within Frederick Jackson Turner's metaphor – felt the old American antipathy toward the wilderness, and anyway they were concentrating on something else. Alexis de Tocqueville says of them:

> In Europe people talk a great deal of the wilds of America, but the Americans themselves never think about them; they are insensible to the wonders of inanimate nature and they may be said not to perceive the mighty forests that surround them till they fall beneath the hatchet. Their eyes are fixed upon another sight: the American people view its own march across these wilds, draining swamps, turning the course of rivers, peopling solitudes, and subduing nature. This magnificent image of themselves does not meet the gaze of Americans at intervals only; it may be said to haunt every one of them in his least as well as in his most important actions and to be always flitting before his mind.[42]

In 1840, the *New York Review*, in a feature typical of the time, advised all foreigners in America to watch out for the symbols of the future:

> A railroad, a penitentiary, a log house beyond the Mississippi, the last hotly-contested elections – things rather heterogeneous to be sure, and none of them at first glance so attractive as the wonders of the old world – are in reality, and to

him who regards them philosophically, quite as important, and as they connect themselves with the unknown future, quite as romantic.[43]

Here is the hope that new symbols – a railroad, for example – could take the place of the forest in expressing the freedom and power of the new nation. Here once again is the expectation that Americans would build their City on the Hill, that they would replace the great forests with a greater civilization. Even Thoreau felt this fever. In the roar of a railroad train he heard a promise he knew would not be kept. "When I hear the iron horse make the hills echo with its snort like thunder," he wrote, "it seems as if the earth had got a race now worthy to inhabit it." The disappointment follows immediately:

> If all were as it seems, and men made the elements their servants for noble ends! If the cloud that hangs over the engine were the perspiration of heroic deeds, or as beneficent to men as that which floats over the farmer's fields, then the elements and Nature itself would cheerfully accompany men on their errands and be their escort.[44]

This is the dilemma that confronted the nation in the nineteenth century. Can the railroad train, the log cabin, the penitentiary, and the last hotly contested election express the ideals of national character and destiny as the objects of nature exemplify them? Do they represent a nation whose deeds are so heroic and whose ends are so noble that it is worthy to inherit a wilderness? Or are they merely the servitors of destruction, rapine, and luxury? You guessed it: the last; and so the celebration of nature turned quickly to eulogy and lament.

Nobody reads James Fenimore Cooper any more – Mark Twain's view of his writing is too accurate[45] – but in the nineteenth century the *Leatherstocking Tales* and the hundreds of dime novels modeled after them provided a sort of elegy on the wilderness. Natty Bumppo, the hero of Cooper's romance, is, needless to say, everything the son of nature should be: strong, honest, innocent, just, a good shot, and so on. He is up against the force of civilization, cast in the form of Judge Marmaduke Temple, who owns most of the visible landscape and whom Bumppo respects, mostly because Temple has working for him the arts of law and theology. In short, it is the Siegfried legend, but in western New York and during the Washington presidency.[46]

In the manner of the mythic German hero Siegfried, Bumppo thus comes into conflict with a number of Alberichs – the Skinners in *The Spy* and Ishmael Bush in *The Prairie* – who, by robbing the land of its wealth,

attempt to set up an empire to rival the judge's own. In one memorable scene from *The Pioneers*, Bumppo encounters some frontiersmen massacring flocks of passenger pigeons by spraying them with buckshot from a cannon. Leatherstocking responds as would any hunter who values nature: A cannon, he says, suits "them that don't know how to put a ball down a rifle barrel, or how to bring it up again with a true aim; but it's wicked to be shooting into flocks in this wasty manner, and none do it who know how to knock over a single bird."[47] When Bumppo is himself sentenced for killing a deer in violation of the new game laws and eventually exiles himself to the prairie, no one can miss the point: the New World would take its manners and prejudices from the old.

The conventional oppositions between the head and the heart, the city and the country, the guilty and the innocent, the past and the future, the dark and the blond, the European and the American, the sublime and the beautiful – all of which are found in *Leatherstocking* and in the thousand romances that imitated it – set the terms by which Americans in the nineteenth and twentieth centuries came to understand the expressive significance of nature and the environing wilderness. If we hope to agree about the expressive features to be found in our national landscape, if we hope to move from an arbitrary to a historically justified way of describing these things, then we must begin with a careful examination of the description of the natural environment available in literature, religion, music, and art.

AMERICA'S COVENANT WITH NATURE

"Appreciation of wilderness," writes Roderick Nash, "began in the cities. The literary gentleman wielding a pen, not the pioneer with his axe, made the first gestures of resistance against the strong currents of antipathy."[48] The pastoral imagery of the South combined easily with the biblical associations of the North: Arcadia merged with Eden; the American was cast as Adam; and technology became the Edenic tree. Once again we stood at the dawn of civilization, as Emerson put it, "the plain old Adam, the simple genuine self against the whole world."[49] "And now," observes Adam in Hawthorne's "New Adam and Eve," "we must again try to discover what sort of world this is and why we have been sent hither."[50]

It did not require the literary gentleman wielding a pen – or the artist – to find out that the New World was not heathen, cursed, desolate,

or ungodly; it was, as anyone, even the foreigner Tocqueville, could see, "the most magnificent dwelling place prepared by God for man's abode" and offered, as he said, "an immense booty to the Americans."[51] Americans did not need artists to tell them this. They needed their artists and writers to provide the litany of confession, in which Americans engaged to a ferocious extent during the nineteenth century, so that they could take hold of this immense booty without feeling too much guilt about the magnificent abode. Where there had been jeremiads, halfway covenants, and revivals, there were now novels, newspaper editorials, and revivals – and in the wake of the revivals came the courts.

"The astonishing fact about this gigantic material thrust of the early nineteenth century," as Miller says,

> is how few Americans would any longer venture, aside from their boasts, to explain, let alone to justify, the expansion of civilization in any language that could remotely be called that of utility. . . . The more rapidly, the more voraciously, the primordial forests were felled, the more desperately poets and painters – and also preachers – strove to identify the personality of this republic with the virtues of pristine and untarnished, or 'romantic' Nature."[52]

Miller is right; writers, artists, and preachers not only exorcised the nation's guilt but also recognized its responsibility; for while the nation saw nature as a source of prosperity, they experienced it, following the Puritans and the Jeffersonians before them, as a symbol of virtue as well. And so they had a purpose other than economic; although the nation destroyed most of the wilderness, it would not do so frivolously. Expiation followed exploitation. The nation had second and more benevolent, more virtuous thoughts. Even while it tore down the wilderness it kept nature alive in the symbolism of religion, literature, and art.

The contribution of artists, writers, and preachers from the time of Edwards to Melville to Fitzgerald and Faulkner was to discover in nature, then, the symbols of virtue, or, for those who remained true to the original covenant, to find in nature the attributes of God – his strength, intelligence, integrity – exemplified. It was to confront man with these attributes as ideals, and thus it was to compel him, as Fitzgerald wrote, "into an aesthetic contemplation he neither understood nor desired, face to face for the last time in history with something commensurate with his capacity to wonder."[53]

In describing what sort of world this is, our artists, writers, and preachers have also told us why we had been sent hither: to conquer

nature, surely, but to achieve also a national character that becomes it – so that our personality as a people will justify our prosperity and our prosperity will not have to justify our personality. How does this differ in any important respect from what Winthrop told his followers aboard the *Arbella*? The covenant is now with nature, no longer with nature's God, but this, in retrospect, may not be an important difference. Since nature may provide the best samples we have of the attributes of God, the terms of the covenant are the same.

The covenant we have made with nature, which is as much an obligation to use well our natural environment as to protect it – and, in any case, not to destroy it wantonly or in a wasteful manner – historically had religious rather than economic or even literary and artistic origins. But "benevolence" may be distinguished into two kinds. The first is the benevolence of Ben Franklin, an economic analyst at heart; it is a willingness to countenance the interests of all creatures (except in the most inconvenient cases) against one's own. It asks, "Which wants have I satisfied today?" Second, we may understand "benevolence" as did Jonathan Edwards as a love for being or as a practice of virtue. This kind of benevolence does not reason in terms of benefits and costs; and it does not blush at the terms "guilt" and "responsibility." What benefits settlers received, for example, from slaughtering Indians and tearing down forests, explain but do not justify these acts; they may even add to the severity of the crime. The point would be to recognize our responsibility not only to what survives of the past but also to what did not survive. The recognition of what we have done – it is guilt – is a great resource to us: It provides a more human and more satisfactory motivation than does the simple pursuit of prosperity. Why does this sound strange? It is as old as Adam. It is the oldest thought in the world.

HISTORY AND RESPONSIBILITY

Our responsibility to the natural environment is our recognition of its qualities both present and past; and it requires us to take a benevolent attitude to these qualities. (Edwards in this sense provides a theological basis for an environmental virtue ethic.) We wish to preserve natural areas where we can and, where we cannot, to remember and suit our actions to the character of what we have destroyed. In *Big Woods*, William Faulkner's hero, Ike McCaslin, on his first hunt, hikes in the area

where the ivory-billed woodpecker had and may still have its range. Following the directions of Sam Fathers, an Indian guide, the young McCaslin kills a deer. Many years later, McCaslin, now an old man, remembers:

> I walked to the buck lying still intact and still in the attitude of magnificent speed and bled it with Sam's knife and Sam dipped his hands into the hot blood and marked my face forever while I stood trying not to tremble, humbly and with pride too though a boy of twelve could not actually have phrased it: "I slew you; my bearing must not shame your quitting life. My conduct forever afterward must become your death."[54]

"I believe," Thoreau wrote, "that Adam in paradise was not so favorably situated on the whole as is the backwoodsman in America." Then he added, it "remains to be seen how the western Adam in the wilderness will turn out."[55] This is the point. If he remains Adam, an innocent, a backwoodsman, a utilitarian, a cost-benefit analyst, he will have his riches, his prosperity. Like F. Scott Fitzgerald's creation Jay Gatsby, he will have no history and no responsibility, but he will be in some respects a Titan, and he will fill with excitement many otherwise empty lives. "The truth was," Fitzgerald wrote, "that Jay Gatsby of West Egg, Long Island, sprang from his Platonic conception of himself. He was a son of God . . . and he must be about his Father's business, the service of a vast, vulgar, and meretricious beauty." The future, one imagines, is with Gatsby, not McCaslin.

At the end of Faulkner's story, McCaslin, now eighty-one, returns along with a few younger people to the remnant of the Big Woods on his last hunt. On the first morning, his great-nephew, Roth Edmonds, shoots two deer, both female, and therefore killed in violation of the law, and with buckshot, not with "the rifle which he had used ever since he had finally seen that a man with a steady eye and hand owed more to the bear or the buck than to shoot it with a blind handful of pellets." McCaslin, too sorrowful to be furious, manages to get the man to pick up the animals and feed them to the dogs – one doe is too old and tough for humans – and he asks Edmonds why he used a shotgun. Edmonds replies with the innocence of the frontiersman who defended to Natty Bumppo the utility of cannon in massacring pigeons. It was the economical answer. It was the willingness-to-pay answer. It was the preference-satisfaction answer. "You said last night you want meat."[56]

Herbert Croly notes that "had it not been for . . . the virgin wilderness, the United States would never have been the Land of Promise." He continues:

> If its promise is anything more than a vision of power and success, that addition must derive its value from a purpose; because in the moral world the future exists only as a workshop in which a purpose is to be realized. . . . Only by a better understanding of the popular tradition, only by an analysis of its merits and difficulties can we reach a more consistent and edifying conception of the Promise of American Life.[57]

How can we reach a more consistent and edifying conception of the Promise of American Life?[58] The choice comes down to this: not what ideals we shall serve, because we know these – freedom, integrity, justice, intelligence, power – but what we shall mean by them. And this question is answered in our symbols. The paradigm, the symbol, if you will, of freedom has been the wilderness, a deer, a bear, an eagle, a rapid river. It could be a washing machine, a coffee percolator, a breakfast food. It might then amount to leisure and efficiency. It's Gatsby's motor car: "the spontaneous fruit of an Edenic tree."[59] It's the shotgun pellets; it could be the cannon. Our symbols of freedom could close with those of national security, law, and order; they may be the prison and the bomber drone. And they will change our understanding of what freedom is. There is a threat here, and one that makes Winthrop's warning mild by comparison. And so the covenant analogy is complete.

"This land," says the old hunter in Faulkner's story, "No wonder the ruined woods I used to know don't cry for retribution. The very people who destroyed them will accomplish their revenge."[60]

Chapter 10

Environmentalism: Death and Resurrection

An editorial in *The Economist* magazine quipped that the environmental movement borrows its underlying narrative from Christian thought. "There is a Garden of Eden (unspoiled nature), a fall (economic development), the usual moral degeneracy (it's all man's fault), and the pressing sense that the world is enjoying its final days (time is running out: please donate now!)."[1] The global economy, at least in comparison to the past, however, seems to be booming. Environmentalism may be in its Last Days. As one commentator put it, "Secular apocalypticism appears devoid of an underlying redemptive meaning and is thus characterized by a sense of hopelessness and despair."[2] The "Death of Environmentalism" is much discussed. Why has the environmental movement, which waxed as a political force in the 1970s, waned today?[3]

THE CONDITIONS OF RELIGIOUS EXPERIENCE

In the *Varieties of Religious Experience*, William James wrote that religious belief expresses the conviction "that there is an unseen order, and that our supreme good lies in adjusting ourselves thereto." Religious experience also arises from the human sense "that there is something wrong about us as we naturally stand. The solution is that we are saved from that wrongness by making proper connection with the higher powers."[4]

The science of ecology for over a century has lent support to these beliefs. First, ecologists have held that an unseen order is to be discovered in biotic communities – that "there is a reality to community structure and there is a dynamic stability . . . a highly significant underlying element of organization and constancy [that persists] over hundreds of thousands or millions of years."[5] Second, ecologists have suggested that there is something wrong about human beings as we naturally stand.

"The ecosystem concept typically considers human activities as external disturbances. . . . *Homo sapiens* is the only important species that is considered external from its ecosystem."[6]

In recent years, however, ecologists have come to question these assumptions. Ecologists are no longer sure that nature has any mathematical organization above the level of the organism or the population. Many ecologists wonder, moreover, if human beings can be excluded from the ecosystem. Ecological science has moved away from the foundational beliefs that nature possesses a hidden order – that there are ecological "systems" or "communities" the "structure" of which "naturally" or by definition excludes human influence. The environmental movement nevertheless continues to look to science to support its faith that there is a hidden order in nature that human beings disrupt because of our "wrongness" – notably our greed or ignorance or intransigence. Environmentalists invoke science to defend traditional religious views about the relation of humanity to nature at a time when science questions those theoretical assumptions. Because it is now caught up in a debate among environmental scientists, environmentalism has become less a popular spiritual or cultural cause and more an academic research program.

A. Does Everything Connect?

To understand the way environmental science and with it environmentalism as a political movement has changed, it is useful to reflect on the mantra that "everything connects." This motto of the environmental movement is often traced to a statement John Muir wrote in 1911. "When we try to pick out anything by itself we find it hitched to everything else in the Universe."[7] Audubon, Catlin, Cole, Olmsted, and other preservationists, many of whom were artists, believed as Muir did that everything in nature connects as in a work of art or in a narrative beginning with Creation. Americans in the Puritan or Reformed tradition adopted the view that God expresses himself in Creation as an artist does in a painting or poem. The natural world is full of "images and shadows of divine things," as Jonathan Edwards said. A person may find a path to salvation through nature if he or she appreciates its power and beauty.[8] Calvin and other Reformers taught that Creation "shadows forth" divine things. Everything connects in nature in a kind of aesthetic coherence that communicates or expresses the genius of the creator.

In the wake of the Enlightenment, however, one could as well believe that everything in nature might connect as parts in a working machine. This approach conceives God not as an Artist but as a Watchmaker who expresses his power and wisdom in the design of complex systems. One could argue that God has separated himself from nature and has even subjected himself to its principles. The true scientist is not the natural historian or observer, but a theoretician, a modeler, who pries into the timeless essence of nature and captures in equations the principles that explain how ecosystems work. The way to understand the unseen order, then, is not individual conversion but mathematical conception. The path to collective salvation lies through scientific research that will lead to the adaptive management of the environment.[9]

Religious experience, according to James, involves not only the belief in the unseen order of nature but also the recognition "that there is something wrong about us as we naturally stand." This concept of human "wrongness" takes two different forms – one moral, the other prudential. If we think of nature as a work of art full of aesthetic symbols, our wrongness would consist in treating it as a way to wealth rather than as a path to salvation – as a resource for economic activity rather than as a refuge from it. Even if we succeed, we replace Creation with Commerce.

If, on the other hand, we think of God as a Watchmaker, then our wrongness is prudential. Our attempt to become wealthy does not make us wrong; we should maximize wealth insofar as possible. What makes humanity wrong is that our technological reach will exceed our ecological grasp. What ecologists do not know can hurt us. We ignore their uncertainty at our peril. The scale of the human economy will exceed the carrying capacity of the Earth. We need to follow a precautionary principle until scientists can confidently predict – or adaptively manage – the outcomes of our actions. The problem is not that Adam and Eve sinned by eating from the Tree of Knowledge. The problem is that the little knowledge they obtained is a dangerous thing.

B. God as Artist

Environmentalism always has found support as a political – indeed, a populist – movement among those who adopt the Artist view of Creation and who thus experience nature as a source of aesthetic, spiritual, or ethical inspiration. These environmentalists build on the tradition that begins with Puritans like Jonathan Edwards, continues through the

American Transcendentalists, such as Thoreau and Emerson, and culminates in the preservationist movement of John Muir. Muir analogized Europeans entering the American wilderness to the Israelites coming into the Promised Land. When asked how he reconciled Creation with evolution, Muir answered in terms of Intelligent Design. "Somewhere before evolution was an Intelligence. You may call that intelligence what you please; I cannot see why so many people object to call it God."[10]

When environmentalists like Muir described wilderness areas as America's cathedrals, they invoked the Reformed tradition that sought to shake off ecclesiastical and scholastic authority. This kind of environmentalism, which leads people on a pilgrimage into nature, encourages each person to come to terms individually with the Creator, whether like Thoreau, by living alone in the woods, like Emerson by declaring that "the Universe is composed of Nature and the Soul," or like Whitman by writing a "Song of Myself." The canonical portrait of John Muir at Yosemite shows a walking-stick as his only companion.[11] The path Thoreau followed into the woods or Muir through the mountains or Melville across the sea was the path of self-discovery.

Environmentalists who experience nature in aesthetic terms, that is, as the work of an Artist not a Watchmaker, are often hunters, anglers, hikers, birdwatchers, and others who, particularly in the rural West, worked to protect wild places they knew, visited, and loved. George Grinnell, an explorer and birder, founded the Audubon Society 1887 to represent the interests of birdwatchers; John Muir, a mountaineer, established the Sierra Club in 1892 for backpackers and campers; Will H. Dilg, a fisherman, convened the Isaak Walton League in 1922 for anglers; Robert Marshall, camper-hiker, initiated the Wilderness Society in 1935 for backpackers; and Jay Darling, a duck hunter, founded the National Wildlife Federation in 1936, made up largely of hunters. As originally established, these environmental organizations depended on the participation of individuals in local chapters and therefore represented a populist constituency.[12] These locally based organizations succeeded in leading a movement to protect what are now 83 million acres in the National Park system and more than 187 million acres in national forests.[13]

The environmental movement has drawn a second source of populist support from Christian groups, more than forty of which, including Evangelicals, today pursue missions they describe as environmental conservation or caring for creation.[14] Richard Cizik, a leader of the 30 million members of the National Association of Evangelicals, insists that

his group seeks to protect the natural environment. In a *New York Times* interview, Cizik said, "The Scriptures themselves . . . say watch over creation and care for it."[15] In a carefully orchestrated political campaign in 1995, Christian organizations, including the Evangelical Environmental Network, stymied the Republican attempt to undo the U.S. Endangered Species Act.[16] This effort continues; a recent *New York Times* headline states, "Evangelical Leaders Swing Influence behind Effort to Combat Global Warming." A current policy statement of the National Association of Evangelicals declares what it calls the "principle of sustainability."[17] The religious commitment to sustaining the natural world as a divine heritage remains strong in America today.

C. God as Watchmaker

The first generation of American ecologists – Stephen Forbes is a good example – were born in the era of natural theology. They would have read John Ray's *The Wisdom of God Manifested in the Works of Creation* (1691); they surely knew William Paley's proposal that if nature is organized according to principles that endow it with a structure or function, "it must have had a maker – that there must have existed, at some time and at some place or other, an artificer or artificers who formed it for the purpose which we find it actually to answer, who comprehended its construction and designed its use."[18] The organization we find in nature, Paley thought, testifies to the existence of God.

With the publication of the *Origin of Species* in 1859, Darwin showed that random mutation and natural selection account for the design we observe in plants and animals. Darwin also knew that "plants and animals . . . are bound together by a web of complex interactions." Darwin did not try to discover the rules, principles, or powers that organize the entangled webs of interactions we call communities or ecosystems. Indeed, it is difficult to see how Darwin could have tackled this problem. Since ecosystems lack genomes, have no evolutionary purposes, do not compete, do not reproduce, and are not units of selection, it is difficult to conceive how evolutionary forces could design them. Whatever structure, function, or organization ecological communities or systems possess – whatever principles govern them – are therefore not easily explicable in evolutionary terms. No one has shown, at any rate, the causal path between evolutionary forces and ecosystem design.

The ability of Darwinian evolution to explain the structure and function of organisms but not of ecosystems put ecologists in a quandary. They could concede that what are called "ecosystems" or "communities" have no structure or function. Assemblages of plants and animals represent not persistent organizations or evolutionary units but blooming, buzzing, confusions of contingency, accretions of accident, happenstances of history. The living world, in fact, does not seem to exist in identifiable structures beyond individual organisms or arguably populations. Historian Donald Worster comments:

> Nature should be regarded as a landscape of patches, big and little, patches of all textures and colors, a patchwork quilt of living things, changing continually through time and space, responding to an unceasing barrage of perturbations. The stitches in that quilt never hold for long.[19]

Rather than surrender the idea of design in nature, however, ecologists could remain true to the belief that there is an unseen order – a "dynamic stability" – which human beings, not belonging to nature, threaten or disrupt. Ecologists have lent scientific support to the religious insistence, first, that there is a hidden order in nature and, second, that there is something wrong about us as we naturally stand. To maintain this course, they could declare that ecological "systems" or "communities" *evolve*; they might suppose that somehow evolution works from the bottom up, first structuring organisms and then populations and then communities or ecosystems. Once Darwin had shown that evolutionary forces shape organisms, why not just *say*, *assume*, or *postulate* that these forces – random mutation and natural selection – organize ecosystems as well?[20] Environmental scientists who believe that they will – indeed *must* for the sake of humanity – uncover these organizing principles might claim political power, at least by invoking a precautionary principle, until they have discovered the truths that await them.

ECOLOGICAL SCIENCE AND ENVIRONMENTAL POLICY

Ecologists have assumed for over a century – many assume today – that whatever God can do, evolution can do better. Evolution involves a lot of brutality – parasitism, predation, starvation, and so on; in other words, it works more like a wrathful Calvinist God than like a rational Thomistic Clockmaker. The outcome, ecologists have argued, is a beneficent

equilibrium.[21] Ecologist Stephen Forbes in a famous article written in 1887 described a lake in Illinois as a system, like a watch, and he assumed evolution was the Watchmaker. Forbes replaced Paley's God with Darwin. He wrote:

> even here, out of these hard conditions, an order has been evolved which is the best conceivable . . . ; an equilibrium has been reached and is steadily maintained that actually accomplishes for all the parties involved the greatest good which the circumstances will at all permit. . . . [A]n order has spontaneously risen which constantly tends to maintain life at the highest limit. . . . Is there not, in this reflection, solid ground for a belief in the final beneficence of the laws of organic nature?[22]

A. Self-Organizing Systems

According to environmental historian Donald Worster, "no individual had a more profound impact" than Frederic Clements (1874–1945) on the course of American as well as British ecological thought.[23] Clements applied to ecosystems the concept of evolution Darwin had explicated in relation to organisms. Clements accomplished this by describing the ecological system or community as an organism – a "unified mechanism in which the whole is greater than the sum of its parts and hence it constitutes a new kind of organic being with novel attributes" – or as a "superorganism" created through stages of succession in which "all living organisms are unified in one communal bond."[24]

Once Forbes and Clements posited the existence of a "communal bond" or beneficent "order" linking organisms within ecosystems, ecologists saw in this bond a moral good worth preserving. Several nature religions that flourished during the period of Forbes and Clements adopted a similar view by supposing that nature self-organizes into ascendant or hierarchical units. For example, Theosophists followed Madame Blavatsky in describing ecological communities in terms of evolution rather than special Creation.[25] For them, all matter self-organizes into more and more complex and ascendant forms – a continuous natural evolution, development, or succession into higher unities culminating in consciousness.[26] The Creation Research Institute itself has endorsed the principle of self-organizing evolutionary processes. "Once the creation was finished, these processes of creation were replaced by processes of conservation, which were designed by the Creator to sustain and maintain the basic systems He had created."[27] I believe that historians of science will in the future regard the currently

popular idea of self-organizing complexity, a theory that unites the nature religions of the nineteenth century with mathematical ecology of today, as continuing a Gnostic faith of ancient origins.

The belief that ecosystems exhibit a hidden design – that biotic communities are structured according to mathematical principles that satisfy the human mind and sustain the human body – unites theoretical ecologists to this day with the tradition of "Great Chain of Being" cosmology associated with philosophers of nature from Plato to Linnaeus. According to this traditional view, natural communities exhibit plenitude (every niche is filled), continuity (an organization from the smallest to the largest being), diversity, and hierarchy (scale).[28] Fundamental to the idea of the "Chain of Being" was a belief that God creates nothing in vain.[29] Accordingly, we are obliged to care as much for the least creature in nature as for the greatest. The familiar rivet-popping analogy of Paul Ehrlich reflects this well-known passage in Alexander Pope's *Essay on Man*:

> Vast chain of being! which from God began,
> Natures aethereal, human, angel, man,
> Beast, bird, fish, insect, what no eye can see . . .
> Where, one step broken, the great scale's destroy'd;
> From Nature's chain whatever link you strike,
> Tenth, or ten thousandth, breaks the chain alike.[30]

B. The Balance of Nature

Since the late nineteenth century, most ecologists – and nearly all the influential ones – have described forests, lakes, estuaries, and similar sites as systems, as communities, or even as superorganisms governed by mathematical laws and general principles – an unseen order – which they sought to describe. Aldo Leopold's well-known dictum about "saving all the parts" and Paul Ehrlich's oft-repeated analogy between species and the rivets in an airplane connote this idea of nature as a complex system governed by rules science will someday discover. E. P. Odum, like most ecologists of the 1950s and 1960s, hoped to reveal the theoretical principles and mathematical equations that account for what he called "higher levels of biological organization," that is, "properties of large-scale, integrated systems."[31] In an influential article, Odum reiterated Forbes's conception of the ecosystem as providing the greatest good for the greatest number. He wrote, "The overall strategy is . . . directed

towards achieving as large and diverse an organic structure as is possible within the limits set by the available energy input and . . . physical conditions."[32]

The belief that nature comprises "dynamically stable" communities, according to ecologist Dan Botkin, has three features. "First, Nature, undisturbed by human influences, achieves a permanency of form and structure that persists indefinitely. Second, this permanent condition is the best condition for Nature: best for other creatures, best for the environment and best for humans. Third, when disturbed from this natural state, Nature is capable of returning to it."[33] Law professor Dan Tarlock has written, "Legislators and lawyers enthusiastically embraced this paradigm because it seemed to be a neutral, universal public policy principle. . . . The contributions of modern environmental resource management to the legal system are premised on this paradigm."[34]

By the 1980s, ecological science did the work of natural theology in supporting the values of the environmental movement. Ecological science argued that living communities or systems possess an unseen order – a self-organizing complexity governed by rules or principles which scientists with enough support will discover by deep mathematical thinking. Environmental scientists also accommodated the belief that there is something wrong with humanity as we stand. According to two historians of science, "Ecologists traditionally have sought to study pristine ecosystems to try to get at the workings of nature without the confounding influences of human activity."[35] Ecologist David Western has written, "Ecologists' preoccupation with the pristine reflects a long tradition in western culture and a philosophy of separating humanity and nature."[36]

The idea of the wrongness of humanity – which excludes mankind from ecosystems – made ecology unique as a science. No other science excludes humanity from the natural world or imagines that humanity can disrupt the laws of nature. Protagoras said, "Man is the measure of all things." The *absence* of human influence has been the measure of the health, integrity, or functioning of ecosystems.[37] A baseline, however, is hard to find. Ecologists concede, "Many ecosystems are dominated directly by humanity, and no ecosystem on Earth's surface is free of pervasive human influence."[38] If nature includes humanity, however, how can it possibly be seen as a self-organizing system? The farm, the suburb, the city, and the kitchen sink would then all exemplify parts of nature but none of them is self-organizing.

The idea that the natural or living world exemplifies a rule-governed complex system – equilibrial or non-equilibrial – the laws of which we have yet to plumb has dominated academic ecology through the 1970s and beyond. This faith in the orderliness of the living world attests to the lingering hold of the argument from God's beneficent design. Historian William Glacken has written, "I am convinced that modern ecological theory, so important in our attitudes towards nature and man's interference with it, owes its origin to the design argument. The wisdom of the creator is self-evident . . . no living thing is useless, and all are related one to the other."[39]

DOUBT IN ECOLOGY

Until the 1970s, the Creationist and the Ecologist described Nature in the same way. They agreed that the natural world is organized into stable, complex, and beneficent communities or systems. Both lent their support to the environmental movement. More recently, however, many ecologists have come to question whether nature has any general design ecologists can study. As ecologist William Drury has written,

> I feel that ecosystems are largely extemporaneous and that most species (in what we often call a community) are superfluous to the operation of those sets of species between which we can clearly identify important interactions. . . . Complexity seems to be a figment of our imaginations driven by taking the 'holistic' view.[40]

After the 1970s, ecologists began to doubt that what they called ecosystems or communities exhibit any rule-governed behavior. One ecologist has remarked that the "striking absence of supporting empirical data" has by now produced "great doubts about the existence of universal laws in ecology."[41] Ecologists such as Daniel Simberloff have noted the lack of evidence that ecosystems are integrated entities and "the failure of general assembly rules to pass scrutiny."[42] Others have said there is no empirical evidence of "an ontological emergence of a community level of biotic organization." Any appearance of organization or constancy at the system or community level "is a biological epiphenomenon, a statistical abstraction, a descriptive convention without true emergent properties but only collective ones, wholly referable in its properties to those of its constituent species, populations, and individuals."[43]

Few scientists in academic life today would touch Muir's idea that "somewhere before evolution was an Intelligence." To mention "intelligent design" is to provoke cascades of derision. Scientists are pleased to call it "self-organization" instead. Having since the time of Forbes promised to show that nature worked like a watch – or functioned like a community – ecologists have not identified that design or explained how it happened.[44] Ecologists warn us against disrupting nature's laws – at least until they understand what those laws are and so can predict what punishment will befall us if we do transgress them. Ecological science has taken God out of the design of nature – but what has it put but its own research agenda in his place?

GETTING RID OF THE POLITICAL BASE

Before 1970, major environmental groups represented sportspeople and others who wished to defend the natural areas they directly experienced. Backpackers swelled the ranks of the Sierra Club and the Wilderness Society; birdwatchers made up the core constituency of the Audubon Society; hunters joined the National Wildlife Federation. Environmental organizations founded before 1970 depended on their local chapters to build their constituencies, offer direction, and provide support.

After Earth Day 1970, a new kind of organization appeared, epitomized by the National Resource Defense Council and the Environmental Defense Fund, staffed by lawyers, economists, scientists, and other experts. These outfits defined the "environment" or "environmentalism" in terms of whatever interests they presumed to represent. They represented science and on that basis asserted political power.[45] The newer groups attracted wealthy patrons and foundation support. They hired professionals to pursue a Washington-based "inside-the-beltway" strategy of lobbying congressional committees, influencing regulatory agencies, and working the courts.

The Sierra Club, the National Wildlife Federation, and other traditional groups, attracted to foundation and other funding, began to model themselves on these staff-based expertise-oriented inside-the-beltway lobbying outfits. They shunned and rid themselves of their erstwhile hook-bullet-and-birder constituencies. Consider the Audubon Society. Starting in the early 1980s, Audubon hired a consulting agency to help it shake off its association with bird watchers; it closed regional offices and reduced the portion of membership dues available to local chapters.[46] According to historian Robert Gottlieb, "for this one-time organization

of birders" – as for the Sierra Club, the National Wildlife Federation, and other groups – "reconstituting itself also meant escaping its past."[47]

By the middle of the 1990s, major traditional environmental organizations had staffed up with scientists, economists, lawyers, and other professionals to compete with each other for funding to produce *apparatchiks* – or, as one historian has said, to provide "career training for the initiation and management of environmental policies." The environmental leadership began to defend an abstraction – the "environment" – it defined in terms of whatever interested it or might attract foundation support. Appealing to theories of the structure and function of ecosystems, the balance of nature, and other scientific principles, the leadership chose to prescribe values to society rather than to respond to values society already had. As a result, the "environment" now comprises a collection of technical concerns that provide funding opportunities for professional environmentalists. These concerns are defined by abstractions about biotic communities, sustainability, biodiversity, ecological integrity, ecosystem services, invasive species, existence values, and other conceptual constructs of ecospeak science.

These abstractions are investigated by scientists and other experts and professsionals who believe they will as a result speak truth to power. They think they are politically representative as long as they are interdisciplinary. They form research teams to determine how much nature is "worth" – and thus in more ways than one, academics "green" their disciplines. They at once blame the science of the past for destroying nature and trust their own science to protect it. All this saps the religious and cultural energies that once made the environmental movement a force to reckon with. Environmentalism insofar as it relies on scientific theories or postulates has little to do with the places – particular forests or vistas – that people know, care about, and want to protect.

RESURRECTION

The religious energy of the 1970s has not disappeared. The public celebration that greeted the discovery in Arkansas of the ivory-billed woodpecker suggests that the spirit of environmentalism might, like that bird, rise again. That ecologists had declared the bird extinct – which it may in fact be – is not the problem. The problem is not that environmental scientists may sometimes be wrong. The problem is that they patronize the public – they capitalize on what they call "charismatic megafauna" to obtain support to study the theoretical constructs, mathematical models,

and academic disputes that interest them. Environmental scientists may try to buttress the environmental movement by declaring everything humanity does to be risky and unsustainable. From a political perspective, however, environmental science, which in many instances seems more like advocacy than honesty, may now be doing more harm than good.

Many environmental scientists – including ecological economists – offer arguments to protect the natural environment on economic grounds, for example, by putting prices on moral or religious commitments. In this way, these environmentalists turn the moral, spiritual, and aesthetic judgments that can guide us into data for cost-benefit analysis. These scientists also argue that undeveloped nature provides ecological services that development destroys. This cuts developing economies and nations from their legitimate aspirations. Economic development often requires cultivating a savannah, farming a lake, planting a forest, building a city, constructing a dam, mining a desert, and altering a genome. The current vogue of "valuing" ecosystem services as a way to prevent development has produced prodigious estimates but no political argument. As the Pilgrims found out when they died, Nature is a place where you cannot get good service.

The problem science poses for environmentalism is particularly poignant in its attempt to answer questions that require instead theological, moral, and aesthetic judgments. For example, consider the decision the Bush administration announced in May 2004 to consider hatchery-bred salmon that join and survive among stream-bred populations in determining whether the species merits listing under the Endangered Species Act.[48] Should hatchery-bred clones of wild fish, if they eventually survive and breed in streams, be deemed as good as wild fish for purposes of conservation?[49] Are we trying to protect simply a biological species or a "wild" population that is independent of human activity?

Moral, religious, and aesthetic questions beset the environmental movement. Any number of novel species can be genetically engineered. Should these be counted as biodiversity? Non-native species now have doubled the richness or number of species on many islands and other places.[50] Is this a good thing? It would seem to be beneficial if the number and diversity of species – as we are sometimes told – correlated with the "stability" or "productivity" of ecosystems. Non-native species are usually defined as those that colonize a place not "naturally" but in the wake of human activity. The very concept implies the wrongness of

humanity. Is the distinction between "native" and "non-native" species, which depends on the role of humanity, a scientific or a theological one? Does ecology or theology – or do both – insist that there is a hidden order in nature and that there is something wrong about us as we naturally stand?

Ecologists who seek to remove non-native species from islands and other environments find that their mottos are all too true: everything connects; they cannot do just one thing. An article in *Science* magazine describes the cascading effects – the unwelcome "ecological kickback" – that followed attempts to exterminate a non-native pig on Santa Cruz Island in California. In fact, "some ecologists think that earlier eradications may actually have helped make the war on pigs necessary," for example, the earlier eradication of a non-native sheep.[51] As ecologists eradicate species that are "wrong" they have to design the ecosystem that is "right." They themselves become creators. "Ecosystems are always changing. Scientists want to play god," said an animal rights advocate, who protested the killing of the pigs.[52]

The environmental movement is dying because it expects science to maintain our faith in the rightness of nature and wrongness of humanity. But ecologists and other biologists no longer lend credibility to the religious, aesthetic, and moral commitments that make people care about the natural environment. The environmental leadership forms a dispirited *nomenklatura* – a technocratic class competing for foundation support and governmental largess. It adopts a tactical, defensive crouch as it fights a rearguard action for a cause in full retreat.

The environmental movement is dying because it represents the Enlightenment not the Reformation. It is full of Descartes and empty of Calvin. It is high on rationality and low on redemption. It presents nature as a system for interdisciplinary scientists to model and administer for the collective good rather than as an object for moral instruction and aesthetic appreciation for every individual. Environmentalists speak as experts who will reveal the mathematical principles by which we can command nature; yet they are pessimistic and suspicious about human progress. Environmentalism today embraces an authoritarian, secular, scientistic, collectivist, elitist, anti-democratic, cosmopolitan, querulous intellectualism, that is, a kind of anti-Americanism. The problem is not that environmentalism of this sort is dead. The problem is that it deserves to die.

All this will change. Environmentalists will reach out to the populist constituencies who gave them support decades ago. Hunters, anglers,

backpackers, birders, and other sportspeople will once again form the backbone of the environmental movement when it reemerges, as it surely will. Evangelical and other Christians who recognize a religious duty to care for Creation must also be welcomed into the environmental movement on their own terms.

Environmentalists will also understand that their cause cannot survive as an exclusively partisan liberal or left-wing movement. Environmentalism may be consistent with liberalism, but there is no logical connection between the two. In fact, conservative values favor many environmental laws because conservatives do understand the importance of cleaning up one's mess, not polluting and thus not trespassing upon the person and property of others, and caring for the beauty and majesty of nature. Because environmentalism is so deeply entrenched in American religious and historical experience, it will survive its current reliance on its own science, however self-defeating that has become. Like the ivory-billed woodpecker that ecologists had declared extinct, plainly the environmental movement will arise again.

Notes

CHAPTER 1: INTRODUCTION

1. According to John Muir, you may "cleanse your soul of worldly evil" by encountering the sacred in nature. For this and other relevant quotations, see Donald Worster, *The Wealth of Nature: Environmental History and the Ecological Imagination* (New York: Oxford University Press, 1993), pp. 193–195.
2. David Hume, *An Enquiry Concerning the Principles of Morals*, Section III, Part 1 (Oxford: Oxford University Press, 1998).
3. Robert H. Nelson, *Reaching for Heaven on Earth: The Theological Meaning of Economics* (Lanham, MD: Rowman and Littlefield, 1991).
4. F. Scott Fitzgerald, *The Crack-Up*, ed. Edmund Wilson (New York: New Directions, 1956); quotation at p. 69.
5. John Muir, "The National Parks and Forest Reservations" *Harper's Weekly* 41 (June 5, 1897): 566–567.
6. Gifford Pinchot, *The Fight for Conservation* (Seattle: University of Washington Press, 1910), p. 42.
7. Ibid., p. 43.
8. For a good account of this conception of the value of nature, see John McPhee, *Encounters with the Archdruid* (New York: Farrar, Straus and Giroux, 1971) (at p. 74 quoting David Brower, then head of the Sierra Club, "I believe in wilderness for itself alone"). According to Roger Kennedy, who directed the U.S. Park Service during the Clinton administration, wilderness puts us "in the presence of the unknowable and the uncontrollable before which all humans stand in awe." Roger Kennedy, "The Fish that Will Not Take Our Hooks," *Wilderness* (Spring 1995): 28–30; quotation at p. 28.
9. Ronald Dworkin, *Life's Dominion* (New York: Vintage Books, 1994), pp. 71–72; for an application of this principle to the endangered species issue, see pp. 76–77.
10. For discussion, see Chapter 5 in this book.
11. Amartya Sen, "Why We Should Preserve the Spotted Owl," *London Review of Books* 26, no. 3 (February 5, 2004): 10–11; http://www.lrb.co.uk/v26/n03/sen_01_.html.

12. Willett Kempton, James S. Boster, and Jennifer A. Hartley, *Environmental Values in American Culture* (Cambridge, MA: MIT Press, 1995), pp. 91, 92.
13. Richard Musgrave, *The Theory of Public Finance* (New York: McGraw-Hill, 1959), p. 5.
14. For an earlier version of the line of argument developed here, see Charles Lindblom, "The Science of 'Muddling Through,'" *Public Administration Review* 19 (1959): 79–88. According to Lindblom, the values that guide policy formation emerge in the process as participants shape their views in relation to those of others. Lindblom denies that there is a single metric – such as economic value or ecological sustainability – that can inform policy; rather what these and other commitments mean emerges as a result of the political process.
15. Adam Jaffe, Steven Peterson, Paul Portney, and Robert Stavins, "Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?" *Journal of Economic Literature* 33 (March 1995): 132–163; quotation at p. 133.
16. Ibid.
17. Michael Porter and Claas van der Linde, "Green and Competitive," *Harvard Business Review* (September/October 1995): 120–134.
18. See, for example, Roger H. Bezdek, "Environment and Economy: What's the Bottom Line?" *Environment* 35 (September 1993): 6–11, 25–32; Eban Goodstein, *Jobs and the Environment: The Myth of a National Trade-Off* (Washington, DC: Economic Policy Institute, 1994); Stephen M. Meyer, "Environmentalism and Economic Prosperity: Testing the Environmental Impact Hypothesis," MIT Project on Environmental Politics and Policy, October 5, 1992 (finding that "states with stronger environmental policies consistently out-performed the weaker environmental states on all the economic measures").
19. Jaffe et al., "Environmental Regulation," p. 135.
20. Robert Repetto, *Jobs, Competitiveness and Environmental Regulation: What Are the Real Issues?* (Washington, DC: World Resources Institute, March 1995); quotation at p. 5.
21. See, for example, S. Dasgupta, B. Laplante, H. Wang, and D. Wheeler," Confronting the Environmental Kuznets Curve," *Journal of Economic Perspectives* 16 (1) (2002): 147–168.
22. U.S. Environmental Protection Agency, "Air Emissions Trends – Continued Progress through 2004"; http://www.epa.gov/airtrends/econemissions.html.
23. Steven Hayward et al., *Index of Leading Environmental Indicators April 2005* (San Francisco: Pacific Research Institute for Public Policy, and Washington, DC: American Enterprise Institute for Public Policy Research, 2005), p. 5; http://www.pacificresearch.org/pub/sab/enviro/05_enviroindex/2005_Enviro_Index.pdf.
24. Robert H. Nelson, "Does 'Existence Value' Exist? An Essay on Religions, Old and New," *Independent Review* (March 1997): 499–521.

25. Tibor Machan, "Pollution and Political Theory," in *Earthbound: New Introductory Essays in Environmental Ethics*, ed. Tom Regan (New York: Random House, 1984), pp. 74–106; quotation at p. 97.
26. *Tenant v. Goldwin*, 1 Salk. 360, 91 Eng. Rep. 314 (K. B. 1705).
27. William Prosser, *Handbook on the Law of Torts*, 4th ed. (St. Paul, MN: West, 1971), sec. 87, p. 576.
28. Larry Ruff, "The Economic Common Sense of Pollution," *The Public Interest* (19) (Spring 1970): 69–85. Reprinted in Robert Dorfman and Nancy Dorfman, *Economics of the Environment: Selected Readings*, 3rd ed. (New York: Norton, 1993), pp. 20–36; quotation at p. 20.
29. Ibid., 29; italics omitted.
30. Ibid.
31. 55 Misc.2d 1023, 287 N.Y.S.2d 112 (1967), *aff'd*, 30 A.D.2d 480, 294 N.Y.S.2d 452 (1968), *rev'd and remanded*, 26 N.Y.2d 219, 309 N.Y.S.2d 312, 257 N.E.2d 870 (1970) (granting an injunction against the nuisance until the trial court determined the proper amount of permanent damages for the plaintiffs in place of temporary damages previously awarded).
32. 55 Misc.2d at 1024, 287 N.Y.S.2d at 113.
33. Judge Jasen (dissenting) 309 N.Y.S.2d 312 257 N.E.2d 87 (Court of Appeals of New York, 1970).
34. For an excellent review of environmentalism in the 1960s and 1970s, particularly the role of moral outrage among middle-class women with respect to pollution, see Adam Rome, "Give Earth a Chance: The Environmental Movement and the Sixties," *Journal of American History* 90 (September 2003): 525–554. See also, Samuel P. Hays, "From Conservation to Environment: Environmental Politics in the United States since World War II," *Environmental Review* 6 (Fall 1982): 14–41.
35. Edward Lee Rodgers, *Hearings on S. 3229, S. 3466, before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works*, 91st Cong., 2d sess. 849 (1970).
36. Maureen L. Cropper and Wallace E. Oates, "Environmental Economics: A Survey," *Journal of Economic Literature* 30 (1992): 675–740; quotation at p. 675. Kip Viscusi comments: "The Supreme Court, for instance, has explicitly prohibited the use of a benefit-cost test for OSHA standards pertaining to toxic substances and hazardous physical agents. Since the statutory mandates in most risk-reducing legislation are written narrowly, court decisions of that kind could prove quite common." Viscusi, "Presidential Oversight: Controlling the Regulators," *Journal of Policy Analysis and Management* 2, no. 2 (1983): 157–173; quotation at p. 162.
37. See, for example, William Rogers, "Benefits, Costs, and Risks: Oversight of Health and Environmental Decisionmaking," *Harvard Environmental Law Review* 4 (1980): 191–240; quotation at p. 201.
38. Quoted in a discussion of the *de minimis* rule in Chris Whipple, "Dealing with Uncertainty about Risk in Risk Management," in National Academy of Engineering, *Hazards: Technology and Fairness* (Washington, DC: National Academy Press, 1986); quotation at p. 55.

39. Michael Dorf and Charles F. Sabel, "A Constitution of Democratic Experimentalism," *Columbia Law Review* 98 (1998): 267–463.
40. Guido Calabresi and Douglas Melamed, "Property Rules, Liability Rules, and Inalienability: One View of the Cathedral," *Harvard Law Review* 85, no. 6 (1972): 1089–1182.
41. Douglas J. McCauley, "Selling Out on Nature," *Nature* 443 (September 7, 2006): 27–28; quotation at p. 27.
42. For an example of this method, see Richard Zerbe, Yoram Bauman, and Aaron Finkle, "An Aggregate Measure for Benefit Cost Analysis," *Ecological Economics* 58 (2006): 449–461.
43. Gretchen Daily, quoted in Charles Petit, "Natural Environment Gets a Price Tag – $33 Trillion," *San Francisco Chronicle*, May 15, 1997, p. A-1.
44. Bertrand Russell, *Introduction to Mathematical Philosophy* (New York: Allen and Unwin, 1919), p. 71.
45. *Grist Magazine* (January 13, 2005); http://www.grist.org/news/maindish/2005/01/13/doe-reprint/.
46. Bill McKibben, "What 'Green' Means," article posted by CommonDreams .org; http://www.commondreams.org/views05/0807-26.htm.
47. This is the euphemism Hegel used. He meant that the role of philosophy is not to save the world but to bayonet the wounded.
48. I paraphrase G. W. F. Hegel, "Preface" in T. M. Knox, ed., *The Philosophy of Right* (Oxford: Clarendon Press, 1962), p. 13.

CHAPTER 2: AT THE SHRINE OF OUR LADY OF FATIMA *or* WHY POLITICAL QUESTIONS ARE NOT ALL ECONOMIC

1. Henry Adams, *The Education of Henry Adams*, 2d ed. (Boston: Houghton Mifflin, 1970), p. 380.
2. Ibid., p. 388.
3. For an account, see Joseph A. Pelletier, *The Sun Danced at Fatima* (Worcester, MA: Washington Press, 1951).
4. *New Catholic Encyclopedia* (New York: McGraw-Hill, 1967), p. 856.
5. Richard N. L. Andrews, "Cost-Benefit Analysis and Regulatory Reform," in *Cost-Benefit Analysis and Environmental Regulations: Politics, Ethics, and Methods*, ed. Daniel Swartzman, Richard Liroff, and Kevin Croke (Washington, DC: Conservation Foundation, 1982), pp. 107–135; quotation at p. 112.
6. For discussion, see Jody Freeman, "Collaborative Governance in the Administrative State," *UCLA Law Review* 45 (1997–1998): 1–98.
7. Frank Michelman, "Political Markets and Community Self-determination: Competing Judicial Models of Government Legitimacy," *Indiana Law Journal* 53 (1977–1978): 147–206; quotation at p. 149. Michelman quotes Kenneth Arrow as follows: "The case for democracy rests on the argument that free discussion and expression of opinion are the most suitable techniques of arriving at the moral imperative implicitly common to all. Voting, from this point of view, is not a device whereby each individual expresses his personal interests, but rather where each individual gives his opinion of the general

will." Kenneth Arrow, *Social Choice and Individual Values* (New Haven, CN: Yale University Press, 1963), p. 85.

8. Economists may invoke the truism that only the values of human beings – not those of trees and animals – count in policy formation. These economists therefore correctly inveigh against the odd idea, associated with some speculation in the early 1970s, that objects of nature have interests of their own to be weighed in cost-benefit analysis. This book agrees completely that only human beliefs, commitments, and projects count – that all values are "anthropogenic," that is, they all come from human beings. This book of course strenuously denies that the relevant values are all "anthropocentric," in other words, that they involve only human well-being or welfare. This is because people have all kinds of beliefs, values, and interests that go beyond the effects on them of an outcome or policy. The distinction lies between the logical subject and the logical object of valuation. If the sentence "*S* attaches a value or assigns a value to *p*" is to be relevant to policy, the logical subject *S* must refer to a person. The predicate or object *p*, however, need not refer to the well-being of anyone, including *S*. A person can find any object *p* valuable for intrinsic reasons, that is, reasons that transcend his or her well-being. To be sure, the pain and suffering of animals matters to any decent human being – so they matter in social policy. Human beings, however, assign all the values. In other places, I have argued against the idea that the interests of the environment should matter to environmental policy (though obviously animal welfare is an ethical concern because people have a duty not to be cruel or to cause unnecessary pain to animals). For a diatribe against legal "standing" for trees, and so on, see Mark Sagoff, "On Preserving the Natural Environment," *Yale Law Journal*, 84, no. 2 (December 1974): 205–267.
9. J. G. March, *A Primer in Decision Making* (New York: Free Press, 1994), p. 58.
10. William Baxter, *People or Penguins: The Case for Optimal Pollution* (New York: Columbia University Press, 1974), p. 15. Baxter adds (p. 17), "The question how one organizes society so as to obtain reasonable assurance that resources are deployed effectively, that is, deployed continuously over time so as to yield the maximum aggregate of human satisfactions, is of course the classic and central question to which the science of economics is addressed."
11. Ibid., p. 17.
12. "To the economist, the environment is a scarce resource which contributes to human welfare. The economic problem of the environment is a small part of the overall economic problem: how to manage our activities so as to meet our material needs and wants in the face of scarcity." A. Myrick Freeman, "The Ethical Basis of the Economic View of the Environment," *The Environmental Ethics and Policy Book* (Belmont, CA: Wadsworth, 1994), p. 307.
13. Arthur M. Okun, *Equality and Efficiency: The Big Tradeoff* (Washington, DC: Brookings Institution, 1975), p. 2. One thinks of Jim Henson's magnificent puppet Miss Piggy and her immortal epithet, "More is More." On the other hand, Madonna's "material girl" presents a more complex and provocative approach to the "more is better" theme.

14. Joseph Seneca and Michael Taussig, *Environmental Economics*, 2d ed. (Englewood Cliffs, NJ: Prentice-Hall, 1979), p. 6. The passage reads: "*Efficiency* is defined as maximum consumption of goods and services given the available amount of resources or, what is logically equivalent, the use of a minimum amount of resources to produce or make available for consumption a given amount of goods and services. *Equity* refers to a just distribution of total goods and services among all consumer units." Note that these economists see the resource base as "given" – allocation is a zero-sum game. In fact, resources are a function of technology. The point of economic analysis is to help increase resources, not just to divvy them up.
15. Ibid. There is a contradiction here. To assure the maximum production and consumption of goods and services given resources, society would have to let trades take place in response to competitive market prices. To "value" goods in terms of "the most the individual is willing to pay," in contrast substitutes centralized planning by economists who measure this "most." There is no reference to markets that depend on competitive prices.
16. James R. Kahn, *The Economic Approach to Environmental and Natural Resources* (Fort Worth, TX: Dryden Press, 1998).
17. A. Myrick Freeman, Robert H. Haveman, and Allen V. Kneese, *The Economics of Environmental Policy* (New York: Wiley, 1973), p. 23.
18. R. J. Hammond, *Benefit-Cost Analysis and Water Pollution Control* (Stanford, CA: Stanford University Press, 1960).
19. This is Kneese's second condition; the first is that markets are competitive, for example, nonmonopolistic. Allen V. Kneese, "Environmental Policy," in *The United States in the 1980s*, ed. Peter Duignan and Alvin Rabushka (Stanford, CA: Hoover Institution Press, 1980), pp. 253–283; quotation at p. 256. Kneese has stated essentially the same argument in Allen Kneese and Blair Bower, *Environmental Quality and Residuals Management* (Baltimore: Johns Hopkins University Press, 1979), pp. 4–5.
20. Kneese, "Environmental Policy," p. 256.
21. Ibid.
22. Ibid., p. 259.
23. David William Pearce, *Environmental Economics* (London: Longmans, 1976), p. 1.
24. Eban S. Goodstein, *Economics and the Environment*, 4th ed. (New York: Wiley, 2005); Charles D. Kolstad, *Environmental Economics* (New York: Wiley, 2000).
25. H. P. Green, "Cost-Benefit Assessment and the Law," *George Washington Law Review* 45, no. 5 (August 1977): 904–905; see also E. J. Mishan, *Cost-Benefit Analysis* (New York: Praeger, 1976), pp. 160–166.
26. For an introduction to and discussion of this approach to the Coase theorem, see Duncan Kennedy, "Cost-Benefit Analysis of Entitlement Problems: A Critique," *Stanford Law Review* 33 (1981): 387–445.
27. Carl Rogers, "A Theory of Therapy, Personality, and Interpersonal Relationships, as Developed in the Client Centered Framework," in *Psychology: A Study of a Science*, ed. S. Koch (New York: McGraw-Hill, 1959), vol. 3, p. 210.
28. Ibid., p. 208.

29. Carl Rogers, *Client Centered Therapy* (Boston: Houghton Mifflin, 1965), p. 150.
30. Ibid.
31. Ibid.
32. Rogers, "A Theory of Therapy," p. 208.
33. Ibid., pp. 523–524.
34. James Buchanan, "Positive Economics, Welfare Economics, and Political Economy," *Journal of Law and Economics* 2, no. 127 (1959): 124–138.
35. A. Randall, "What Mainstream Economists Have to Say about the Value of Biodiversity," in *Biodiversity*, ed. E. O. Wilson and Frances M. Peter (Washington, DC: National Academy Press, 1988), p. 217. The assimilation of what is good with what the individual wants captures the change in emphasis in America from the moral and social to the psychological and subjective. See Philip Reiff, *The Triumph of the Therapeutic* (New York: Harper & Row, 1966). One way to understand the ethos of cost-benefit analysis is to recognize it as a station on the road America has followed from the moral self-castigation of the *Education of Henry Adams* to the self-absorbed neuroses depicted in the movies of Woody Allen.
36. For a discussion of social orderings and preference relations, see A. K. Sen, *Collective Choice and Social Welfare* (San Francisco: Holden-Day, 1970), and K. J. Arrow, *Social Choice and Individual Values*, 2d ed. (New York: Wiley, 1983), chap. 2.
37. Immanuel Kant, *Foundations of the Metaphysics of Morals*, ed. R. Wolff, trans. L. Beck (Indianapolis: Bobbs-Merrill, 1969). I follow the interpretation of Kantian ethics of W. Sellars, *Science and Metaphysics* (New York: Humanities Press, 1968), chap. 7, and W. Sellars, "On Reasoning about Values," *American Philosophical Quarterly* 17 (1979): 81–101.
38. See Alasdair MacIntyre, *After Virtue* (Notre Dame, IN: University of Notre Dame Press, 1981).
39. For the suggestion that property rights to have an abortion be traded in markets as a solution to the political controversy, see Hugh H. Macauley and Bruce Yandle, *Environmental Use and the Market* (Lexington, MA: Lexington Books, 1977). These authors write (pp. 120–121): "There is an optimal number of abortions, just as there is an optimal level of pollution, or purity. . . . Those who oppose abortion could eliminate it entirely, if their intensity of feeling were so strong as to lead to payments that were greater at the margin than the price anyone would pay to have an abortion."
40. For this suggestion, see Charles J. Cicchetti, A. Myrick Freeman III, Robert H. Haveman, and Jack L. Knetsch, "On the Economics of Mass Demonstrations: A Case Study of the November 1969 March on Washington," *American Economic Review* 61 (1971): 179–195. The authors use the Clawson–Knetsch–Hotelling travel-cost method to measure political opposition to the Vietnam War. Had they the data, they would also factor in the cost of postage on letters to Congress.
41. William Simon, "Homo Psychologious: Notes on a New Legal Formalism," *Stanford Law Review* 32 (1980): 495.
42. Ibid.
43. Rieff, *The Triumph of the Therapeutic*, p. 52.

44. MacIntyre, *After Virtue*, p. 22. The idea here is that some theories of political economy take ruler–subject relations seriously, and some do not, except insofar as these relations may be revealed in a market. For this distinction, see Edward Nell, "The Revival of Political Economy," *Social Research* 39 (1972): 32–53, and John Gurley, "The State of Political Economics," *American Economic Review* 61 (1971): 53–63. Gurley writes (pp. 54–55): "Political economics . . . studies economic problems by systematically taking into account, in a historical context, the pervasiveness of ruler-subject relations in society. . . . It is these pervasive relations of power and authority that lead to conflict, disharmony and disruptive change." Conventional welfare economics of the sort I criticize here seeks to understand and arbitrate conflict without understanding it in this context.
45. I lift this idea from Gunnar Myrdal, *The Political Element in the Development of Economic Theory*, trans. Paul Streeter (London: Routledge and Kegan Paul, 1953), esp. p. 54. For discussion, see Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958), sect. 6.
46. Adams, *Education*, p. 476.

CHAPTER 3: THE ALLOCATION AND DISTRIBUTION OF RESOURCES

1. 405 U.S. 727 (1972).
2. Ibid., p. 729.
3. The Council on Environmental Quality wrote: "Mineral King well illustrates the issue of recreational development for the pleasure of tens of thousands of people every year versus the value of an undisturbed naturalness for fewer visitors." *Sixth Annual Report* 2 (1975): 242. For details relating to the Disney project and its market, see John Harte and Robert Socolow, *Patient Earth* (New York: Holt, Rinehart and Winston, 1971), pp. 168–170; for commentary, "Mineral King Goes Downhill," *Ecology Law Quarterly* 5 (1976): 555.
4. See Arnold Hano, "Protectionists vs. Recreationists – The Battle of Mineral King," *New York Times Magazine*, August 17, 1969, p. 24; Peter Browning, "Mickey Mouse in the Mountain," *Harper's* (March 1972): 65–71; "Thar's Gold in Those Hills," *Nation* 206 (1968): 260.
5. National Parks and Recreation Act of 1978, Pub. L. No. 95–625, sec. 314, 92 Stat. 3467 (codified at 16 U.S.C. sec. 45F [supp. III 1979]).
6. Richard A. Musgrave, *The Theory of Public Finance* (New York: McGraw-Hill, 1959), pp. 87–88.
7. Stephen Marglin, "The Social Rate of Discount and the Optimal Rate of Investment," *Quarterly Journal of Economics* 77 (1963): 98.
8. Paul Milgrom, "Is Sympathy an Economic Value? Philosophy, Economics and the Contingent Valuation Method," in *Contingent Valuation*: *A Critical Assessment*, ed. J. A. Hausman (North Holland: Elsevier, 1993), pp. 417–441; quotation at p. 431.
9. Gordon Tullock, *Toward a Mathematics of Politics* (Ann Arbor: University of Michigan Press, 1967), p. 3. Cf. p. 1: "In modern economics and in the political theory which is now developing out of economics, the preference schedule has substituted for the man."

10. A. K. Sen, "Rational Fools: A Critique of the Behavioral Foundations of Economic Theory," *Philosophy and Public Affairs* 6 (1977): 317–344. Sen writes (pp. 335–336): "A person is given *one* preference-ordering, and as and when the need arises this is supposed to reflect his interest, represent his welfare, summarize his idea of what should be done, and describe his actual choices and behavior. Can one preference-ordering do all these things? A person thus described may be 'rational' in the limited sense of revealing no inconsistencies in his behavior, but if he has no use for these distinctions . . . he must be a bit of a fool. The *purely* economic man is close to being a social moron. Economic theory has been much preoccupied with this rational fool decked in the glory of his *one* all-purpose preference ordering."
11. See Martin H. Krieger, "Six Propositions on the Poor and Pollution," *Policy Sciences* 1 (1970): 311–324; and Henry Peskin, "Environmental Policy and the Distribution of Benefits and Costs," in *Current Issues in U.S. Environmental Policy*, ed. Paul R. Portney (Baltimore: Resources for the Future, 1978), pp. 144–163.
12. This distinction has been drawn in a somewhat different form by Henry M. Peskin and Eugene Seskin, "Introduction and Overview," in *Cost Benefit Analysis and Water Pollution Policy*, ed. Peskin and Seskin (Washington, DC: Urban Institute, 1975), pp. 4–5. These authors use "allocation" to mean the total amount of a resource that should be produced or otherwise made available; they use distribution the way I use the allocation–distribution distinction to mark the difference between resource management and its consequences on income. For a similar treatment, see Burton Weisbrod, "Income Redistribution Effects and Benefit-Cost Analysis," in *Problems in Public Expenditure Analysis*, ed. Samuel B. Chase (Washington, DC: Brookings Institution, 1968), pp. 177, 178. For the same distinction made in somewhat different language, see Otto Eckstein, *Water-Resource Development* (Cambridge, MA: Harvard University Press, 1958), p. 17.
13. See, for example, Arthur M. Okun, *Equality and Efficiency: The Big Tradeoff* (Washington, DC: Brookings Institution, 1975).
14. For an example of this method, see Richard Zerbe, Yoram Bauman, and Aaron Finkle, "An Aggregate Measure for Benefit Cost Analysis," *Ecological Economics* 58 (2006): 449–461. For comment, Sagoff, "An Aggregate Measure of What? A Reply to Zerbe, Bauman, and Finkle," *Ecological Economics* 60, no. 1 (November 2006): 9–13.
15. "Allocation programs include measures to affect relative prices and/or the allocation of resources in an economy, motivated by considerations of economic efficiency. Distribution programs consist of efforts to alter the distribution of incomes in society, motivated by considerations of distributive equity." Edward M. Gramlich, *Benefit-Cost Analysis of Government Programs* (Englewood Cliffs, NJ: Prentice-Hall, 1981), p. 13.
16. See, e.g., Thomas C. Schelling, "Economic Reasoning and the Ethics of Policy," *Public Interest* 63 (1981): 37–61.
17. For an argument to the effect that the priority of the right to the good is trivial when the good is conceived in terms of preference satisfaction, see Michael J. Sandel, *Liberalism and the Limits of Justice* (Cambridge: Cambridge

University Press, 1982). I have reviewed Sandel's arguments in "The Limits of Justice," *Yale Law Journal* 92, no. 6 (1983): 1065–1081.

18. Ronald Dworkin, "Liberalism," in Stuart Hampshire, ed., *Public and Private Morality* (Cambridge: Cambridge University Press, 1978), pp. 112–143. Dworkin has developed convincing arguments for the kinds of aesthetic and spiritual values I defend here as beacons to public policy. Needless to say, the conceptual clarity Dworkin created in the area of philosophy and public policy has supported the development of this field. See, for example, Ronald Dworkin, *Life's Dominion: An Argument about Abortion, Euthanasia, and Individual Freedom* (New York: Knopf, 1993), especially pp. 69–77.
19. Some critics of liberalism, like Sandel (see note 17), believe that liberals are doomed to carry on this empty debate.
20. Leading examples of this literature include Ronald Dworkin, *Taking Rights Seriously* (Cambridge, MA: Harvard University Press, 1977), and Richard Posner, *The Economics of Justice* (Cambridge, MA: Harvard University Press, 1985).
21. There are some court cases, for example, those involving affirmative action, to which debates of this sort are quite relevant. See, for example, Dworkin, "Reverse Discrimination," in *Taking Rights Seriously*, pp. 223–239.
22. For discussion relating the social discount rate to environmental ethics, see J. A. Doeleman, "On the Social Rate of Discount: The Case for Macroenvironmental Policy," *Environmental Ethics* 2 (1980): 45–58, and sources cited therein.
23. Derek Parfit, "Energy Policy and the Further Future," working paper, Center for Philosophy and Public Policy, University of Maryland, February 23, 1981. A slightly different version of the passage cited appears in Parfit, "Energy Policy and the Further Future: The Identity Problem," in *Energy and the Future*, ed. Douglas MacLean and Peter F. Brown (Totowa, NJ: Rowman and Littlefield, 1983), pp. 167–179.
24. William Blackstone summarizes well my view on this point. See Blackstone, "The Search for an Environmental Ethic," in *Matters of Life and Death*, ed. Tom Regan (Philadelphia: Temple University Press, 1980), p. 331.
25. Immanuel Kant, *Critique of Judgment*, trans. H. Bernard (New York: Hafner, 1951), sec. 59.
26. Mill argues in several passages that one may be legitimately compelled under certain circumstances to be a "good Samaritan." See "On Liberty," in *Collected Works*, vol. 18 (Toronto: University of Toronto Press, 1977), p. 224.
27. I have argued this position more fully in "Liberalism and Law," in *Liberalism Reconsidered*, ed. Douglas MacLean and Claudia Mills (Totowa, NJ: Rowman and Littlefield, 1983), pp. 12–24.
28. See Christopher Stone, *Should Trees Have Standing? Toward Legal Rights for Natural Objects* (Los Altos, CA: William Kaufmann, 1974).
29. See Council on Environmental Quality, *Public Opinion on Environmental Issues: Results of a National Opinion Survey* (Washington, DC: President's Council on Environmental Quality, 1980), 49 pp.

30. Ibid., pp. 4, 11. For more evidence, see John M. Gilroy and Robert Y. Shapiro, "The Polls: Environmental Protection," *Public Opinion Quarterly* 50 (1986): 270–279. This excellent survey describes and summarizes many polls.
31. Pascal's wager seems to follow along these lines. "Let us weigh the gain and loss in wagering that God is. Let us estimate the two chances. If you gain, you gain all; if you lose, you lose nothing. Wager, then, without hesitation that He is." B. Pascal, *Pensées*, trans. W. Trotter (New York: P. F. Collier, 1952), sec. 233. For a contemporary reduction of Christianity to hedging bets, see Robert B. Ekelund Jr., Robert F. Hebert, and Robert D. Tollison, *The Marketplace of Christianity* (Cambridge, MA: MIT Press, 2006). The authors argue that "each person who seeks religion from an organized church purchases an implied contract that contains obligations and expectations that, once fulfilled, result in passage to a utility-maximizing afterlife." Protestantism offers a better deal than Catholicism, according to these authors, because it requires less of an upfront payment. "Protestantism had fewer mechanisms through which its agents could extract rents, so that, in effect, it sold redemption much cheaper, even allowing for the seemingly random allocation of God's grace."
32. Robert Goodin extends this analysis to many goods besides environmental ones. See Goodin, *Political Theory and Public Policy* (Chicago: University of Chicago Press, 1982), chap. 6.
33. "That which is related to general human inclination and needs has a *market price*. . . . But that which constitutes the condition under which alone something can be an end in itself does not have a mere relative worth, *i.e.*, a price, but an intrinsic worth, *i.e.*, *dignity*." Immanuel Kant, *Foundations of the Metaphysics of Morals*, ed. R. Wolff, trans. L. Beck (Indianapolis: Bobbs-Merrill, 1959), p. 53 (emphasis in original).
34. For a general discussion of the distinction between "positive" and "negative" freedom, see Isaiah Berlin, *Four Essays on Liberty* (London: Oxford University Press, 1969), esp. the third essay and pp. xxxvii–lxiii of the Introduction; and Gerald MacCallum, "Negative and Positive Freedom," *Philosophical Review* 76 (1967): 312–321.
35. Quoted in this context by William Ruckelshaus in "Risk, Science, and Society," *Issues in Science and Technology* 3 (Spring 1985): 19–38; quotation at p. 24.
36. A classic of useful writing in economics along these lines is Thomas Schelling, *Micromotives and Macrobehavior*, rev. ed. (New York: Norton, 2006).

CHAPTER 4: VALUES AND PREFERENCES

1. P. Sullivan, "William 'Bub' Post III; Unhappy Lottery Winner," *Washington Post*, January 20, 2000, p. B8.
2. R. Sudgen, "Welfare, Resources, and Capabilities: A Review of Inequality Reexamined by Amartya Sen," *Journal of Economic Literature* 31 (1993): 1947–1962; quotation at p. 1948.
3. Paul A. Samuelson described this circularity many decades ago. "This, the consumer's market behavior is explained in terms of his preferences,

which are in turn defined only by behavior. . . . Often nothing more is stated than that people behave as they behave, a theorem which has no empirical implications . . ." P. A. Samulson, *The Foundations of Economic Analysis* (New York: Atheneum. 1974), pp. 91–92.

4. M. Sagoff, *Price, Principle, and the Environment* (New York: Cambridge University Press, 2004), chap. 3.
5. Alfred Marshall, *Principles of Economics* (Philadelphia: Porcupine Press, 1890), Section III, vi, 5.
6. Leland Deck, "Visibility at the Grand Canyon and the Navajo Generating Station," in R. D. Morgenstern, ed., *Economic Analysis at EPA: Assessing Regulatory Impact* (Washington, DC: Resources for the Future: 1997), pp. 267–301.
7. R. Coase, R., "The Problem of Social Cost," *Journal of Law & Economics* 3, no. 1 (1960); Duncan Kennedy, "Cost-Benefit Analyses of Entitlement Problems: A Critique," *Stanford Law Review* 33 (1982); R. O. Zerbe and H. McCurdy, "The Failure of Market Failure," *Journal of Policy Analysis and Management* 18, no. 4 (1999): 558–578; R. O. Zerbe and H. McCurdy "The End of Market Failure," *Regulation* 23, no. 2 (2000): 10–14.
8. Coase, "Social Cost," pp. 25–26.
9. Resources for the Future, "Furry Math? Market Has Failed to Capture True Value of Nature?" *Science Journal* (August 9, 2002) (quoting Paul Portney); http://www.rff.org/rff/News/Coverage/2002/August/Furry-Math-Market-Fails-to-Capture-Natures-Value.cfm.
10. A. M. Freeman, *The Benefits of Environmental Improvement: Theory and Practice* (Baltimore: Resources for the Future, Johns Hopkins University Press, 1979), p. 6.
11. Edith Stokey and Richard Zeckhauser, *A Primer for Policy Analysis* (New York: Norton, 1978), p. 262.
12. See, for example, D. A. Schkade and J. W. Payne, "How People Respond to Contingent Valuation Questions: A Verbal Protocol Analysis of Willingness to Pay for an Environmental Regulation," *Journal of Environmental Economics and Management*, 26 (1994): 88–109. See especially pp. 88 and 89. Thomas H. Stevens et al., "Measuring the Existence Value of Wildlife: What Do CVM Estimates Really Show?" *Land Economics* 67 (1991): 390; Thomas H. Stevens et al., "Measuring the Existence Value of Wildlife: Reply," *Land Economics* 69 (1993): 309; R. Blamey et al., "Respondents to Contingent Valuation Surveys: Consumers or Citizens?" *Australian Journal of Agricultural Economics*, 39 (1995): 263, 285; and many others.
13. Kenneth J. Arrow, *Social Choice and Individual Value*, 2d ed. (New Haven, CT: Yale University Press, 1963), p. 17.
14. A. Sen, "Why Exactly Is Commitment Important for Rationality? *Economics and Philosophy* 21 (2005): 5–6; see also A. Sen, "Rational Fools: A Critique of the Behavioral Foundations of Economic Theory," *Philosophy and Public Affairs* 6 (1977): 317–344; A. Sen, "Goals, Commitment and Identity," *Journal of Law, Economics, & Organization* 1 (985): 341–355; and A. Sen, "Maximization and the Act of Choice," *Econometrica* 65 (1997): 745–779.
15. Sen, "Rational Fools," p. 327.

16. Ibid., p. 328.
17. Ibid.
18. Ibid., p. 329.
19. Matthew Adler and Eric Posner, *New Foundations of Cost-Benefit Analysis* (Cambridge, MA: Harvard University Press, 2006), pp. 126–127. These authors are plainly correct to assert that "existence" and other "nonuse" values, since they are unrelated to welfare, should not be included in a welfare analysis.
20. Tom Tietenberg, *Environmental and Natural Resource Economics*, 5th ed. (New York: Harper Collins College, 2000), p. 20.
21. David Pearce, *Economics and the Environment* (Cheltenham, UK: Edward Elgar Pearce 1998), p. 221.
22. Anthony Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice* (Upper Saddle River, NJ: Prentice-Hall, 1996), p. 76 (italics in original).
23. George Peterson and Alan Randall have written, "The benefit cost criterion is not an alien intruder from the economic arena into the political environment. Rather, it is directly derived from one particular, utilitarian, political philosophy." Alan Randall and George Peterson, "The Valuation of Wildland Benefits," in *Valuation of Wildland Benefits*, ed. Peterson and Randall (Boulder, CO: Westview, 1984), pp. 3–4.
24. Eban S. Goodstein, *Economics and the Environment*, 4th ed. (New York: Wiley, 2005), p. 24.
25. To be sure, the pain and suffering of animals matters to any decent human being – so they matter in social policy. Human beings, however, assign all the values. In other places, I have argued against the idea that the interests of the environment should matter to environmental policy (though obviously animal welfare is an ethical concern because people have a duty not to be cruel or to cause unnecessary pain to animals). For a diatribe against legal "standing" for trees, see Mark Sagoff, "On Preserving the Natural Environment," *Yale Law Journal*, 84, no. 2 (December 1974): 205–267.
26. Goodstein, *Economics and the Environment*, p. 25.
27. See, for example, Robert Samuelson, *The Good Life and Its Discontents: The American Dream in the Age of Entitlement* (New York: Knopf, 1997), e.g., p. 56; R. E. Lane, *The Market Experience* (New York: Cambridge University Press, 1991); and Michael Argyle, "Causes and Correlates of Happiness," in *Well-Being: The Foundations of Hedonic Psychology*, ed. Daniel Kahneman, Ed Diener, and Norbert Schwarz (New York: Russell Sage Foundation, 1999), pp. 353–373. See also Richard Easterlin, "Does Economic Growth Improve the Human Lot?" in *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*, ed. Paul David and Melvin Reder (New York: Academic Press, 1974); Richard Easterlin, "Will Raising the Incomes of All Increase the Happiness of All?" *Journal of Economic Behavior and Organization* 27 (1995): 35–47; David G. Myers, *The Pursuit of Happiness: Who Is Happy and Why?* (New York: Avon, 1993). Researchers consistently find that among people who are not poor, rising income correlates with unhappiness due to higher divorce rates (T. T. Clydesdale, "Family Behaviors among Early

U.S. Baby Boomers: Exploring the Effects of Religion and Income Change, 1965–1982," *Social Forces* 76 [1997]: 605–635); greater stress (P. Thoits and M. Hannan, "Income and Psychological Distress: The Impact of an Income-Maintenance Experiment," *Journal of Health and Social Behavior* 20 [1979]: 120–138); depression (E. Diener, E. Sandvik, L. Seidlitz, and M. Diener, "The Relation between Income and Subjective Well-being: Relative or Absolute?" *Social Indicators Research* 28 [1992]: 253–281); and many other reasons (P. D. Brickman, D. Coates, and R. Janoff-Bulman, "Lottery Winners and Accident Victims: Is Happiness Relative?" *Journal of Personality and Social Psychology* 36 [1978]: 917–927). Robert Frank argues that "gains in happiness that might have been expected to result from growth in absolute income have not materialized because of the ways in which people in affluent societies have generally spent their incomes." Robert Frank, "How Not to Buy Happiness," *Daedalus* 133, no. 2 (Spring 2004): 69–79. Frank argues quite plausibly that subjective well-being or satisfaction does not correlate with how much one paid for a good but with the kind of good it is. The classic study of consumer dissatisfaction – the fact that the more you pay for a good the greater is your resentment when the purchase disappoints – is A. O. Hirschman's *Exit, Voice, and Loyalty* (Cambridge, MA: Harvard University Press, 1970). For an extensive and convincing set of papers exploring the theme that money does not buy happiness and that preference-satisfaction has no empirical correlation with perceived well-being once basic needs are met, see L. Bruni and P. L. Porta, *Economics and Happiness: Framing the Analysis* (Oxford: Oxford University Press, 2005).

28. Richard Layard, *Happiness: Lessons from a New Science* (New York: Penguin, 2005), p. 3.
29. Bruno S. Frey and Alois Stutzer, "What Can Economists Learn from Happiness Research," CESifo Working Paper No. 503; University of Zurich Working Paper No. 80. June 2001, p. 9.
30. Richard Posner, *The Economics of Justice* (Cambridge, MA: Harvard University Press, 1981), p. 60.
31. Robert E. Lane, "The Road Not Taken: Giving Friendship Priority over Commodities," paper presented at a conference on Consumption, Global Stewardship and the Good Life, University of Maryland, College Park, MD, September 29–October 2, 1994; quotation at page 7.
32. A. O. Hirschman, *Shifting Involvements: Private Interest and Public Action* (Princeton, NJ: Princeton University Press, 1982), p. 10.
33. I am here questioning the relationship between preference-utilitarianism and happiness. I recognize the problems that attend the measurement of happiness and the identification of its causes – which may differ in every case. For discussion, see Will Wilkinson, "In Pursuit of Happiness Research: Is It Reliable? What Does It Imply for Policy?" Cato Institute Policy Analyis Policy no. 590 (April 11, 2007), Washington, DC; http://www.cato.org/pub_display.php?pub_id=8179.
34. Fred Hirsch, *Social Limits to Growth* (Cambridge, MA: Harvard University Press, 1976).

35. There would be some virtue in having more races, or cultural spheres, in which people can compete. For analysis, see Robert Frank, *Choosing the Right Pond: Human Behavior and the Quest for Status* (New York: Oxford University Press, 1987).
36. Hirsch, *Social Limits to Growth*, p. 1.
37. Mary Douglas and Baron Isherwood, *The World of Goods* (New York: Basic, 1979), esp. chap. 1, "Why People Want Goods."
38. Hirsch, *Social Limits to Growth*, p. 5.
39. John Stuart Mill, "What Utilitarianism Is," in *The Utilitarians* (Garden City, NY: Doubleday, 1961), p. 410.
40. F. H. Knight, *The Ethics of Competition and Other Essays* (New York: Harper Bros., 1935), pp. 22–23.
41. Adler and Posner would have economists "launder" preferences before putting them in the WTP wash. Adler and Posner, *New Foundations*, pp. 149–153.
42. R. O. Zerbe, Jr., Y. Bauman, and A. Finkle, "A Preference for an Aggregate Measure: A Reply to Sagoff," *Ecological Economics* 60, no. 1 (2006): 14–16. See also Alan Randall, "What Mainstream Economists Have to Say about the Value of Biodiversity," in *Biodiversity*, ed. E. O. Wilson and Frances M. Peter (Washington: National Academy Press, 1988), p. 217.
43. D. N. McCloskey, *The Rhetoric of Economics* (Madison: University of Wisconsin Press, 1985); quotation at p. 16.
44. See, for example, F. Ackerman and L. Heinzerling, *Priceless: On Knowing the Price of Everything and the Value of Nothing* (New York: New Press, 2004).
45. Samuelson, *Foundations*, pp. 97–98 (italics removed).
46. Dasgupta, "Values or Facts?" p. 229.
47. Huib Pellikaan and Robert J. van der Veen, *Environmental Dilemmas and Policy Design* (Cambridge: Cambridge University Press, 2002); quotation at p. 10.
48. Julie R. Irwin, Paul Slovic, Sarah Lichtenstein, and Gary H. McClelland, "Preference Reversals and the Measurement of Environmental Values," *Journal of Risk and Uncertainty* 6, no. 1 (1993): 5–18; quotation at p. 5.
49. John A. List, "Preference Reversals of a Different Kind: The 'More Is Less' Phenomenon," *American Economic Review* 92, no. 5 (2002): 1636–1643; quotation at p. 1637.
50. Amartya K. Sen, "Rational Fools: A Critique of the Behavioral Foundations of Economic Theory," *Philosophy and Public Affairs* 6, no. 4 (1977): 317–344; quotations on pp. 335–336.
51. Amartya Sen and Bernard Williams, "Introduction," in *Utilitarianism and Beyond*, ed. A. Sen and B. Williams (Cambridge: Cambridge University Press, 1982), pp. 1–21; quotation at p. 4.
52. J. R. Hicks, "The Rehabilitation of Consumers' Surplus, *Review of Economic Studies* 8, no. 2 (1941): 108–116; quotation at p. 108.
53. Gunnar Myrdal, *The Political Element in the Development of Economic Theory*, trans. Paul Streeter (London: Routledge and Kegan Paul, 1953); quotation at pp. 194–195.

54. Adler and Posner, *New Foundations*, p. 23.
55. Peter Boettke, Christopher Coyne, and Peter Leeson, "High Priests and Lowly Philosophers: The Battle for the Soul of Economics," *Case Western Reserve University Law Review* 56, no. 3 (Spring 2006): 553.
56. F. A. Hayek, *Individualism and Economic Order* (Chicago: University of Chicago Press, 1948), p. 50.
57. P. Dasgupta, "What Do Economists Analyze and Why: Values or Facts?" *Economics and Philosophy* 21 (2005): 221–278; quotation at p. 230.
58. Ibid.
59. P. Lewis, "Boettke, the Austrian School, and the Reclamation of Reality in Modern Economics," *Review of Austrian Economics* 18, no. 1 (2005): 83–108; quotation at p. 86.
60. Richard Musgrave, *The Theory of Public Finance* (New York: McGraw-Hill, 1959), p. 5.
61. Bruno S. Frey and Alois Stutzer, "What Can Economists Learn from Happiness Research," *Journal of Economic Literature* 40, no. 2 (June 2002): 22–35. Interview at http://www.esi-topics.com/erf/2006/june06-Frey_Stutzer.html.
62. Carol Graham, "The Economics of Happiness," *World Economics* 6, no. 3 (July–September 1995): 41–55.
63. R. J. Shiller, "Why Do People Dislike Inflation?" NBER Working Papers 5539, National Bureau of Economic Research, Inc., Chicago, 1996.
64. L. Winkelmann and R. Winkelmann, "Why Are the Unemployed So Unhappy?" *Economica* 65 (1998): 1–15.
65. Rafael Di Tella, R. J. MacCulloch, and A. J. Oswald, "Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness," *American Economic Review* 10 (March 2001): 335–341; quotation at p. 336.
66. Dasgupta, "Values or Facts?" p. 222.

CHAPTER 5: CAN WE PUT A PRICE ON NATURE'S SERVICES?

1. Theodore D. Goldfarb, *Taking Sides: Clashing Views on Controversial Environmental Issues*, 9th ed. (Guilford, CT: McGraw Hill/Dushkin: 2001) (Issue 1).
2. Gretchen Daily, ed., *Nature's Services: Societal Dependence on Natural Ecosystems* (Washington, DC: Island Press, 1997).
3. Gretchen Daily quoted at the web page of The Natural Capital Project at Stanford University; http://www.naturalcapitalproject.org/about.html. Visited November, 2006.
4. Barton H. Thompson, Jr., "Markets for Nature," *William and Mary Environmental Law and Policy Review* 25 (Winter 2000): 261–316; quotation at p. 265.
5. See James Salzman, "Creating Markets for Ecosystem Services: Notes from the Field," *New York University Law Review* 80 (June 2005): 870–961; quotation at p. 879.
6. Robert Weeden, a wildlife biologist, has written that environmentalists who engage in the monetization of environmental benefits are "bedding with porcupines." Robert Weeden, "On Wooden Nickels, Trojan Horses, and Lonely Drummers," *Alaska Fish and Game* (May–June 1987). Juneau: Alaska

Department of Fish and Game. Quoted by Steve Colt, Book Review, *Journal of Economic Literature* 44 (2006): 192–193; quotation at p. 192.

7. For an excellent study of the issues involved in regulatory "bubbles" and other "cap-and-trade" schemes, see T. H. Tietenberg, *Emissions Trading: An Exercise in Reforming Pollution Policy* (Washington, DC: Resources for the Future, 1985).
8. Thompson, "Markets for Nature," p. 262.
9. Thompson, "Markets for Nature," p. 264.
10. Ruth Greenspan Bell, "What to Do about Climate Change," *Foreign Affairs* (May/June 2006): 105–113.
11. I have argued that this cannot be now done at the international level – a view Bell (ibid.) endorses. See Mark Sagoff, "Controlling Global Climate: The Debate over Pollution Trading," *Report from the Institute for Philosophy and Public Policy*," 19, no. 1 (Winter 1999): 1–6. See also, Sagoff, "Pollution Trading and the Global Environment," in *Property Rights, Economics, and the Environment*, vol. 5 of Legal Relationship Series, ed. Michael D. Kaplowitz (Stamford, CT: JAI Press, 2000), pp. 241–257.
12. In May 2006.
13. The reference is to the familiar joke told about a group of people abandoned on a desert island with only canned goods. To solve the problem, the economist among them suggests that they "assume the existence of a can-opener." Many economic analyses of carbon-trading systems assume that a method of allocation and an enforcement mechanism can be established among nations whose only relationships so far have been to frighten each other. See, for example, Jonathan B. Wiener, "Global Trade in Greenhouse Gas Control: Market Merits and Critics' Concerns," *Resources*, 129 (Fall 1997): 13–16.
14. John Locke, *Concerning Civil Government, Second Essay: An Essay Concerning the True Original Extent and End of Civil Government*, sect. v, par. 43 (1690); http://www.mind-trek.com/treatise/jl-ccg/jl-ccg05.htm.
15. Robert Constanza, Ralph d'Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert O'Neill, Jose Paruelo, Robert Raskin, Paul Sutton, and Marjan van den Belt, "The Value of the World's Ecosystem Services and Natural Capital," *Nature* 387 (May 15, 1987): 253–260.
16. John Locke, *Second Treatise Concerning Civil Government*, sect. v, par. 42.
17. Ibid.
18. Karl Marx, *Grundrisse, Foundations of the Critique of Political Economy*, trans. Martin Nicolaus (1858; Hammondsworth, UK: Pelican Classics, 1993), p. 366.
19. Richard O. Zerbe Jr., Yoram Bauman, and Aaron Finkle, "A Preference for an Aggregate Measure: A Reply to Sagoff," *Ecological Economics* 60 (2006) 14–16.
20. N. Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, MA: Harvard University Press, 1971); see also Herman Daly, *Valuing the Earth: Economics, Ecology, and Ethics* (Cambridge, MA: MIT Press, 1992).

21. P. M. Vitousek, P. R. Ehrlich, A. H. Ehrlich, and P. Matson, "Human Appropriation of the Products of Photosynthesis," *BioScience* 36, no. 6 (June 1986): 368–373.
22. See, for example, T. Prugh, *Natural Capital and Human Economic Survival* (Solomons, MD: ISEE Press, 1995).
23. To repeat the mantra I have intoned before: having a preference gives the individual a reason to try to satisfy it. In general, he or she should be free to try to satisfy that preference under rules and within institutions that assure the same freedom to others. The existence of that preference or that WTP makes no legitimate or intelligible claim on society to try to satisfy it. Society has no reason to seek to satisfy preference per se or taken simply as it comes. Rather, society has an interest in helping out with certain preferences of particular kinds, for example, basic needs (according to a theory of justice), security (according to political theory), and merit goods (if society is so inclined).
24. Peter Boettke, Chris Coyne, and Peter Leeson, "High Priests and Lowly Philosophers: The Battle for the Soul of Economics," *Case Western Reserve University Law Review*, 56 (2006) 551–568.
25. Locke, *Concerning Civil Government*, sect. v, par. 35.
26. Ibid.
27. Locke, *Concerning Civil Government*, sect. v, par. 43.
28. Locke, *Concerning Civil Government*, sect. v, par. 40.
29. John Locke, *Concerning Civil Government*, sect. v, par. 43.
30. See USDA Factbook, "Cost of Food Services and Distribution," p. 8; http://www.usda.gov/news/pubs/factbook/001b.pdf. The same statement was repeated in earlier years.
31. USDA, *Amber Waves*, February 2004; http://www.ers.usda.gov/amberwaves/february04/indicators/behinddata.htm.
32. "Cropland values averaged $1,780 per acre and pasture values averaged $644 per acre on January 1, 2004, compared with $1,660 and $605 per acre, respectively, a year earlier," nationally. USDA Press Release, August 6, 2004; http://www.nass.usda.gov/mt/pressrls/misc/lndvalue.htm. See also USDA, "Government Payments to Farmers Contribute to Rising Land Values," *Agricultural Outlook* (June–July 2001), stating, "The gap between land value with and without government payments . . . rose to 25 percent during 1998–2001. . . . For example, elimination of government payments would have lowered land values by 69 percent in parts of the Northern Plains, and by about 30 percent throughout much of the Corn Belt"; http://www.ers.usda.gov/publications/agoutlook/june2001/AO282h.pdf.
33. See Bill McKibben, "An Explosion of Green," *Atlantic Magazine* (April 1995); http://www.theatlantic.com/politics/environ/green.htm.
34. Willard W. Cochrane, *The Curse of American Agricultural Abundance* (Lincoln: University of Nebraska Press, 2002), p. 122; endorsing the position of Deborah E. Popper and Frank Popper, "The Great Plains: From Dust to Dust," *Planning* (December 1987), pp. 12–18.
35. J. H. von Thuenen, *The Isolated State* (1840; New York: Pergamon, 1966). Commentators write that von Thuenen considered "rent as a function solely of

location, not fertility or climate, . . . with rent differentials arising from transportation costs." G. Cornelis van Kooten and Erwin H. Bulte, *The Economics of Nature* (Malden, MA: Blackwell, 2000), p. 61.

36. In paragraph 28 of the *Communist Manifesto*, Marx uses the word "Idiotismus," which does not necessarily refer to "idiocy" ("Idiotie"). There is a lot of controversy over the correct translation and what, exactly, Marx meant.
37. Press Release, August 6, 2004; http://www.nass.usda.gov/mt/pressrls/misc/lndvalue.htm.
38. The Conservation Reserve Program in Kansas pays an average annual rental fee of about $36 per acre to farmers to retire their land from production – or about $10 per day per year for 100 acres. Try to find a reasonably located parking space in Manhattan, New York, for that price. For information, see http://www.ks.nrcs.usda.gov/news/annual_rpt02/crp.html.
39. Alexander E. Farrel, Richard J. Pleven, Brian T. Turner, Andrew D. Jones, Michael O'Hare, and Daniel M. Kammon, "Ethanol Can Contribute to Energy and Environmental Goals," *Science* 311 (January 27, 2006): 506–508.
40. Steven C. Blank, *The End of Agriculture in the American Portfolio* (Westport, CT: Quorum Books, 1998), p. 125.
41. Quoted by Blank, *The End of Agriculture*, p. 125.
42. For citations to and discussion of Maitland, see Herman E. Daly, "The Return of Lauderdale's Paradox," *Ecological Economics* 25 (1998): 21–23, citing Lord Lauderdale, *An Inquiry into the Nature and Origin of Public Wealth and into the Means and Causes of Its Increase*, 2d ed. (Edinburgh: Constable, 1819). Thank you to Herman Daly for pointing this out to me.
43. James Maitland, Lord Lauderdale, "An Inquiry . . . "; http://www.thoemmes.com/economics/wealth5.htm.
44. For discussion and citations, see Bjorn Lomberg, *The Skeptical Environmentalist* (New York: Cambridge University Press, 1998), p. 150.
45. Committee to Review the New York City Watershed Management Strategy, National Research Council [NRC], *Watershed Management for Potable Water Supply: Assessing the New York City Strategy* (Washington, DC: National Academy Press, 2000), p. 161; http://www.nap.edu/catalog/9677.html?se_side. Increases in fecal coliform bacteria, when observed in the principal reservoir, "coincided both spatially and temporally" with increases in waterfowl populations (p. 197; cf. p. 160).
46. National Science Board, *Task Force on the Environment, Environmental Science and Engineering for the 21st Century: The Role of the National Science Foundation*; http://www.nsf.gov/cgi-bin/getpub?nsb0022 and http://www.nsf.gov/nsb/tfe/nsb99133/box1.htm.
47. Robert B. Jackson, Stephen R. Carpenter, Clifford N. Dahm, Diane M. McKnight, et al., "Water in a Changing World," published online by the Ecological Society of America, *Issues in Ecology*; http://www.esa.org/issues9.htm; reprinted in *Ecological Applications* (August 11, 2001): 1027–1045.
48. Graciela Chichilnisky and Geoffrey Heal, "Economic Returns from the Biosphere," *Nature* 391 (February 1998): 629–630.
49. For examples, see Chichilnisky and Heal, "Economic Returns from the Biosphere"; for further confirmation see Simon Levin, *Fragile Dominion*

(Reading, MA: Perseus Books, 1999), p. 204; Edward O. Wilson, "What Is Nature Worth?" *Wilson Quarterly*, 26, no. 1 (Winter 2002): 20–39 at 23–24; National Science Board, *Task Force on the Environment, Environmental Science and Engineering for the 21st Century: The Role of the National Science Foundation*; http://www.nsf.gov/cgi-bin/getpub?nsb0022 and http://www.nsf.gov/nsb/tfe/nsb99133/box1.htm; Jackson, Carpenter, Dahm, McKnight, et al., "Water in a Changing World"; Stephen Farber, Robert Costanza, Daniel Childers, Jon Erickson, Katherine Gross, Morgan Grove, Charles Hopkinson, James Kahn, Stephanie Pincetl, Austin Troy, Paige Warren, and Matthew Wilson, "Linking Ecology and Economics for Ecosystem Management," *BioScience* 56, no. 2 (February 2006): 121–133 (referring to "the value of preserving and restoring the pristine character of the Catskills watershed, measured by the cost savings to New York City of not having to build a multibillion-dollar water treatment system" at p. 26); and scores of other authorities.

50. For discussion, see Mark Sagoff, "On the Value of Natural Ecosystems: The Catskills Parable," *Politics and the Life Sciences*, 21, no. 1 (March 2002): 16–21; reprinted in *Philosophy & Public Policy Quarterly*, 22, no. 1/2 (Winter/Spring 2002): 10–16. See also Thompson, "Markets for Nature," p. 305 ("Where public water companies own watershed land, they have often opted to sell off acreage." The land had so increased in value over the years that the companies "can realize gain in value by selling the land.")
51. Thompson, "Markets for Nature," p. 301.
52. The resource rent "reflects what fishermen are willing to pay to harvest that amount of the fish stock. Resource rent is the net revenue in excess of normal profits generated by the harvesting of fish that is due to the fish stock itself. In open-access fisheries, rent dissipation is said to occur because the value of the fish stock is not captured." NOAA, *Fisheries Economics & Social Sciences Program*, Primer on Fisheries Economics, chap. 1; http://www.st.nmfs.gov/st1/econ/oleo/chap1.pdf.
53. This is generally known as a Schaefer model because it was fully described by M. B. Schaefer, "Some Aspects of the Dynamics of Populations Important to the Management of Commercial Marine Fisheries," *Bulletin of the Inter-American Tropical Tuna Commission* 1 (1954): 25–56.
54. "Environmental Fiscal Reform for Sustainable Development and Poverty Reduction Workshop Proceedings and Country Case Studies," Information Sheet 2: "Fiscal Issues in Fisheries Exploitation and Management," printed online as an annex to the FAO *Report on the Workshop on Fiscal Reform of Fisheries* (October 2003); http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/y5653e/y5653e05.htm.
55. Subsidies in the OECD Fisheries Sector: A Review of Recent Analysis and Future Directions, 2002. By A. Cox and C.-C. Schmidt, commissioned by the OECD. See page 7 and table on page 10.
56. Overall, in 2000, capture fisheries production worldwide, according to the Food and Agriculture Organization, "reached 94.8 million tonnes, the highest level ever. The estimated first sale value of this production amounted to some US$81 billion." How much of this could be realized under optimal

conditions and attributed to ecosystems is anyone's guess. If the fishing effort stopped at an economically optimal point, it would certainly capture some of this revenue resource rent attributable to ecosystem services. The potential rent would differ for different species at different places and times. See *State of the World's Fisheries and Aquaculture 2002* (SoFIA); http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/005/y7300e/y7300e04.htm.

57. United Nations Food and Agriculture Organization (FAO), *State of the World's Fisheries and Aquaculture* (SOFIA) 2000, Part 4, "Outlook"; http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/003/X8002E/x8002e07.htm.
58. Juliet Eilperin, "Fish Farming's Bounty Isn't without Barbs; Aquaculture May Change Way U.S. Eats, but Effect on Seas Is a Concern," *Washington Post*, January 24, 2005, p. A1. See also Seaweb at http://www.seaweb.org/resources/aquaculturecenter/issues.php#development ("Aquaculture is the fastest growing sector of the world food economy, increasing by more than 10% per year and currently accounts for more than 30% of all fish consumed").
59. Pew Initiative on Food and Biotechnology, "Future Fish? Issues in Science and Regulation of Transgenic Fish," Pew Initiative on Food and Biotechnology, 1331 H Street, Suite 900, Washington, DC 20009 USA, January 2003, 72 pp.; http://pewagbiotech.org/research/fish/fish.pdf.
60. SeaWeb, "Genetic Modification of Aquatic Organisms for Aquaculture"; http://www.seaweb.org/resources/aquaculturecenter/documents/Aquaculture.GMOD.pdf.
61. Jerry F. Franklin and K. Norman Johnson, "Forests Face New Threat: Global Market Changes," *Issues in Science and Technology* (Summer 2003); http://www.issues.org/issues/20.4/franklin.html.
62. McKibben, "An Explosion of Green."
63. UN-ECE/FAO. *Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand* (industrialized temperate/boreal countries), contribution to the Global Forest Resources Assessment 2000 (New York: United Nations, 2000). "Data from reporting countries show an average increase in area of about 1.95 million ha per year"; http://www.unece.org/trade/timber/fra/screen/summary.pdf. See also Anne Simon Moffat, "Temperate Forests Gain Ground," *Science* 282, no. 5392, (November 1998): 1253.
64. Felicity Barringer, "Deals Turn Swaths of Timber Company Land into Development-Free Areas," *New York Times*, April 2, 2006, p. 16; see also Patti Bond, "Georgia Forestland in $6.1 Billion Deal," *Atlanta Journal-Constitution*, April 5, 2006, p. 1.
65. Ibid.
66. Billy Humphries Jr., chairman of Macon-based Forest Resource Consultants, quoted in Bond, "Georgia Forestland," p. 16.
67. John V. Krutilla, "Conservation Reconsidered," *American Economics Review* 57 (1967): 777–796; quotation at p. 777.
68. Ibid., p. 778.

69. Roger A. Sedjo, "Transgenic Trees: Implementation and Outcomes of the Plant Protection Act," Resources for the Future Discussion Paper 04-10 (April 2004); p. 4; http://www.rff.org/Documents/RFF-DP-04-10.pdf. See also R. A. Sedjo and D. Botkin, "Using Forest Plantations to Spare Natural Forests," *Environment* 30 (1997): 15–20, 30; and D. Victor and J. Ausubel, "Restoring the Forests," *Foreign Affairs* (November–December 2000).
70. John E. Losey and Mace Vaughan, "The Economic Value of Ecological Services Provided by Insects," *BioScience* 56, no. 4 (April 2006): 311–323; quotation at 311.
71. Ibid., p. 315.
72. Ibid., p. 311.
73. See J. Ghazoul, "Business as Usual: Questioning the Global Pollination Crisis," *Trends in Ecology and Evolution* 20 (2005): 367–373. See also R. A. Morse and N. W. Calderone, "The Value of Honey Bees as Pollinators of U.S. Crops in 2000," *Bee Culture* (March 2000): 2–15. It is very easy for ecological economists to theorize and speculate about prices paid to beekeepers for pollinating services. It is more difficult to get the data – to telephone beekeepers or study the actual market – and then to show the relevant decline of a natural pollinator, so this is rarely if ever done.
74. P. G. Kevan and T. P. Phillips, "The Economic Impacts of Pollinator Declines: An Approach to Assessing the Consequences," *Conservation Ecology* 5, no. 1 (2001): 8; http://www.consecol.org/vol5/iss1/art8/.
75. Losey and Vaughan, "Economic Value," p. 312.
76. World Resources Institute, IUCN et al., *Global Biodiversity Strategy: Guidelines for Action to Save, Study and Use Earth's Biotic Wealth Sustainably and Equitably* (1992) at p. 1; http://pubs.wri.org/pubs_content_text.cfm?ContentID=535. Only 1.4 million of what might be 100 million species have been identified. Owing to colonizing species following globalization, the species richness of most places is increasing vastly – doubling on most large oceanic islands, for example – with species hybridization and radiation evolving new varieties. New species may be evolving faster than we can identify them. Genetic engineering, which can recombine genetic material from nearly any species, has the capacity to produce an infinite number of new creatures, but we have plenty as it is.
77. This number is taken from the Fish and Wildlife Service Daily Boxscore at http://ecos.fws.gov/tess_public/Boxscore.do.
78. These pretextual economic arguments often backfire. No pharmaceutical firm in the United States takes seriously the idea that it can find medicines by assaying organisms in rain forests; companies develop "drugs based on molecules that scientists can create for themselves in the laboratory, using new combinatorial chemistry techniques." Colin Macilwain, "When Rhetoric Hits Reality in Debate on Bioprospecting," *Nature* 392 (April 9, 1998): 535–540. Unfortunately, environmentalists have believed their own stories – sucked their own exhaust, as the PR saying goes – with the unintended consequence that officials in developing countries now guard their forests from ecologists. "Increasingly, scientists hoping to collect specimens in developing countries rich in flora and fauna are being met with major

bureaucratic barriers. Local governments are afraid that their biological riches will be stolen without compensation." Eugene Russo, "Ethics and War Challenge Biologists," *The Scientist* 4 (March 25, 2003); http://www.the-scientist.com/news/20030325/03/.

79. David Ehrenfeld, "Why Put a Value on Biodiversity?" in *Biodiversity*, ed. E. O. Wilson and Frances M. Peter (Washington, DC: National Academy Press, 1988), pp. 212–216.
80. See Victoria Dawson, "Around the Mall: Bugs Beware," *Smithsonian Magazine.com*, http://www.smithsonianmagazine.com/issues/2004/october/around_the_mall.php. See also Jared Sagoff, "Local Entomologist Doesn't Mind Being Bugged," *Montgomery County Gazette*, July 11, 2003; http://gazette.net/gazette_archive/2003/200328/carrollcty/state/167662-1.html.
81. For a good discussion, see Jane S. Shaw, "Nature in the Suburbs," Heritage Foundation Backgrounder Paper 1724, February 18, 2004; http://www.heritage.org/Research/SmartGrowth/BG1724.cfm.
82. After the bankruptcy of Shaman Pharmaceuticals – a firm that did attempt to assay biodiversity for medicines – it is hard to find a biologist who takes seriously bioprospecting, that is, the search for valuable pharmaceutical and other biochemicals by collecting and assaying rain forest and other creatures. Occasionally, a firm (such as Merck) will investigate microbes near toxic waste sites and other degraded environments where microorganisms may evolve antibiotic and other unusual qualities.
83. Douglas J. Krieger, "The Economic Value of Forest Ecosystem Services: A Review," The Wilderness Society, March 2001, p. iii; http://www.wilderness.org/Library/Documents/upload/Economic-Value-of-Forest-Ecosystem-Services-A-Review.pdf.
84. Costanza et al., "The Value of the World's Ecosystem Services and Natural Capital," p. 253.
85. I refer only to projects such as the construction of housing that are privately funded, in other words, which take place in the context of a competitive market. There is no doubt that pork barrel projects, such as many undertaken by the U.S. Corps of Engineers, can be a disaster from every point of view. That government-funded projects undermine important ecosystem services without any compensating advantages to anyone but those who take the funding and run is a fact everyone knows; the destruction of the Everglades is an example. See Jaboury Ghazoul, "Challenges to the Uptake the Ecosystem Service Rationale for Conservation," *Conservation Biology*. (OnlineEarly Articles), posted August, 2007. The article describes the opportunity costs of keeping natural environments from development and argues that technological substitutes for ecosystem services, such as pollination, are economically far more efficient.
86. See, for example, James Salzman, Barton H. Thompson, and Gretchen Daily, "Protecting Ecosystem Services: Science, Economics, and Law," *Stanford Environmental Law Journal* 20 (May 2001): 309–332.
87. The most celebrated example is the much-cited approval (by a margin of one vote) by Napa County in 1998 "to spend $160 million to acquire 500 acres of flood plain . . . " along the Napa River. Salzman et al., "Protecting Ecosystem

Services," p. 320. Tracking down the evidence for this, I found footnotes that end up with newspaper accounts which say, "The measure . . . authorizes a special half-cent sales tax to raise $6 million annually for 20 years for a variety of flood control projects along the river's 30-mile length. . . . Under a long-standing agreement, the federal government will contribute $78 million toward the flood control project to match funds from the city of Napa." See Glen Martin, "Napa OKs Anti-Flood Tax Measure," *San Francisco Chronicle*, March 4, 1998, p. 16. Subsequent accounts show the project quickly turned from restoration to development. According to one report, "'It's . . . become more of a redevelopment project than a flood control project,' said Harry Martin, publisher of the Napa *Sentinel*. 'It's politics. This is the largest public works project in the county's history.'" See Jim Doyle, "Improvements Return Napa River to an Asset," *San Francisco Chronicle*, September 20, 2002, p. A1 (describing the banks of the Napa River as resembling "the glitzy features of other riverfront cities"). Subsequent events suggest that the "ecosystem service" approach was less successful than hoped and that traditional infrastructure strategy might have worked better for the money. "'They spent millions and millions on this thing, and it didn't work,' Karen Ross said as she tried to salvage furniture from her antiques shop on Soscol Avenue, not far from the Napa River" in 2006. See Glen Martin, "Napa's Muddy Mess: As Merchants Dry Out Stores, $170 Million Flood Control Plan Receives Mixed Reviews," *San Francisco Chronicle*, January 2, 2006, p. A1.

88. Kai M. A. Chan, Robert M. Pringle, Jai Ranganathan, Carol L. Boggs, Yvonne L. Chan, Paul R. Ehrlich, Peter K. Haff, Nicole E. Heller, Karim Al-Khafaji, Dena P. Macmynowski, "When Agendas Collide: Human Welfare and Biological Conservation." *Conservation Biology* 21 (February 2007): 59.

chapter 6: do we consume too much?

1. Al Gore, *An Inconvenient Truth* (Emmaus, PA: Rodale, 2006), p. 12.
2. For a good history of the apocalyptic tradition within American environmentalism, see Frederick Buell, *From Apocalypse to Way of Life: Environmental Crisis in the American Century* (New York: Routledge, 2003).
3. David W. Orr, "Armageddon versus Extinction," *Conservation Biology* 19 (April 2005): 290–292. Quotation at p. 290.
4. Paul R. Ehrlich and Anne H. Ehrlich, *One with Nineveh: Politics, Consumption, and the Human Future* (Washington, DC: Island Press, 2004), p. 69.
5. An urban legend supposes that former Interior Secretary James Watt told Congress that environmental protection was unimportant in light of the imminent return of Jesus Christ. No one has found any basis for this supposition. When confronted with this supposed statement, Watt stated, "I never said it. Never believed it. Never even thought it. I know no Christian who believes or preaches such error. The Bible commands conservation – that we as Christians be careful stewards of the land and resources entrusted to us by the Creator."

6. "Questions for Richard Cizik: Earthly Evangelist," interview by Deborah Solomon, *New York Times Magazine*, April 3, 2005; http://www.clas.ufl.edu/users/kschwart/earthy%20evangelist.pdf.
7. See, for example, Herman E. Daly, "From Empty-world Economics to Full-world Economics: Recognizing an Historical Turning Point in Economic Development," in *Population, Ecology, and Lifestyle*, ed. Robert Goodland, Herman E. Daly, and Salah El Serafy (Washington, DC: Island Press, 1992), pp. 23–37.
8. John Muir, *The Yosemite* (New York: Century, 1912), p. 256.
9. Walt Whitman, *Specimen Days* (Boston: David R. Godine, 1971), p. 61.
10. National Academy of Sciences, Population Summit of the World's Scientific Academies: *A Joint Statement by Fifty-eight of the World's Scientific Academies* (Washington, DC: NAS Press, 1993), p. 5. John Stuart Mill more than a century earlier had criticized statements of this kind. Mill wrote, "If the natural course of things were perfectly right and satisfactory, to act at all would be a gratuitous meddling, which, as it could not make things better, must make them worse. Or if action at all could be justified, it would only be when in direct obedience to instincts, since these might perhaps be accounted part of the spontaneous order of Nature; but to do anything with forethought and purpose would be a violation of that perfect order. If the artificial is not better than the natural, to what end are all the arts of life? To dig, to plough, to build, to wear clothes, are direct infringements of the injunction to follow nature." J. S. Mill, "On Nature," in *Nature, The Utility of Religion and Theism* (1874); http:/www.lancs.ac.uk/users/philosophy/texts/mill_on.htm.
11. P. R. Ehrlich and J. Holdren, "Impact of Population Growth," *Science* 171 (1971): 1212–1217; quotation at p. 1212.
12. Ibid., p. 1213.
13. See Paul R. Ehrlich, *The Population Bomb* (New York: Ballantine Books, 1971), pp. 146–148, endorsing an end to food aid in impoverished areas.
14. Paul R. Ehrlich and Anne H. Ehrlich, *The End of Affluence* (New York: Ballantine Books, 1974), p. 33. Paul Ehrlich and Richard L. Harriman in *How to Be a Survivor: A Plan to Save Planet Earth* (New York: Ballantine, 1971) proposed for disussion a new constitution for the Americas in which experts direct the dismantling of "overdeveloped" countries and reduce population to "optimum" levels.
15. Donella Meadows, et al., *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind* (New York: New American Library, 1972).
16. See publisher's blurb at http://www.amazon.com/exec/obidos/ASIN/1559638796/ref=pd_sxp_elt_l1/002-8426557-5628017.
17. Donella H. Meadows, Jorgen Randers, and Dennis L. Meadows, *Limits to Growth: The Thirty-Year Update* (White River Junction, VT: Chelsea Green, 2004), p. 1.
18. The World Resources Institute, *World Resources 1994–1995* (Washington, DC: World Resources Institute, 1995), p. 5.

19. Quoted and cited in Stephen Moore, "The Coming Age of Abundance," in *The True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), p. 137.
20. Steven Hayward et al., *Index of Leading Environmental Indicators* (San Francisco: Pacific Research Institute for Public Policy, and Washington, DC: American Enterprise Institute for Public Policy Research, April 2005), p. 5; http://www.pacificresearch.org/pub/sab/enviro/05_enviroindex/2005_Enviro_Index.pdf.
21. The World Bank, *World Development Indicators 2005* (Washington, DC: World Bank, 2005) reports:

    "Since 1990 extreme poverty in developing countries has fallen from 28 percent to 21 percent. Over the same time population grew 15 percent to 5 billion people, leaving 1.1 billion people in extreme poverty. If economic growth rates in developing countries are sustained, global poverty will fall to 10 percent – a striking success.

    But hundreds of millions of people will still be trapped in poverty, especially in sub-Saharan Africa and South Asia and wherever poor health and lack of education deprive people of productive employment; environmental resources have been depleted or spoiled; and corruption, conflict, and misgovernance waste public resources and discourage private investment."

22. Millenium Ecosystem Assessment, *Ecosystems and Human Well-being: Current State and Trends* (Washington, DC: Island Press, 2005), p. 74.
23. Millenium Ecosystem Assessment, chap. 8, "Food," p. 212.
24. Millenium Ecosystem Assessment, chap. 28, "Synthesis," p. 829. United Nations Population Division, World Population Prospects: The 2002 Revision (February 2003); http://www.un.org/esa/population/publications/wpp2002/WPP2002-HIGHLIGHTSrev1.PDF.

    (Noting that because of HIV/AIDS and other scourges, "whereas more developed regions, whose life expectancy today is estimated at 76 years, will see it rise to 82 years, that of less developed regions will remain considerably below, reaching 73 years by mid-century (up from 63 years today)."
25. Millennial Assessment, *Ecosystems and Human Well-being: Current State and Trends*.
26. John Tierney, "Betting the Planet," *New York Times*, December 2, 1990, section 6, p. 52; col. 3; magazine. This irrefutable argument is commonplace. See, for example, C. Folke, M. Hammer, R. Costanza, and A. Jansson, "Investing in Natural Capital – Why, What, and How?" in *Investing in Natural Capital: The Ecological Economics Approach to Sustainability*, ed. A. Jansson, M. Hammer, C. Folke, and R. Costanza (Washington, DC: Island Press, 1994), pp. 1–20 (analogizing optimists to "the man who fell from a ten story building, and when passing the second story on the way down, concluded 'so far so good, so why not continue?'" quotation at p. 3.
27. See Stephen Moore, "The Coming Age of Abundance," in *The True State of the Planet*, ed. Ronald Bailey (New York: Free Press, 1995), pp. 126–127.
28. Thomas H. Lee, "Advanced Fossil Fuel Systems and Beyond," in *Technology and Environment*, ed. Jesse H. Ausubel and Hedy E. Sladovich (Washington, DC: National Academy Press, 1989), pp. 114–136; quotation at p. 116.

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31. See Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Simon and Schuster, 1992), p. 122.
32. See Jesse Ausubel, "The Liberation of the Environment," *Daedalus* 125, no. 3 (Summer 1996): 1–19.
33. See Jesse Ausubel, "Can Technology Spare the Earth?" *American Scientist* 84 (March–April 1996): 166–178; esp. pp. 164–170. For further information see Solstice: Internet Information Service of the Center for Renewable Energy and Sustainable Technology, http://www.crest.org/.
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36. Amory B. Lovins and L. Hunter Lovins, "Reinventing the Wheels," *Atlantic Monthly*, (January 1995); http://www.theAtlantic.com/atlantic/issues/96apr/oil/wheels.htm.
37. See John Huey, "Waking Up to the New Economy," *Fortune Magazine* (June 27, 1994): 36. See also Janice Castro, "Tussle over High Technology," *Time Magazine* (January 26, 1987): 48; http://www.time.com/time/magazine/article/0,9171,963340,00.html.
38. See Warren Brown and Martha M. Hamilton, "Running On, and On, and On: Better Cars Are Changing the Economics of Driving for Consumers and Firms," *Washington Post*, March 9, 1997, p. H1.
39. See *World Resources* 1994–95, p. 15; see also Albert Adriannse et al., *Resource Flows: The Material Basis of Industrial Economies* (Washington, DC: World Resources Institute, April 1997), p. 2.
40. Adriannse et al., *Resource Flows*, p. 2.
41. "For most economies, services have been the fastest growing sector. In 1990–2003 the service sector grew by 3.8 percent a year in developing and transition economies and by 3.1 percent in high-income economies." World Bank, *World Development Indicators 05*, "Environment." See also P. R. Ehrlich, G. Wolff, G. C. Daily, J. B. Hughes, S. Daily, M. Dalton, and L. Goulder, "Knowledge and the Environment," *Ecological Economics* 30 (1999): 267–284 ("Employment doubled in the services sector from 1970–1995 and services now account for over 75% of GNP and up to 80% of total employment. A number of these growth service industries, such as finance and telecommunications, are knowledge-based"; quotation at pp. 269–270).
42. See Peter Blomquist, "Fighting Poverty in the Information Age," *Seattle Times*, October 18, 1995, p. B5.

43. Recently, a group of ecological economists has conceded, "Knowledge is now recognized as a primary factor of production." They state the obvious as follows: "The acquired knowledge must be put to good use. Appropriate institutions, such as new financial institutions to securitize the biosphere, have a vital role in meeting this challenge." Similarly no one can doubt that "even if knowledge is becoming a more important factor of production in more-developed economies, and even if this allows more-developed economies to achieve a higher rate of economic growth, this is not automatically good news for the environment. After all, economic growth is not always accompanied by an increase in environmental quality – especially under conventional definitions of economic growth. Thus it is necessary to examine closely the connection between knowledge as a production input and environmental quality." For these and similar insights see Paul R. Ehrlich, Gary Wolff, Gretchen C. Daily, Jennifer B. Hughes, Scott Daily, Michael Dalton, and Lawrence Goulder, "Knowledge and the Environment," *Ecological Economics* 30 (1999): 267–284.
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46. Ibid., p. 2.
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110. National Agricultural Statistics Service, "NASS Crop Production," November 9, 2006; http://usda.mannlib.cornell.edu/usda/nass/CropProd/2000s/2006/CropProd-11-09-2006.pdf.

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112. Sean Holton, "Sugar Growers Reap Bonanza in Glades," *Orlando Sentinel Tribune*, September 18, 1990, p. A1.
113. Phyllis Berman and Alexandra Alger, "The Set-aside Charade," *Forbes* (March 13, 1995): 78.
114. See Keith Maskus, "Large Costs and Small Benefits of the American Sugar Programme," *World Economy* 12 (1989): 85–104.
115. Holton, "Sugar Growers Reap Bonanza in Glades."
116. For an excellent account of the political costs of the sugar program internationally, see Anne O. Krueger, "The Political Economy of Controls: American Sugar," in *Public Policy and Economic Development Essays in Honor of Ian Little*, ed. Maurice Scott and Deepak Lal (New York: Oxford University Press, 1990).
117. See Luis Llambi, "Opening Economies and Closing Markets: Latin American Agriculture's Difficult Search for Place in the Emerging Global Order," in *From Columbus to ConAgra*, ed. Alessandro Bonanno (Lawrence: University of Kansas Press, 1994), esp. pp. 184–194.
118. See "Calgene Gets Canola OK," *Sacramento Bee*, November 2, 1994, p. D5; see also "Calgene Completes Talks with FDA on Laurate Canola," *Genetic Engineering News* (April 15, 1995): 9. For a good review of Calgene's (now Monsanto's) attempts to bring high-laurate canola oil to market, see Allison R. Krahn, "High Laurate Canola" Department of Plant Sciences, University of Saskatchewan, 2003; http://www.usask.ca/agriculture/plantsci/classes/plsc416/projects_2003/allisonk/highlauratecanola.index.html.
119. See S. Jovetic, "Natural Pyrethrins and Biotechnological Alternatives," *Biotechnology and Development Monitor*, No. 21 (1994): 12–13. Kate De Selincourt's study, "Genetic Engineering Targets Third World Crops," is available from the Panos Institute, 9 White Lion Street, London N1 ORP. The *Washington Post* reports that Agridyne is spending $3 million on getting genetically engineered microbes to express pyrethrum. (See Sally Lehrman, "Splicing Genes or Slicing Exports? U.S. Firms' Bio-Engineered Tropical Plants May Threaten Third World Farmers," *Washington Post*, September 27, 1992, p. H1.)
120. Robin Broad and John Cavanaugh, "Don't Neglect the Impoverished South's Developing Countries," *Foreign Policy* (December 22, 1995): 18–27.
121. Lehrman, "Splicing Genes, Slicing Exports?"
122. Quoted in Mary Ellen Curtin, "Harvesting Profitable Products from Plant Tissue Culture," *Bio/Technology* 1 (1983): 657. See also R. S. Chaleff, "Isolation of Agronomically Useful Mutants from Plant Cell Cultures," *Science* 219 (1983): 676–682. ("With recognition of the similarities between cultured plant cells and microorganisms came the expectation that all the extraordinary feats of genetic experimentation accomplished with microbes would soon be realized with plants." Ibid. at 679. Chaleff enumerates the difficulties that must be resolved before this expectation may be fulfilled.)

123. For documentation and further analysis, see Bruce L. Gardner, "The Political Economy of U.S. Export Subsidies for Wheat," in *The Political Economy of American Trade Policy*, ed. Anne Krueger (Chicago: University of Chicago Press, 1996), pp. 291–331. See also Derek Biyearly, "The Political Economy of Third World Food Imports: The Case of Wheat," *Economic Development and Cultural Change* 35 (1987): 307–328.
124. P. Robbins, *Stolen Fruit: The Tropical Commodities Disaster* (London: Zed Books & CTA, 2003).
125. Harriet Friedman, "The International Relations of Food: The Unfolding Crisis of National Regulation," in *Food: Multidisciplinary Perspectives*, ed. Barbara Harriss-White and Sir Raymond Hoffendberg (Oxford: Blackwell, 1994); quotation at pp. 102–103.
126. Partha Dasgupta, Carl Folke, and Karl-Goren Maler, "The Environmental Resource Base of Human Welfare," in *Population, Economic Development, and the Environment* (New York: Oxford University Press, 1994), p. 31.
127. Personal communication, April 2, 1997.
128. Norman Myers, "Population and Biodiversity," in *Population: The Complex Reality*, ed. Francis Graham-Smith (Golden, CO: North American Press, 1994), pp. 117–136; quotation at p. 129.
129. Norman Myers, "The World's Forests and Human Populations: Their Environmental Interconnections," in *Resources, Environment, and Population: Present Knowledge, Future Options*, ed. Kingsley Davis and Nikhail S. Bernstam (New York: Oxford University Press, 1991), pp. 237–251; esp. p. 243.
130. Norman Myers, "The Question of Linkages in Environment and Development," *BioScience* 43, no. 5 (May 1993): 306.
131. Ibid.
132. Ibid.; see also Norman Myers, "Population, Environment, Development," *Environmental Conservation* 20, no. 3 (Autumn 1993): 205–216.
133. Environmentalists too often insult Christian Evangelical, Pentecostal, and other groups by charging that they see no responsibility for preserving the natural world because they believe the Last Days are imminent. According to an article in *Grist* magazine (November 1, 2004) by Glenn Scherer, "Many Christian fundamentalists feel that concern for the future of our planet is irrelevant, because it *has* no future." James Watt, President Reagan's secretary of the interior, appears as the poster child of this allegation. Watt is supposed to have said to Congress, "God gave us these things to use. After the last tree is felled, Christ will come back." In fact, Watt did not make such a statement. (*Grist* has apologized.) Watt told Congress he had "to be steward for the natural resources for this generation as well as future generations." As to "Christ will come back after the last tree is felled," Watt wrote in the *Washington Post*, "I never said it. Never believed it. Never even thought it. I know no Christian who believes or preaches such error. The Bible commands conservation – that we as Christians be careful stewards of the land and resources entrusted to us by the Creator" (James Watt, "The Religious Left's Lies," *Washington Post*, May 21, 2005, p. 19). If environmentalists want to alienate religious people who care about Creation – in short, if they insist on despising their natural allies – they may find

some book or web site somewhere that advocates an imminent Apocalypse and tar all Christian groups by association with it. They should resist this strategy.

134. For a partial list, see Fred Van Dyke, "Between Heaven and Earth – Evangelical Engagement in Conservation," *Conservation Biology* 19, no. 6 (2005): 1693–1696.
135. The *New York Times*, March 10, 2005, section A, col. 1, p. 16 (article by Laurie Goodstein). In the fall of 2004, the National Association of Evangelicals issued its policy document entitled "For the Health of the Nation: An Evangelical Call to Civic Responsibility" (http://www.nae.net). It includes many statements supporting environmental protection, for example: "We urge Christians to shape their personal lives in creation-friendly ways: practicing effective recycling, conserving resources, and experiencing the joy of contact with nature. We urge government to encourage fuel efficiency, reduce pollution, encourage sustainable use of natural resources, and provide for the proper care of wildlife and their natural habitats."
136. Millennium Ecosystem Assessment, chap. 5, "Ecosystem Conditions and Human Well-Being," p. 128.
137. Millennium Ecosystem Assessment, Ecosystems and Human Well-Being, chap. 3, "Drivers of Change," p. 74.
138. Pope Paul VI, "Populorum Progressio," Encyclical of Pope Paul VI on the Development of Peoples, March 26, 1967, in *The Papal Encyclicals 1958–1981*, ed. Claudia C. Ihm (Wilmington, NC: McGrath, 1981), pp. 183–185; quotation at p. 184.
139. Henry David Thoreau, *Walden* (Princeton, NJ: Princeton University Press, 1971) p. 174.
140. Juliet B. Schor, *The Overworked American* (New York: Basic Books, 1991), p. 11.
141. Paul Wachtel, "Consumption, Satisfaction and Self-Deception," paper presented at a conference on Consumption, Stewardship and the Good Life, University of Maryland, College Park, September 29–October 2, 1994; quotation at p. 5.
142. People "who win large sums of money in football pools or lotteries are not found to be on the whole more happy afterwards." Michael Argyle, *The Psychology of Happiness* (New York: Methuen, 1986); see also Mary Jordan, "Millions Don't Turn Everything into Gold," *Washington Post*, July 21, 1991, pp. A1, A21; and P. D. Brickman, D. Coates, and R. Janoff-Bulman, "Lottery Winners and Accident Victims: Is Happiness Relative?" *Journal of Personality and Social Psychology* 36, no. 8 (1978): 917–927.
143. Adam Smith, *The Theory of the Moral Sentiments*, ed. D. D. Raphael and A. L. Macfie (Oxford: Clarendon Press, 1976), bk. IV, 1, 11, p. 185.
144. See John Maynard Keynes, "Economic Possibilities for Our Grandchildren," in Keynes, *Essays in Persuasion* (New York: Norton, 1963), pp. 366, 369–370, 372.
145. For discussion, see Robert H. Nelson, *Reaching for Heaven on Earth: The Theological Meaning of Economics* (Lanham, MD: Rowman and Littlefield, 1991), esp. chap. 6.

146. See Herbert Stein, "The Washington Economist: The End of Economics as We Know It," *The American Enterprise* (publication of the American Enterprise Institute) (September–October, 1994): 6–9.
147. Robert H. Nelson, "In Memoriam: On the Death of the 'Market Mechanism,'" *Ecological Economics* 20 (1997): 187–197; quotation at p. 188.
148. H. D. Thoreau, *The Journal of Henry David Thoreau*, vol. 10, ed. Bradford Torrey and Francis H. Allen (Boston: Houghton Mifflin, 1949); quotation at page 252.
149. Aesthetic, cultural, and moral terms, of course, may also have economic and prudential significance. For an insightful discussion of normative terms such as "health" and "integrity" as applied to ecological communities and systems, see Laura Westra, *An Environmental Proposal for Ethics: The Principle of Integrity* (Lanham, MD: Rowman and Littlefield, 1994).
150. David Ehrenfeld, "Why Put a Value on Biodiversity?" in *Biodiversity*, ed. E. O. Wilson and Frances M. Peter (Washington, DC: National Academy Press, 1988), pp. 212–216; quotation at p. 215.
151. Edward O. Wilson, *The Diversity of Life* (Cambridge, MA: Harvard University Press, 1992), p. 345.
152. Al Gore, *Earth in the Balance: Ecology and the Human Spirit* (Boston: Houghton Mifflin, 1992), p. 225.
153. Ibid., p. 1.
154. John Stuart Mill, *Principles of Political Economy with Some of Their Applications to Social Philosophy*, bk. IV, chap. VI, sec. 2 [1848] (Fairfield, NJ: Augustus M. Kelley, 1987), p. 750.

Chapter 7: Is an Environmental Ethic Compatible with Biological Science?

1. D. Kennedy, "The Ivory-Bill Returns," *Science* 308, no. 5727 (June 3, 2005): 1377.
2. D. S. Wilcove, *The Condor's Shadow: The Loss and Recovery of Wildlife in America* (New York: Anchor Books, 2000), p. 18.
3. D. S. Wilcove, "Rediscovery of the Ivory-billed Woodpecker," *Science* 308, no. 5727 (June 3, 2005): 1422–1423.
4. Herman Daly, "The Lurking Inconsistency," *Conservation Biology* 13, no. 4 (1999): 693–694.
5. E. O. Wilson, *Consilience* (New York: Knopf, 1998), p. 131.
6. Herman Daly, "Policy, Possibility, and Purpose," *Worldviews* 6, no. 2 (2002): 183–197; quotation at p. 193.
7. William J. Matter and Guy R. McPherson, "No Lurking Inconsistency," *Conservation Biology* 14, no. 4 (August 2000): 1204–1205.
8. For discussion, see D. W. Ehrenfeld, "Why Put a Value on Biodiversity?" in *Biodiversity*, ed. E. O. Wilson and Frances M. Peter (Washington, DC: National Academy Press, 1988), pp. 212–216.
9. Daly, "Policy, Possibility, and Purpose," p. 190.
10. Ibid., p. 193.

11. Steven C. Trombulak, "Misunderstanding Neo-Darwinism: A Reaction to Daly," *Conservation Biology* 14, no. 4 (2000): 1202–1203.
12. Frank Press, *Science and Creationism: A View from the National Academy of Sciences* (Washington, DC: National Academy Press, 1984); http://www.natcenscied.org/resources/articles/3053_statements_from_scientific_and_12_19_2002.asp#nas1.
13. M. L. Rosenzweig, "The Four Questions: What Does the Introduction of Exotic Species Do to Diversity?" *Evolutionary Ecology Research* 3 (2001): 361–367; quotation at p. 361.
14. Stephen Jay Gould, "Nonoverlapping Magisteria," *Natural History* 106 (March 1997): 16–22. Reprinted in *Leonardo's Mountain of Clams and the Diet of Worms* (New York: Harmony Books, 1998), pp. 269–283; http://www.stephenjaygould.org/library/gould_noma.html.
15. Bruce Barcott, "For God So Loved the World," *Outside Magazine* (March 2001); http://outside.away.com/outside/magazine/200103/200103christian3.html.
16. Otto Mayr, *Authority, Liberty, and Automatic Machinery in Early Europe* (Baltimore: Johns Hopkins University Press, 1986); quoting Robert Boyle, *The Excellency of Theology as Compared with Natural Philosophy* (1665) at p. 56.
17. Gould, "Nonoverlapping Magisteria."
18. George Gaylord Simpson, *The Meaning of Evolution*, rev. ed. (New Haven: Yale University Press, 1967); quotation at pp. 344–345.
19. Cotton Mather, *The Christian Philosopher*, ed. William Solberg (1721; Urbana: University of Illinois Press, 1994).
20. George Marsden, *Jonathan Edwards: A Life* (New Haven: Yale University Press, 2003), p. 69. Edwards conceded that "God has once or twice interrupted the course of the greater wheels of the machine, as when the sun stood still in Joshua's time." Jonathan Edwards, *Images or Shadows of Divine Things*, ed. Perry Miller (New Haven: Yale University Press, 1948), p. 135.
21. Liah Greenfeld, *Nationalism: Five Roads to Modernity* (Cambridge, MA: Harvard University Press, 1992); quoting Benjamin Franklin, "Information to Those Who Would Remove to America" (1782), at p. 408.
22. Avihu Zakai, "Jonathan Edwards and the Language of Nature: The Re-Enchantment of the World in the Age of Scientific Reasoning," *Journal of Religious History* 26, no. 1 (February 2002): 15–41; quotation at p. 34.
23. Lynn White, "The Historical Roots of Our Ecological Crisis," *Science* 155 (1967): 1203–1207.
24. For discussion, see John F. Martin, *Profits in the Wilderness: Entrepreneurship and the Founding of New England Towns in the Seventeenth Century* (University of North Carolina Press: Chapel Hill, 1991).
25. See P. Miller and T. Johnson, eds., *The Puritans*, vol. 2 (New York: Vintage, 1963), p. 209 (quoting Johann Alsted's *Encyclopaedia*, a widely used textbook in seventeenth century New England). While the first Puritans in America were not devoid of an aesthetic sense, they did not anticipate the categories of the sublime and the beautiful. For them, beauty had to do with order, craft, and utility; they lacked a concept of purely aesthetic expressiveness

or value. A preacher commenting on the glories of this world – as distinct from those of the world to come – might go so far as to note "the summer season clothed with pleasant dress, and profitable for use." Ibid. at p. 210.

26. Miller and Johnson, *The Puritans*, p. 731.
27. Perry Miller, "Introduction," in *Images or Shadows of Divine Things*, ed. Perry Miller (reprinted; Westport, CN: Greenwood Press, 1977).
28. Jonathan Edwards, *Miscellaneous Observations on Important Theological Subjects*, ed. John Eskine (Edinburgh, 1793); http://www.apuritansmind.com/JonathanEdwards/JonathanEdwards-Miscellanies-Illumination.htm.
29. Iris Murdoch, *Sovereignty of the Good* (New York: Schocken Books, 1970).
30. Zakai, "Jonathan Edwards," p. 29.
31. R. W. Emerson, "On Nature," in *Selected Writings of Emerson*, ed. Donald McQuade (New York: Modern Library, 1950), p. 90.
32. Jonathan Franzen, "My Bird Problem," *New Yorker* (August 8, 2005): 52 et seq.; http://www.sguez.com/cgi-bin/ceilidh/adult/?C31888045200A-5745-954-00.htm.
33. There are certain technical philosophical aesthetics behind this statement. In *Languages of Art*, 2d ed. (Indianapolis: Hackett, 1976), Nelson Goodman develops a theory that defines expression in terms of metaphor and exemplification. On this theory, which I believe is correct, a work of art or an object of nature can be expressive without being the expression of its author. The object by exemplifying its metaphorical properties expresses them – and this may take place without the intent of the author. As theology, this suggests that nature can express attributes of God without God intending even to communicate himself to the creature. To explore these logical relationships, I would have to presume on the patience of a reader interested in environmental policy and ethics. I took a run at these issues in aesthetic theory, however, in Sagoff, "On Preserving the Natural Environment," *Yale Law Journal* 84, no. 2 (December 1974): 205–267, especially part II, which attempts to tease out the consequences of Goodman's analysis for environmental ethics.
34. Jonathan Edwards, *A Dissertation Concerning the End for which God Created the World* (1765); http://www.jonathanedwards.com/text/2D/The%20End%20chpt%201.htm.
35. For a version of this argument, see Mark Sagoff, "A Transcendental Argument for the Concept of Personhood in Neuroscience," *American Journal of Bioethics* 7, no. 1 (January 2007): 72–73.
36. Friedrich Nietzsche, *Birth of Tragedy*, trans. Walter Kaufman (New York: Vintage, 1996), sec. 5, p. 52.

CHAPTER 8: SETTLING AMERICA *or* THE CONCEPT OF PLACE IN ENVIRONMENTAL ETHICS

1. The earliest telling I have found is C. V. Piper, *Turf for Golf Courses* (New York: Macmillan, 1917), p. 1. Piper reports that even in 1917, the "hoary" tale had done "veteran service."

2. Simon Schama, *Landscape and Memory* (New York: Knopf, 1995), p. 18
3. Bill McKibben, *The End of Nature* (New York: Random House, 1989), p. 65.
4. According to the definition found in the Wilderness Act of 1964, in a wilderness "the earth and its community of life are untrammeled by man." Wilderness Act of September 3, 1964 (P.L 88-577, 78 Stat. 890; 16 U.S.C. 1121 (note), 11 31–1136), Sec. 2C.
5. Mill, "Nature," p. 23. One may raise the nice philosophical point that in Chapter 7, I argue that an environmental ethic must take nature to be expressive (and thus to have aesthetic value) if it is to escape the toils of a value-free neo-Darwinian science. Does this entail that the course of nature must be the expression of a Supreme Being? Insofar as ecologists believe that biotic communities or ecosystems have an organization or are governed by rules or principles humans can disrupt, we must conclude that Mill was right – this would entail a Designer. (The idea of "self-organization" is a ruse or dodge absent an explanation of the rules that give it a direction or coherence and distinguish it from a historical process.) On the other hand, we can argue that nature is expressive simply in the sense that it exemplifies important metaphorical qualities (*sensu* Nelson Goodman) without entailing any theological thesis. In other words, I do not criticize but simply analyze environmentalism as Calvinism without God.
6. George Perkins Marsh, *Man and Nature*, ed. D. Lowenthal (1864; Seattle: University of Washington Press, 2003). ("As we have seen, man has reacted upon organized and inorganic nature, and thereby modified, if not determined, the material structure of his earthly home"; quotation at p. 13.)
7. Ibid., p. 4.
8. Liberty Hyde Bailey, *The Holy Earth* (1915; New York: Cornell University, 1980), p. 3.
9. The epic battle over damming the Hetch Hetchy valley provides the canonical example of the conflict of these traditions.
10. Gertrude Stein, "The Gradual Making of the Making of Americans," in *Selected Writings of Gertrude Stein*, ed. Carl Van Vechten (New York: Vintage, 1972), p. 258. "Think of anything, of cowboys, of movies, of detective stories, of anybody who goes anywhere or stays at home and is an American and you will realize that it is something strictly American to conceive of a space that is filled with moving, a space of time that is filled always filled with moving."
11. C. W. Moore et al., "Towards Making Places," *Landscape* (Autumn 1962), quoted in A. Briggs, "The Sense of Place," in *The Fitness of Man's Environment*, Smithsonian Annual II (Washington, DC: Smithsonian Institution Press, 1968), p. 85.
12. Wallace Stegner, *Where the Bluebird Sings to the Lemonade Springs* (New York: Modern Library; reprint edition 2002), p. 72.
13. Frederick Jackson Turner, *The Frontier in American History* (Ann Arbor: University of Michigan Scholarly Publishing Office, University of Michigan Library, 2005 [1894]), p. 1.
14. Wallace Stegner comments: "Ghost towns and dust bowls, like motels, are western inventions. All are reflections of transience, and transience in most

of the West has hampered the development of stable, rooted communities and aborted the kind of communal effort that takes in everything from kindergarten to graveyard and involves all kinds of grades and ages of people in a shared past and a promise of continuance." Stegner, *Bluebird Sings* at xvi.

15. Allan Gussow, *A Sense of Place: The Artist and the American Land* (Washington, DC: Island Press Reprint edition, 1997), p. 27. Henry Miller's indictment is more severe: "America is full of places. Empty places. And all those places are crowded. . . . Everyone seeking a nice cozy little joint to be with his fellow man. Not ever finding such a place, but pretending that it does exist. If not here than elsewhere." Miller, *Remember to Remember* (New York: Norton, 1986), p. xv.
16. B. Barber, "Jihad vs. McWorld," *Atlantic Monthly* (March, 1992): 53–65; quotation at p. 53.
17. Alexis de Tocqueville, *Democracy in America*, trans. Henry Reeve, edited with an introduction by Henry Steele Commager (New York, Oxford University Press, 1947) vol. 2, p. 240.
18. Karl Polanyi, *The Great Transformation*, 2d ed. (Boston: Beacon Press, 1940; reprint, 2001), p. 163. For case studies of the organic aspect of the relation of communities to nature, see Robert Coles, *Migrants, Sharecroppers, and Mountaineers* (Boston: Little, Brown, 1970). Coles quotes one farmer in the deep South: "To me the land I have is always there, waiting for me, and it's part of me, way inside me; it's as much me as my own arms and legs" (p. 411).
19. Polanyi, *The Great Transformation*, p. 163.
20. For a brilliant discussion of this conflict in the history of the American West, see Stegner, *Bluebird Sings*, chap. 5. Stegner notes that being footloose has always fascinated Americans; it is "associated in our minds with escape from history and oppression and law and irksome obligations and with absolute freedom" (p. 71). Stegner continues: "But the rootlessness that expresses energy and a thirst for the new and an aspiration toward freedom and personal fulfillment has just as often been a curse. Migrants deprive themselves of the physical and spiritual bonds that develop within a place and a society. Our migratoriness has hindered us from becoming a people of communities and traditions, especially in the West. It has robbed us of the gods who make places holy. It has cut off individuals and families and communities from memory and the continuum of time" (pp. 71–72).
21. R. W. Emerson, "The Over-Soul," in *The Collected Works of Ralph Waldo Emerson, Volume II: Essays: First Series*, Alfred R. Ferguson and Jean Ferguson Carr, eds. (Cambridge, MA: Harvard University Press, 1979), p. 160.
22. Henry David Thoreau, Letter, September 27, 1855, to Daniel Ricketson, in *The Writings of Henry David Thoreau*, vol. 6 (Boston: Houghton Mifflin, 1906), p. 262.
23. Yet both Emerson and Thoreau shared the belief that nature is better known to the poet than the workman. In a familiar passage Thoreau asks, "Is it the lumberman, then, who is the friend and lover of the pine, stands nearest to it, and understands its nature best? Is it the tanner who has barked it, or he who has boxed it for turpentine, whom posterity will fable to have changed

into a pine at last? No! no! it is the poet; he it is who makes the truest use of the pine – who does not fondle it with an axe, nor tickle it with a saw, nor stroke it with a plane – who knows whether its heart is false without cutting into it – who has not bought the stumpage of the town on which its stands." Henry David Thoreau, *The Maine Woods*, in H. D. Thoreau, *A Week on the Concord and Merrimack Rivers, Walden, The Maine Woods, Cape Cod* (New York: Library of America, 1985 [first published posthumously in 1864), p. 685.

24. The original was printed in the August 1862 issue of *Atlantic Monthly*.
25. Gussow, *Sense of Place*, p. 27.
26. Mark Twain, *Life on the Mississippi*, chap. 8; in the 1911 edition, p. 59, but widely available online.
27. Ibid, p. 83. For a thorough study of these passages, see Leo Marx, *The Pilot and the Passenger: Essays on Literature, Culture, and Technology in the United States* (New York: Oxford University Press, 1988).
28. Twain, p. 85.
29. E. C. Relph, *Place and Placelessness* (London: Routledge and Kegan Paul, 1976), p. 87.
30. Hugh Raup, "The View from John Sanderson's Farm: A Perspective for the Use of the Land," *Forest History* 10 (April 1966): 2–11.
31. Ibid., p. 8.
32. Ibid. p. 6. The invention of harvesters, tractors, and other machinery that could be used over large areas also put a nail in the coffin of New England agriculture.
33. Ibid., p. 7.
34. Ibid., p. 11.
35. Ibid., p. 7.
36. Ibid.
37. Ibid., p. 8.
38. Ibid.
39. For an excellent discussion of this see Y. Tuan, *Space and Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press, 1977), esp. chap. 5. Tuan notes: "Freedom implies space; it means having the power and enough room in which to act" (p. 52). He adds: "Space is a common symbol of freedom in the Western world. Space lies open; it suggests the future and invites action" (p. 54). Place, in contrast, concerns commitment and responsibility, actuality rather than potentiality. It is not the realm of conquest but the sphere of concern. Place involves what Tuan calls "an ordered world of meaning . . . and beyond it is . . . space" (p. 56).
40. William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: Norton, reprint edition 1992), p. 7.
41. Ibid.
42. Ibid., p. 257.
43. Ibid., p. 258.
44. Ibid.
45. Ibid.
46. Ibid., p. 257.

47. I paraphrase Paul R. Ehrlich, Gretchen C. Daily, Scott C. Daily, Norman Myers, and James Salzman, "No Middle Way on the Environment," *Atlantic Monthly*, 280, no. 6 (December 1997): 98–104.
48. Paul R. Ehrlich, Gary Wolff, Gretchen C. Daily, Jennifer B. Hughes, Scott Daily, Michael Dalton, and Lawrence Goulder, "Knowledge and the Environment," *Ecological Economics* 30, no. 2 (August 1999): 267–284; quotation at p. 267.
49. Ibid., p. 270.
50. William Cronon, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature," in *Uncommon Ground: Toward Reinventing Natur*e, ed. William Cronon (New York: Norton, 1996), pp. 69–90; quotation at p. 83.
51. Ibid., p. 80.
52. See, for example, George Perkins Marsh, *The Earth as Modified by Human Action: Man and Nature* (1874; New York: Scribner, 1976). Charles Mann, *1491* (New York: Knopf, 2005).
53. Wendell Berry has the best statement I have read of this idea. "We have given up the understanding – dropped it out of our language and so out of our thought – that we and our country create one another, are literally part of one another; that our land passes in and out of our bodies just as our bodies pass in and out of our land; that we and our land are part of one another, and so cannot possibly flourish alone; that, therefore, our culture must be our response to our place, our culture and our place are images of each other and inseparable from each other, and so neither can be better than the other." Wendell Berry, *The Unsettling of America*, 3rd ed. (San Francisco: Sierra Club Books, 1996), p. 22. Another magical expression of the same theme is "The Gift Outright" by Robert Frost.
54. For further discussion, one may consult the literature presenting the concept of nature as postmodern, that is, a socially constructed idea that was never intended to refer to anything real but to a metaphysical category instead. In her admirable book *What Is Nature? Culture, Politics, and the Non-Human* (Oxford: Blackwell, 1995), Kate Soper takes up the idea of Nature as "everything which is not human" (p. 15). From this perspective "it is correct to insist that 'nature' is the idea through which we conceptualize what is 'other' to ourselves" (p. 16). "One is invoking the metaphysical concept in the very posing of the question of humanity's relation to nature" (p. 155). For a defense of the wilderness idea against this "deconstruction," see Holmes Rolston, "Nature for Real: Is Nature a Social Construct?" in *The Philosophy of the Environment*, ed. T. Chappell (Edinburgh: Edinburgh University Press, 1997), pp. 38–64.
55. Cronon, "Trouble with Wilderness," p. 85.
56. In American literature, two of the most memorable expressions of this view differ in emphasis. William Faulkner wrote, "The past is never dead. It's not even past." This statement, which is constantly misquoted and wrongly attributed to the *Sound and the Fury* (1929), is spoken by Gowan Stevens in *Requiem for a Nun*, Act One. See William Faulkner, *Novels 1942–1954: Go Down, Moses / Intruder in the Dust / Requiem for a Nun / A Fable*, ed. Joseph Blotner and Noel Polk (New York: Library of America, 1994), p. 535. Compare

this sense of the weight of the past with the possibility that with it comes liberation – because one is no longer defined by one's preferences or desires. T. S. Eliot wote in "Little Gidding" (the fourth of the "Four Quartets"):

> This is the use of memory:
> For liberation – not less of love but expanding
> Of love beyond desire, and so liberation
> From the future as well as the past.

CHAPTER 9: NATURAL AND NATIONAL HISTORY

1. Quoted in Perry Miller and Thomas H. Johnson, *The Puritans*, rev. ed. (New York: Harper & Row, 1963), p. 103.
2. Quoted in *Proceedings of the Massachusetts Historical Society*, vol. 12 (1871–1873), p. 83.
3. See, for example, Exodus 14:3 ("the wilderness had shut them in") and 32:1–35; see also the description of Christ struggling with Satan and demons in the wilderness: Mark 1:12–13; Matthew 4:1–11; and Luke 4:1–13.
4. Thomas Huxley, "Wordsworth in the Tropics," *Yale Review* 18 (1929): 672–673.
5. Roderick Nash, *Wilderness and the American Mind* (New Haven, CN: Yale University Press, 1967), pp. 23–24.
6. Karl Marx, *Grundrisse zur Kritik der Politischen Okonomie*, quoted in William Leiss, *The Domination of Nature* (New York: Braziller, 1972), p. 73.
7. Perry Miller, *Errand into the Wilderness* (New York: Harper & Row, 1964), p. 206.
8. Longfellow published the *Courtship of Miles Standish* in 1858 based on a popular legend. John Alden came with the *Mayflower*, married Patricia Mullins, and with her had ten children.
9. This familiar description is the title of an election sermon preached by the Reverend Samuel Danforth in 1670. Available on line as "A Brief Recognition of New-Englands Errand into the Wilderness: An Online Electronic Text Edition," Samuel Danforth (Paul Royster, transcriber and editor), University of Nebraska-Lincoln 2006; http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1038&context=libraryscience.
10. Quoted in Miller and Johnson, *The Puritans*, pp. 198–199.
11. John Higginson, *The Cause of God and His People in New England* (Cambridge, MA: Samuel Green, 1663), pp. 10–11.
12. Ibid.
13. This was the synod of 1679–1680; see Perry Miller, *Nature's Nation* (Cambridge, MA: Harvard University Press, 1967), p. 25; Williston Walker, *The Creeds and Platforms of Congregationalism* (New York: Scribner, 1893), pp. 409–440; cf. Perry Miller, *The New England Mind: From Colony to Province* (Cambridge, MA: Harvard University Press, 1967), p. 35.
14. Miller, *Errand*, p. 15.
15. For an account of the land development that followed the Great Migration, see F. Martin, *Profits in the Wilderness* (Chapel Hill: University of North Carolina Press: 1991).

16. Miller, *Nature's Nation*, p. 6.
17. Robert Frost captures this history magnificently in his poem, "The Gift Outright." His sparse verse describing how Americans took root – how they became the land's as they took possession of it – is so accurate no better expression of the point can possibly be imagined.
18. Miller, *Nature's Nation*, p. 7.
19. David Gelernter, "Americanism – and Its Enemies," *Commentary* 119, no. 1 (January 2005): 41 ff (8 pages).
20. David Gelernter, "A Religious Idea Called 'America': How Puritanism Created It, What It Means, Why It Matters," American Enterprise Institute web page (posted Tuesday, February 14, 2006); http://www.aei.org/publications/pubID.23883,filter.all/pub_detail.asp.
21. R. B. W. Lewis, *The American Adam: Innocence, Tragedy, and Tradition in the Nineteenth Century* (Chicago: University of Chicago Press, 1955).
22. For discussion see William Gass. Book Review, *New York Times*, May 3, 1973, p. 7 (reviewing Gertrude Stein's *Geographer I*).
23. Joel Myerson, "Introduction," in *Transcendentalism: A Reader*, ed. Joel Myerson (New York: Oxford University Press, 2000), p. xxvi.
24. Simon A. Levin, "The Role of Theoretical Ecology in the Description and Understanding of Populations in Heterogeneous Environments," *American Zoologist* 21 (1981): 865–875. Quotation at p. 866.
25. Leonardo da Vinci, *Frammenti Letterari e Gilosofici*, ed. Edmondo Solmi (Firenze: Giunti-Barbera, 1899), pp. 94–95.
26. K. S. Shrader-Frechette and E. D. McCoy, "Applied Ecology and the Logic of Case Studies," *Philosophy of Science* 61 (1994): 228–249.
27. Stephen Bocking, *Nature's Experts* (New Brunswick: Rutgers University Press, 2004), p. 18.
28. I describe and discuss this conflict between two methods in ecology in Mark Sagoff, "The Plaza and the Pendulum: Two Concepts of Ecological Science," *Biology and Philosophy* 18 (2003): 529–552.
29. Jonathan Edwards, *The Works of President Edwards* (New York: Leavitt, Trow, 1879), pp. 217–218.
30. The hylomophic or Spinozistic tendency of Transcendentalism comes from Edwards – and should not be confused with pantheism or mysticism. The contrast in ecological science today opposes those (in the tradition of Cotton Mather) who believe that eternal truths are to be found in the mathematical ordinances that govern systems and those (in the spirit of Robert Blake) who hold that "Art and Science cannot exist but in minutely organized Particulars" William Blake, *Jerusalem: The Emanation of the Giant Albion*, edited with an introduction and notes by Morton D. Paley (Princeton, NJ: William Blake Trust/Princeton University Press, 1991), chap. 3, Plate 55.
31. Henry David Thoreau, *The Maine Woods*, in H. D. Thoreau, *A Week on the Concord and Merrimack Rivers, Walden, The Maine Woods, Cape Cod* (New York: Library of America, 1985 [first published posthumously in 1864), p. 646.
32. I paraphrase a line from Wallace Stevens, "Sunday Morning."

33. Significantly, this is the motto of his essay "History." Ralph Waldo Emerson, "History," in *Essays & Essays*, 1st ser., vol. 1 (Columbus, OH: C. E. Merrill, 1969), p. 1.
34. See Nelson Goodman, *Languages of Art* (Indianapolis: Bobbs-Merrill, 1968), p. 68 ("metaphorical possession is not literal possession; but possession is actual whether literal or metaphorical").
35. Simon Schama makes this point as follows: "Landscapes are culture before they are nature; constructs of the imagination projected onto wood and water and rock. . . . But it should also be acknowledged that once a certain idea of landscape, a myth, a vision, establishes itself in an actual place, it has a peculiar way of muddling categories, of making metaphors more real than their referents; of becoming, in fact, part of the scenery." Schama, *Landscape and Memory* (New York: Knopf, 1995), p. 61.
36. Henry David Thoreau, *Walden* (Princeton, NJ: Princeton University Press, 1971), chap. 7, "The Bean Field."
37. Philip Cafaro, *Thoreau's Living Ethics*: Walden *and the Pursuit of Virtue* (Athens: University of Georgia Press, 2004).
38. My colleague Robert H. Nelson, who also makes this point and uses this phrase, as of this writing is completing a book largely on this theme.
39. Hector St. Jean de Crèvecoeur (Michel-Guillaume-Jean de Crèvecoeur), *Letters from an American Farmer* (1904; New York: Dutton, 1962), p. 54.
40. Thomas Jefferson, *Notes on the State of Virginia* (Chapel Hill: University of North Carolina Press, 1955), pp. 164–165. Published for the Institute of Early American History and Culture, Williamsburg, VA.
41. Leo Marx, *The Machine in the Garden* (New York: Oxford University Press, 1964), p. 73.
42. Alexis de Tocqueville, *Democracy in America* (New York: Random House, Vintage Books, 1946), p. 74.
43. Miller, *Errand*, p. 211.
44. Thoreau, *Walden*, p. 116.
45. Mark Twain, "Fenimore Cooper's Literary Offenses," in *How to Tell a Story and Other Essays* (New York: Harper Bros., 1904), p. 78.
46. George Bernard Shaw, "The Perfect Wagnerite," in *Selected Prose of Bernard Shaw* (New York: Dodd, Mead, 1952), pp. 218–233.
47. James Fenimore Cooper, *The Leatherstocking Saga* (New York: Pantheon, 1954), p. 681.
48. Roderick Nash, *Wilderness and the American Mind* (New Haven, CN: Yale University Press, 1967), p. 44.
49. Ralph Waldo Emerson, *Journal*, quoted in R. W. B. Lewis, *The American Adam* (Chicago: University of Chicago Press, 1955), p. vi.
50. Nathaniel Hawthorne, "The New Adam and Eve," in *Mosses from an Old Manse* (1900; Freeport NY: Books for Libraries, 1970), p. 20.
51. Tocqueville, *Democracy in America*, p. 19.
52. Miller, *Errand*, p. 207.
53. F. Scott Fitzgerald, *The Great Gatsby* (New York: Scribner, 1953), p. 182ff.
54. William Faulkner, *Big Woods* (New York: Random House, 1955), unpaginated, 6th page from end of text.

55. Quoted in Nash, *Wilderness and the American Mind*, p. 90.
56. Faulkner, *Big Woods*, unpaginated, 3rd page from end of text.
57. Herbert Croly, *The Promise of American Life*, ed. Arthur Schlesinger Jr. (Cambridge, MA: Harvard University Press, 1965), pp. 6–7.
58. For discussion of the economic promise of American life, see Robert Nelson, *Reaching for Heaven from Earth* (Totowa, NJ: Littlefield Adams, 1993). But for another view, see Christopher Lasch, *True and Only True Heaven: Progress and Its Critics* (New York: Norton, 1991).
59. J. Ortega Y Gasset, *The Revolt of the Masses* (1932; New York: Norton, 1957), p. 89.
60. Faulkner, *Big Woods*, unpaginated, last page.

CHAPTER 10: ENVIRONMENTALISM: DEATH AND RESURRECTION

1. "The End of the World: A Brief History," The Economist (December 18, 2004); http://www.economist.com/diversions/displayStory.cfm?story_id=3490697.
2. Donald R. McGregor, "Public Response to Y2K: Social Amplification and Risk Adaptation or How I Learned to Stop Worrying and Love Y2K," in *The Social Amplification of Risk*, ed. Nick Pidgeon, Roger E. Kasperson, and Paul Slovic (New York: Cambridge University Press, 2003), p. 256.
3. Michael Shellenberger and Ted Nordhaus argue that the environmental community no longer engages values Americans share and respect. The leadership defines its political strategy "around using science to define [a] problem as 'environmental' and crafting technical policy proposals as solutions." Environmentalism is seen as a special interest, according to Schellenberger and Nordhaus, because it puts "the technical policy cart before the vision-and-values horse." Shellenberger and Nordhaus, "The Death of Environmentalism"; http://www.thebreakthrough.org/images/Death_of_Environmentalism.pdf.
4. William James, *The Varieties of Religious Experience* (1902; New York: Random House, 1994), see pp. 61 and 552.
5. W. H. Wagner, "Problems with Biotic Invasives," in *Biological Pollution,* ed. Bill McKnight (Indianapolis: Indiana Academy of Science, 1993), pp. 1–8; quotation at p. 2.
6. R. V. O'Neill, "Is It Time to Bury the Ecosystem Concept? (with Full Military Honors, of Course!)," *Ecology* 82 (2001): 3275–3284; quotation at p. 3279.
7. For attribution, see http://www.sierraclub.org/john_muir_exhibit/frameindex.html. See also http://www.sierraclub.org/john_muir_exhibit/writings/misquotes.html.
8. Muir wrote of natural history, "We may read the letter-pages of friends when written over and over, we are intimately acquainted with their hand-writing, and under the same conditions we may read Nature's writings on the stone pages of the mountains." *The Yosemite* (New York: Century, 1912).
9. See Robert Nelson, *Reaching for Heaven on Earth* (Totowa, NJ: Littlefield Adams, 1993). In debates over intrinsic and instrumental value, one can hear

echoes of controversies within Protestantism between Evangelicals and others who preach individual conversion and Progressives associated with the Social Gospel movement who taught social uplift. This chapter argues that environmentalism is dead because it has become associated with the Progressive aspects of Christianity. It must then base ecological protection on economic values as the discipline of ecological economics tries to do. This appears to be a failing strategy in spite of high hopes that economic arguments can be found for keeping nature natural (e.g., the present emphasis on "pricing" ecosystems services).

10. Quoted in Michael P. Cohen, *The Pathless Way* (Madison: University of Wisconsin Press, 1984), p. 163.
11. At the Bancroft Library and widely reproduced. Since this is a photograph, somebody must have been there with him. (The photographer is unknown.)
12. Roderick Nash, *Wilderness and the American Mind*, 2d ed. (New Haven, CN: Yale University Press, 1973); quotations from Muir found at pp. 125–126.
13. National Parks Conservation Center Fact Sheet; http://www.npca.org/about_npca/park_system/default.asp.
14. For a partial list, see Fred Van Dyke, "Between Heaven and Earth – Evangelical Engagement in Conservation," *Conservation Biology* 19, no. 6 (2005): 1693–1696.
15. "Questions for Richard Cizik: Earthy Evangelist," interview by Deborah Solomon, *New York Times Magazine*, April 3, 2005; http://www.clas.ufl.edu/users/kschwart/earthy%20evangelist.pdf.
16. For a good historical account of this effort, see Bruce Barcott, "For God So Loved the World," *Outside Magazine* (March 2001); http://outside.away.com/outside/magazine/200103/200103christian3.html.
17. A current policy statement of the National Association of Evangelicals insists on what it calls the "principle of sustainability," which, it says, implies that "our uses of the Earth must be designed to conserve and renew the Earth rather than to deplete or destroy it." In the fall of 2004, the NAE issued its policy document entitled "For the Health of the Nation: An Evangelical Call to Civic Responsibility" (http://www.nae.net). It includes many statements supporting environmental protection, for example,

    "We urge Christians to shape their personal lives in creation-friendly ways: practicing effective recycling, conserving resources, and experiencing the joy of contact with nature. We urge government to encourage fuel efficiency, reduce pollution, encourage sustainable use of natural resources, and provide for the proper care of wildlife and their natural habitats."

18. William Paley, *Natural Theology,* 9th ed. (London: Printed for R. Faulder, 1805), vol. 1, p. 55.
19. Donald Worster, "The Ecology of Order and Chaos," *Environmental History Review* (Spring/Summer 1990): 1–13; quotation at p. 10. Many ecologists now take this view. L. Hansson summarizes, "There is a wide consensus even among ecologists that ecology as a science has not lived up to the expectations and that it is not able to either provide coercive basic theories nor good solutions to pressing environmental problems." L. Hansson, "Why

Ecology Fails at Application: Should We Consider Variability More than Regularity?" *Oikos* 100, no. 3 (2003), 624–627.

20. For an example of this reasoning, see S. A. Levin, *Fragile Dominion: Complexity and the Commons* (Reading, MA: Perseus Books, 1999).
21. Ecologists writing in the first half of the twentieth century, such as Frederic Clements, A. G. Tansley, Aldo Leopold, Paul Sears, and E. P. Odum, followed Forbes in making the ecosystem or the natural community the organizing concept of their science. See, for example, Aldo Leopold, *A Sand County Almanac and Sketches Here and There* (New York: Oxford University Press: 1949), pp. 216–218. According to environmental historian Donald Worster, these ecologists packed the ecosystem concept with "so much stress on natural order that it came close to dehistoricizing nature altogether." Donald Worster, "Nature and the Disorder of History," in *Reinventing Nature,* ed. Michael Soul and Gary Lease (Washington, DC: Island Press, 1995), p. 70. For Odum, "ecology was the study of the 'structure and function of nature,' a definition that almost left out of the picture Darwinian evolution and all its turmoils" (ibid.).
22. Stephen A. Forbes, "The Lake as a Microcosm," 1887; reprinted in *Bulletin of the Illinois State Natural History Survey* 15 (1925): 537–550.
23. Donald Worster, *Nature's Economy: A History of Ecological Ideas*, 2d ed. (New York: Cambridge University Press, 1994), pp. 211–215.
24. Frederic Clements, *Plant Succession: An Analysis of the Development of Vegetation* (1916), as quoted in Worster, *Nature's Economy*, pp. 211–215.
25. See H. P. Blavatsky, "Is Creation Possible for Man?"; http://www.blavatsky.org/hpb/arts/IsCreationPossibleforMan.htm.
26. For a more contemporary statement of Theosophist and related spiritual beliefs about the ascendant organization of the natural world, see Robert Ulanowicz, *Ecology, the Ascendent Perspective* (New York: Columbia University Press, 1997).
27. Institute for Creation Research, *Scientific Creationism,* 2d ed., ed. Henry M. Morris, (El Cajon, CA: Master Books, October 1974), p. 12.
28. For a deeply mathematical exposition of the principles of Great Chain of Being ecology, see S. A. Levin, "The Problem of Pattern and Scale in Ecology," *Ecology* 73, no. 6 (1992): 1943–1967.
29. See Lovejoy, *Great Chain of Being* (Cambridge, MA: Harvard University Press, 1956) at p. 60.
30. Ibid.; quoting Pope at p. 60.
31. E. P. Odum, "The Emergence of Ecology as a New Integrative Discipline," *Science* 195 (1977): 1289–1293. For more than thirty years ecologists have been announcing this "emergence" in an optative mood. It has not happened.
32. E. P. Odum, "The Strategy of Ecosystem Development," *Science* 164 (1969): 262–270.
33. Daniel Botkin, "Adjusting Law to Nature's Discordant Harmonies," *Duke Environmental Law & Policy Forum* 25 (1996): 26.
34. A. Dan Tarlock, "Beyond the Balance of Nature: Environmental Law Faces the New Ecology," *Duke Environmental Law & Policy Forum* 7 (Fall, 1996): 198.

35. R. Gallagher and B. Carpenter, "Human-Dominated Ecosystems," *Science* 277 (1997): 485–486.
36. D. Western, "Human-modified Ecosystems and Future Evolution," *Proceedings of the National Academy of Sciences* 98, no. 10 (May 8, 2001): 5458–5465.
37. "Our ability to protect biological resources depends on our ability to identify and predict the effects of human actions on biological systems, especially our ability to distinguish between natural and human-induced variability in biological condition." J. R. Karr and E. W. Chu, *Restoring Life in Running Waters: Better Biological Monitoring* (Washington, DC: Island Press, 1999); http://www.epa.gov/bioindicators/html/premise8.html.
38. P. M. Vitousek, J. D. Aber, R. W. Howarth, G. E. Likens, P. A. Matson, D. W. Schindler, W. H. Schlesinger, and D. G. Tilman, "Human Alteration of the Global Nitrogen Cycle: Sources and Consequences," *Ecological Applications* 7 (1997): 737–750; quotation at p. 494.
39. C. J. Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California Press, 1967), p. 243.
40. W. H. Drury, *Chance and Change: Ecology for Conservationists* (Berkeley: University of California Press, 1998), p. 23. I believe this is one of the best books written in ecology.
41. A. M. Ghilarov, "The Changing Place of Theory in 20th Century Ecology: From Universal Laws to Array of Methodologies," *Oikos* 92, no. 2 (2001): 357–362.
42. D. Simberloff and T. Dayan, "Ruling out a Community Assembly Rule: The Method of Favored State," in E. Walker and P. A. Eddy, eds., *The Search for Assembly Rules in Ecological Communities* (Cambridge: Cambridge University Press, 1999); quotation at p. 62.
43. F. S. Gilbert and J. Owen, "Size, Shape, Competition, and Community Structure in Hoverflies," *Journal of Animal Ecology* 59 (1990): 21–39; quotation at p. 33.
44. J. Weiner, "On the Practice of Ecology," *Journal of Ecology* 83 (1995): 153–158; L. W. Aarssen, "On the Progress of Ecology," *Oikos* 80 (1997): 158–177.
45. That science is the way to political power seems to be the assumption of many environmentalists. Michael Crichton cautions against this path to power. "But in the end, science offers us the only way out of politics. And if we allow science to become politicized, then we are lost." Creighton, "Environmentalism as Religion," Lecture to the Commonwealth Club of San Francisco, September 15, 2003; http://www.crichton-official.com/speeches/speeches_quote05.html.
46. See Mark Dowie, *Losing Ground: American Environmentalism at the End of the Twentieth Century* (Cambridge, MA: MIT Press, 1995), especially p. 267.
47. Robert Gottlieb, *Forcing the Spring* (Washington, DC: Island Press, 1993), p. 154.
48. Blaine Harden, "Hatchery Salmon Plan Announced; Fish to Be Used in Stream Rebuilding," *Washington Post*, May 29, 2004, p. A03. This policy follows a 2001 U.S. District Court decision delisiting Oregon coast coho salmon because genetically similar hatchery-bred fish had joined and swelled the

wild population. *Alsea Valley Alliance* v. *Evans*, 161 F. Supp.2d 1154 (D. Or. 2001).

49. Holly Doremus discusses this among other examples of "wicked" questions in Holly Doremus, "The Purposes, Effects, and Future of the Endangered Species Act's Best Available Science Mandate," *Environmental Law* 34 (Spring, 2004): 397–450.
50. I have provided examples, arguments, and invective in various articles, including M. Sagoff, "The Plaza and the Pendulum: Two Concepts of Ecological Science," *Biology and Philosophy* 18 (2003): 529–552; and "Do Non-Non-Native Species Threaten the Natural Environment?" *Journal of Agricultural and Environmental Ethics* 18 (2005): 215–236.
51. Kevin Krajick. "Winning the War against Island Invaders," *Science* 310, no. 5753 (December 2, 2005): 1410–1413.
52. Santa Barbara businessman Richard Feldman, as quoted in ibid.

Index