

CHAPTER NINE

THE SOCIAL SIEGE OF NATURE

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Living nature—the native species of plants and animals in their native settings—is under two kinds of siege; one is overt, the other covert. The overt siege is physical; it is carried out by increasing multitudes of human beings equipped and accompanied by bulldozers, chainsaws, plows, and livestock. The covert assault is ideological and therefore social; it serves to justify, where useful, the physical assault. A principal tool of the social assault is deconstruction.

Deconstruction is a style of “postmodern” critical analysis originally applied to texts. Recently deconstruction has also become popular among social critics, particularly among those who identify with emancipatory (human social justice) movements. A tenet of these movements is that one must question the premises that sustain the existing social order. And if those premises “privilege” a particular group, and if that group has not struggled to achieve its status, or if the premises are “false,” then it is essential to “deconstruct” these premises—to lay them bare by the dissection of analysis—because the exposure of premises increases the likelihood of change. The reader of this book will have already learned a great deal about this.

When I discovered that social critics were deconstructing both nature and wilderness, even questioning their existence and essential reality, I wondered how and why. Gradually I have come to view

many of these critics as humanists who feel that they must attack and redefine the concept of living nature and its protection as part of the struggle to liberate the less powerful classes of *Homo sapiens* from oppression by economically and politically stronger subgroups of the species.¹ For example, some argue that since people have always been part of nature, it is unreasonable to exclude native people from nature preserves.²

In this concluding chapter I present a status report on living nature in light of contemporary biological thought and recent global biophysical changes.³ I also try to clarify the structure and motivation of the social assault and to deconstruct some current fallacies, misconceptions, and myths that have become impediments to protecting what remains of species diversity and wilderness. Finally, I argue that postmodern views are a major influence on the formation of biodiversity policy, sometimes to the detriment of living nature.

Coexisting Constructions of Living Nature

Euro-American civilization, the dominant culture in recent history, has invented many living natures, each formation mirroring, to some extent, the science of the day and the heterogeneity of religious beliefs and cultures. It is apparent that no universal Western perception of nature exists. People can hold many independent impressions of nature, depending on culture, experience, context, and scale. For an American, living nature can be a sunny meadow, the mountains, the coast. It can be red in tooth and claw as on television documentaries. It can be a shelterbelt or a park, a pasture or a plantation. For many, living nature is the storehouse of resources provided for human welfare. And there are people, still, who perceive everything in nature as the work of God (to teach us humility) or that of Satan (to tempt us into sin).

One of the explanations for the coexistence of such diverse views is our ignorance, both cultural and naturalistic, about our world. Many human beings are still pre-Darwinian in their understanding of natural selection (and in their faith in a wide range of fundamentalist doctrines), pre-Hellenistic in their command of logic, pre-Bernoullian in their grasp of probability, pre-Mendelian in their understanding of genetics, and pre-Modern in their humility before the dissipative sig-

nificance of the Second Law of Thermodynamics. Most people, moreover, being unaware of Malthus, are oblivious to the implacability of geometric population growth in a world where resources increase arithmetically. Nor do most people appreciate the genetic/evolutionary basis of human selfishness—why reproductively competent human beings, just as in all the other ten million species, are preoccupied throughout their lives with their own biological fitness, which translates into attractiveness, wealth, and status. Thus it is ironic that we speak so glibly of postmodernism in an age when the majority of people, often because they are uneducated, remain pre-modern and easily fall victim to superstition and demagoguery.

It is not surprising, then, that so many concepts of living nature co-exist in the so-called modern world. Perceptions of nature do not so much change over time as accumulate, layer on layer, such that the most scientific conceptions exist side by side with the most pagan, even within the mind of a single person. Figure 9.1 illustrates nine distinct cognitive formations:

- **Magna Mater:** the hunter-gatherer, animistic, pagan sense of divine oneness or monism.⁴
- **Unpredictable and Evil Bully:** a force mindlessly causing random inconvenience and catastrophes, or even a fall into anarchy and barbarism.
- **Aging and Reluctant Provider:** a supply depot producing fiber, minerals, food, fresh water, pharmaceuticals, and other services.
- **Wild Kingdom:** the venue of trophy, camcorder, and life list. This is the nature of television documentaries, of the ecotourist on safari in Kenya or Antarctica, of the grizzly fishing for salmon or mauling a camper, of the scuba-diver among coral reefs or the hiker in forest, tundra, and steppe. It is also the deer through the rifle scope and the bird through binoculars.
- **Open-Air Gymnasium:** the nature of ski slope, surf, rock climb, mountain ascent, and river rapids. Here the emphasis is on the sensual high of strenuous accomplishment, overcoming limits, winning contests, and domination.
- **New Age Temple:** the locus of vision quests, of drumming, dancing, sweat lodges, and other aboriginal-like or shamanistic rituals for facilitating rites of passage, self-esteem, or sense of

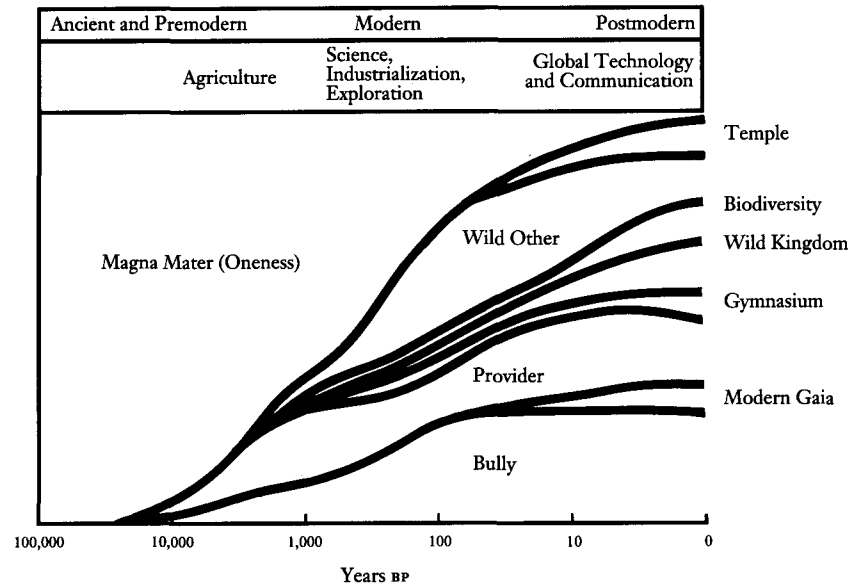


Figure 9.1 Western constructions of living nature: though the relative span of each concept is meant to suggest its prevalence at different periods in the West, these are merely guesses.

integrity and identity.⁵ This is living nature as a divine setting—a temple—where one learns about the self, seeks peace, and pursues integration for psychic or psychological healing and maturation.⁶ Perhaps this is as close as we modern human beings can get to the Magna Mater of pagan monism—to the world before a separate nature was invented.

- Wild Other or Divine Chaos: wild nature that has no concern for human beings except when other animals perceive us as a dangerous predator or as a possible food item.⁷ To me this is the point of deep ecology—to let the other be, neither to contain it within the self nor to control it.
- Gaia: the view that living nature is homeostatic and self-regulating.⁸
- Biodiversity: the living nature of the contemporary Western biologist. It is the most concrete of all these perceptions, which makes it the most vulnerable.

This list is not meant to be comprehensive; the reader may want to add other “natures.” (A similar typology—arguments for the preservation of the nonhuman world—was suggested by Warwick Fox.)⁹ The point is that many living natures coexist in this late stage of modernity, a reflection of the polymorphic, fragmented nature of human occupations and preoccupations in a civilization that encompasses an extraordinary range of subcultures, levels of affluence, contact with natural habitats, and philosophical sophistication.

A Scientific View of Living Nature

What is living nature from the perspectives of late-twentieth-century taxonomists, ecologists, biogeographers, evolutionists, geneticists, and physiologists (all of whom are probably unreconstructed modernists), and how does this living nature differ from the other eight constructions?¹⁰ Living nature can be described by reference to four categories of process: physical, evolutionary, ecological, and anthropogenic.

Physical Processes

Astronomical, geological, and climatic events are, for practical purposes, random (sometimes chaotic) and beyond control. Predictability, in most cases, is impossible or unlikely in the near future, except in the loose sense that certain events (such as earthquakes, collisions with large extraplanetary objects, major storms, and climate change, including glacial epochs) are highly probable, given enough time. Because climate and other large-scale physical events are characterized by nonlinear and often chaotic dynamics, long-term predictions may never be reliable. Though we are not in control of large-scale physical events, our activities can, nonetheless, affect many phenomena, including climate and sea level, local weather, and the ozone layer.

Evolutionary Processes

Evolutionary biology continues to reshape our view of living nature. There are five major dimensions to our evolutionary worldview. First, there is now no question that all life on earth evolved from a common ancestor. The genetic material and the codes embedded

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within it reveal that every living kind of plant and animal owes its existence to a single-celled ancestor that evolved some three and a half billion years ago. All species are *kin*.

Second, the genetic material of contemporary organisms is constantly being altered by mutations, and the resulting variability is constantly pruned by differential survival and reproduction—natural selection. Natural selection is variable in intensity and often episodic. Evolutionary rates are inversely proportional to generation length, which explains why pathogens and pests evolve faster than either we humans or our crops. Most evolutionary biologists believe that natural selection has tended to increase the complexity of organisms. Complexity, however, is limited by developmental, ecological, and genetic constraints. An understanding of natural selection, as we shall see, is relevant to our current environmental and medical predicaments.

Third, the related phenomena of isolation and space account for the large number of species on the planet. Millions of species persist because mountain ranges, lakes, river systems, oceans, islands, and continents are relatively isolated; isolation facilitates speciation and space permits coexistence, in part by partitioning habitats. Organisms evolved opportunistically to take advantage of the immense range of spatial, temporal, and physical/chemical variation in habitats.

Fourth, it is probably an accident that mammals suddenly came to dominate the fauna during the last sixty-five million years. Had it not been for the doomsday scenario that apparently unfolded when one or two huge asteroids crashed into the earth around sixty-five million years ago, dinosaurs might still rule. Human beings, therefore, owe their existence to an unpredictable catastrophic event. On the scale of the solar system, however, events of this kind are both trivial and frequent.

Fifth, on the scale of human life spans, the natural extinctions of species of plants and animals are rare indeed. Although biologists have recorded hundreds of extinctions in the last few centuries, virtually all are artificial.¹¹ Those who argue that extinction is natural and inevitable are guilty of the "Auschwitz fallacy," the fallacy that ignores causation as well as acceleration. The important thing about contemporary extinctions is the rate of annihilation, not their long-term probability (which is 1). Extinction rates have increased a thou-

sandfold in recent decades because of the ecological hegemony of *Homo sapiens*.

Ecological Processes

The real biological world little resembles the rose/blue-tinted television portrayal. Certainly the idea that species live in integrated communities is a myth.¹² So-called biotic communities, a misleading term, are constantly changing in membership. The species occurring in any particular place are rarely convivial neighbors; their coexistence in certain places is better explained by individual physiological tolerances.¹³ Though in some cases the finer details of spatial distribution may be influenced by positive interspecies interactions, the much more common kinds of interactions are competition, predation, parasitism, and disease. Most interactions between individuals and species are selfish, not symbiotic, though these interactions can lead sometimes to evolved and reciprocally beneficial interspecies responses that may help to maintain diversity and the integrity of social groups.¹⁴ *Homo sapiens* is no exception.¹⁵ In general, though, the idea that living nature comprises cooperative communities replete with altruistic, mutualistic symbioses has been overstated. (See note 7.)

Moreover, living nature is not equilibrated—at least not on a scale that is relevant to the persistence of species. Nor do homeostatic systems such as Gaia buffer life on a relevant spatiotemporal scale—that of plant and animal species in real ecosystems—particularly when confronted with a species such as *Homo sapiens*.¹⁶ In a sense, the science of ecology has been hoist on its own petard by maintaining, as many did during the middle of this century, that natural communities tend toward equilibrium. Current ecological thinking argues that nature at the level of local biotic assemblages has never been homeostatic. Therefore, any serious attempt to define the original state of a community or ecosystem leads to a logical and scientific maze. The principle of balance has been replaced with the principle of gradation—a continuum of degrees of human disturbance (see Borgmann in Chapter 3).

Anthropogenic Processes

By far the most important ecological force today is the increasing spatial and material dominance of *Homo sapiens*. First, the human population is unstable; its growth is out of control by any biological stan-

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ard; the growth rate of humans is, by definition, unsustainable because it is exponential. The population of *Homo sapiens* doubles every four decades or so. But population is not the only phenomenon that is growing exponentially. The same explosive rates characterize scientific discovery, technological development, and most categories of information. In light of these rates, and given that people do not learn more today than they did one hundred years ago, we must conclude that our ignorance is also increasing exponentially.

Second, population growth, particularly when combined with powerful technologies, is causing other changes, many of which we are just beginning to detect. Nations and multinational corporations are depleting fossil fuels and topsoils, eliminating aquifers by pumping, polluting groundwater, wiping out inland seas (such as the Aral Sea), and removing nearly all ancient forests and converting them to simpler, less diverse systems. People are degrading most grasslands and destroying most of the world's fisheries, slowly replacing them with aquaculture in ponds and estuaries which destroy the nesting and breeding habitats of many species. In addition, manufacturing and consumption are perturbing the earth's atmosphere by releasing reactive chemicals—including gases that are selectively affecting terrestrial and aquatic species (such as ozone and acids)—and other chemicals that have the capacity to destroy the protective shield of ozone and increase the temperature. Among the most insidious of the active chemicals now being released are those with physiological effects. In a sense, our species is conducting an uncontrolled, planet-wide physiology experiment. For example, the falling fertility of male animals (from sturgeon to alligators, from cougars to human beings) is being attributed to estrogen-mimicking chemicals such as DDT and ethynylestradiol in birth control pills (one of the most potent biochemical agents known).¹⁷ Together these changes are causing an episode of species extinction that is likely to eliminate one-quarter to one-half of all species during the next fifty to one hundred years.¹⁸

Third, as Daniel Botkin remarks, "We talk about spaceship Earth, but who is monitoring the dials and turning the knobs? No one."¹⁹ With few exceptions,²⁰ the laudable objectives of natural resource sustainability are subverted by the greed of the extractors themselves. Under the Magnuson Act, for example, the fundamental fishing law in the United States, eight regional councils are authorized to set fishing limits; but these councils are dominated by the commercial

^{Fishing} fishing industry and, except in Alaska, have not been able to regulate themselves or protect the resource. Thus the industry is responsible for its own destruction.²¹

Fourth, the human condition can still be described as difficult for at least half of the world's people. In spite of the many ways that we have learned to exercise our will over water and wetlands (by damming and draining), over forests (by deforestation), and over predators and other species (by hunting, fishing, and trapping), and despite all the wounds we have inflicted on nature, many natural catastrophes still occur. Weather is still beyond the control of farmers, drivers, and vacationers. Storms still wreak havoc, as do earthquakes and wildfires. And rates of evolution among pathogens and pest species routinely outpace the rate at which technology can develop new fixes.

Attempts by affluent sections of humanity to distance themselves from weather, floods, weeds, diseases, and dangerous animals have been locally and modestly successful, though the costs of these actions (dams, loss of fisheries, loss of ancient forests, evolved resistance of pathogens to antibiotics and pesticides, and increase in cancer rates) will be borne by future generations. Many human beings are subject to chronic shortages of food, degradation of soils, and depletion of fuel and water supplies; at the same time, human populations are increasingly vulnerable to old diseases such as measles, malaria, diphtheria, and tuberculosis and to new ones such as AIDS, Lyme disease, Epstein-Barr syndrome, hepatitis C and E, Legionnaire's disease, new forms of cholera, and new viral pneumonias (such as hantavirus).

On the Cusp of Crisis

Living nature little resembles the everyday conceptions portrayed in Figure 9.1. Living nature is under siege. Though all life is related by descent from a common ancestor, one species of mammal, *Homo sapiens*, has occupied or exploited nearly every point on the planet's surface and has already co-opted much of the land's photosynthetic output.²² Consequently, at least one-quarter of living species are on the cusp of the most profound extinction crisis in the last sixty-five million years. The welfare of living nature is further compromised by the relative insignificance of homeostatic mechanisms that operate on the ecosystem (or community) level. The metaphor of the self-regulating organism, when applied to biotic communities, is danger-

ously misleading. Though there are some exceptions, particularly outside the tropics, large sections of living nature will not survive the onslaught.²³

The physical attack on living nature is frontal, converting wildlands and wild waters to farms, plantations, pastures, canals, airports, roads, highways, cities—a built, denatured, and degraded environment. Much of what remains, the remnants of native habitats, is severely fragmented, disturbed, overgrazed, overhunted, overfished, and clearcut. Increasingly, the physical attack, particularly in the tropics, is the struggle of materially subordinate members of *Homo sapiens* to survive in relatively infertile lands that they have been forced to occupy by more powerful elites and the implacable calculus of overpopulation. This brute force siege of nature, however, is not news. Perhaps more surprising is the justification of this physical siege by ideology—the social siege of nature.

The Ideological War on Nature

In this section I wish to outline the cultural or social siege of nature. This is not a conspiracy but a program that is carried out independently by traditional contestants who have distinctly different ideologies: conservative free market capitalists, humanists concerned with the emancipation and empowerment of certain social and ethnic groups, and others, including animal rights organizations. Their assault is covert because none of these groups would publicly admit to being hostile to nature or wilderness. Each group adheres to at least one of the three myths described here,²⁴ employing the myth that best fits its political needs of the moment. These myths are all post-modern in the sense that they reject conventional Western beliefs and biases:

- The Myth of Western Moral Inferiority—the proposition that Western attitudes toward nature are inferior to those based on other traditions (aboriginal, Eastern)
- The Myths of Constructionism—the view that nature is either unknowable (the Strong project of Hayes in Chapter 4) or that nature nowadays has been physically constituted by the economic activities of aboriginal peoples

- The Myth of the Pristine/Profane Dichotomy—the belief that the remnants of living nature have been irreversibly changed by human disturbance, so that nature today is an artificial production and therefore profane

As we shall see in the following sections, these myths have been used to justify various political agendas.

The Myth of Western Moral Inferiority

Stephen Kellert's research (Chapter 7) undermines the myth of Western moral inferiority, a canonical doctrine of New Age post-modernists who argue that many traditional Western and American attitudes reflect environmental insensitivity and are inferior to Eastern or aboriginal attitudes, which stress respect and harmony. Kellert's conclusions undermine this bit of conventional wisdom. This is not to say that Western society is environmentally virtuous. Far from it. But Western culture may not be more evil with respect to living nature than some other human traditions.

The national park movement started in the United States. There are many reasons why the modern search for ethical and practical models of conservation might have begun there. Americans, unlike Europeans or Asians, saw the widespread destruction of favorite places in their own lifetime. This horror of desecration, as well as the grandeur and wildness that remained, may have produced many of America's and the world's greatest conservationists, including Thoreau, Muir, Leopold, Carson, Brower, Ehrlich, Foreman, and Snyder.

A corollary of the myth of Western moral inferiority is the belief (an aspect of multiculturalism) that native peoples, particularly Native Americans, always behave in an exemplary way toward living nature, holding it in great reverence. Gary Paul Nabhan (Chapter 6) notes that there may have been exceptions. Further, it is likely that non-Westernized native peoples had a relatively light footprint because of their low population densities and their lack of access to livestock, firearms, and fossil-fueled vehicles and machines.²⁵ It also appears that aboriginal or native peoples have no special restraint when introduced to new technologies.²⁶

The intent of those who promulgate the myth of Western inferiority is honorable—it is to discover better models for the relations of

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people to living nature. And many such models exist in Oriental and shamanistic traditions. The effect, however, is harmful because the myth misdiagnoses the cause of human callousness, blaming it on culture. But nearly everyone, regardless of ethnicity, wants a more prosperous and secure life. The problem is greed, whether we call it "fitness maximization" or "enlightened self-interest." And greed, as both the world's great religious traditions and evolutionary biologists agree, is more fundamental than culture, and the consequences, especially where technology-based affluence is achievable, are predictable.

The Myths of Constructionism

The deconstructionist critique of nature occurs at two levels. At the cognitive/cultural level both the existence of nature and the accuracy of descriptions of it are questioned on the ground that perceptual and cultural filters distort reality so much that we cannot have certain knowledge about it. All we have are biased reports, constructions. At the physical level, constructionists claim that nature is no longer natural. Rather, it is a human artifact because aboriginal peoples have altered it fundamentally with their economic manipulations.

Several contributors to this volume associate two objectives with the deconstructionist project—one is political. Paul Shepard (Chapter 2) describes the deconstructionist mission of Lyotard to be the leveling of all points of view: all are words (text, narrative); statements are the only reality; nature itself is inscrutable. Therefore all social theories and isms are equivalent, and "life is a struggle for verbal authority." This struggle is often viewed as the contemporary form of the Marxist class struggle of the nineteenth and twentieth centuries. The usual targets of these critiques are values and programs characterized as Western, capitalist, patriarchal, and scientific/technological in approach.

The second objective (a major project of deconstruction) is the dethroning of objectivism (Hayles in Chapter 4).²⁷ Objectivism, like dualism, creates a separation between the observer of nature and nature itself; it is the basis for science and the primary mode of discourse in the modern era. Objectivist biologists say that living nature, species and associations, are real—"out there"—and that science is a way of gradually increasing our knowledge of them. The deconstruction-

ist alternative, nihilistic monism, is to deny that nature is real—or to insist that if there is anything "out there," we cannot know it because we are shut up in the concentric prisons of cultural bias and sensory apparatus. Therefore, it is impossible to know nature at all. All we have are culturally tainted reports, texts or words, including scientific studies about the world, none of which is more valid than any other. The social objective of this movement is to demystify and dethrone the "hegemonic dominance" of science and replace it in the public's ranking of authority with a level field that does not privilege any single approach or give it the "power to ignore competing representations made from other positions" (Hayles in Chapter 4).

This old scholarly trend—to ennoble words but to deny or demean nature—can be traced to ancient Greece. David Abram, commenting on Plato's *Phaedrus*, notes that the citified Socrates is ambivalent about the relationship of living nature and knowledge. While cautioning the reader to retain some skepticism about philosophizing, he expresses even more doubt about the utility of the animism that still dominated the world beyond the walls of Athens:

Socrates, always eager for philosophical discourse, agrees to accompany Phaedrus into the open country where they may together consider Lysia's text and discuss its merits. It is summer: the two men walk along the Ilissus river, wade across it, then settle on the grass in the shade of a tall, spreading plane tree. Socrates compliments Phaedrus for leading them to this pleasant glen, and Phaedrus replies, with some incredulity, that Socrates seems wholly a stranger to the country, like one who has hardly ever set foot outside the city walls. It is then that Socrates explains himself: "*You must forgive me, dear friend: I'm a lover of learning, and trees and open country won't teach me anything, whereas men in town do.*"²⁸

Three thousand years later, historicists and some deconstructionists are taking the next step, claiming that living nature and wilderness are illusory—just some biologists' narrative, banal, ersatz, or, at a minimum, coterminous with history as criticized by Shepard (Chapter 2), Borgmann (Chapter 3), and Worster (Chapter 5).

A more moderate deconstructionist view is presented by Hayles (Chapter 4), who argues that if we begin with the premise that "we know the world because we are connected with it," then we might

APPRECIATION & CRITIQUE OF HAYLES: YES - WE NEED SCIENCE AS SCREENING DEVICE

gain some insight. This perspective is attractive because it resonates with traditional wisdom. But there are dangers here. The main hazard may be the absence of effective checks and balances. How do we avoid falling into the snares of astrologers, creationists, and all manner of quacks who claim to have some special intimacy with the world? Should all points of view be given equal access to the media (a kind of extended Fairness Doctrine), and should all positions have equal funding from the National Endowment for the Humanities? Worster (Chapter 5) notes a similar problem with the excessive relativity of contemporary historicism.²⁹ When all norms are equal, Da Vinci is no better than graffiti. Or as Worster sarcastically notes: "Disneyland, by the theory of historical relativism, is as legitimate as Yellowstone. . . . Each is the product of history and therefore stands equal its opposite."

The bludgeon of multicultural relativism can also be used to defend oppression and cruelty. Ethnic fundamentalists, for example, might claim that female circumcision and other forms of institutionalized oppression of women cannot be condemned by a Westerner, because the Westerner, observing from a different cultural context, cannot possibly understand the social benefits of such practices. The inertia of traditional cultures often blocks attempts to educate women and free them from male domination. As stated by the director-general of Oxfam Europe: "Worldwide, the most powerful inhibitors to slowing population growth—the ones that are least understood by policy makers—are cultural, including people's views of God, ancestor worship, lineage, the purpose of the family, witchcraft, marriage, and polygamy."³⁰ These harsh comments about radical forms of postmodern criticism or social constructionism should not be construed as mere ethnocentrism. A level playing field is one thing; but a playing field without rules and referees is a free-for-all where bullies win.

Human beings are not the only ones that suffer from the new social polemics. Entire species are being driven to extinction because of superstitious cultural practices in wealthy countries—and the reluctance of activists to meet them head-on for fear of being called racist. Surely we must forthrightly criticize the use of tiger bones in Chinese herbal medicine and the use of rhinoceros horns for dagger handles by Yemeni men. Just as we are obligated to criticize practices that victimize minority populations of *Homo sapiens* (such as the Ku

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Why are some social critics in denial about the existence or significance of nature? Shepard (Chapter 2) suggests that deconstructionists suffer from sensory deprivation—a kind of developmental deficit of nature exposure that causes the solipsist hallucination that the world is illusory. Perhaps in a similar spirit, Hayles (Chapter 4) rejects the "strong program" of extreme constructivism, arguing that there is, indeed, a world outside our sense organs and brains.³¹ Must we concede defeat to this postmodern nihilism?³² Should we give up believing in pulsars, DNA, T-cells, moon rocks, shifting crustal plates, and Michael Jackson? Must all these "ideas" be rendered epistemologically equal to spirit guides and little green men? Hayles says no, referring to Sandra Harding's strong objectivism and to her own constrained interpretation of constructionism. Hayles proposes that if different cultures have similar renderings (isomorphisms) about some phenomenon in nature, then the phenomenon can be granted a kind of tentative reality.

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But once the door is opened to shared viewpoints as a criterion for reality, the possibility exists that such isomorphisms give aid and comfort to those, namely Western positivist scientists, who seek generality and believe they are able to discover truths about nature. What if the realm of agreement is immense and the realm of competing constructions is small? This would reestablish a constrained realism and constitute a serious challenge to more radical constructionists, many of whom critique the "totalizing" and domineering tendencies of Western, science-dominated culture.³³ For example, if Western scientific descriptions of biodiversity agree with those of non-Western cultures, biologists might feel justified in remaining ignorant of modern philosophy and social criticism. Say, for instance, that the classifications of plants and animals developed by hunting-gathering peoples were basically the same as those developed by Western scientists. This might suggest that the differences between "Western" and "non-Western" cultural constructions of nature have been exaggerated and that the lenses of different cultures do not bend reality as much as some believe.

In fact, the taxonomies of aboriginal societies are virtually always the same in structure as those of modern, scientific cultures (both are hierarchical and consist of nested sets of exclusive categories); more-

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over, aboriginal taxonomies typically recognize the same entities as species as do modern taxonomists.³⁴ The parallel structure of Western and aboriginal descriptions of nature is referred to by E. O. Wilson:

In 1928 the great ornithologist Ernst Mayr traveled as a young man to the remote Arfak Mountains of New Guinea to make the first thorough collection of birds, including hawks. Before departing, he visited key bird collections already deposited in European museums. By studying specimens gathered from western New Guinea, he estimated that a little more than one hundred bird species would be likely to occur in the Arfak Mountains. His species concept was of a European scientist looking at dead birds, who then sorts the specimens in piles according to their anatomy, as a bankteller stacks nickels, dimes, and quarters. Once settled in a camp, after a long and hazardous trek, Mayr hired native hunters to help collect all the birds of the region. As the hunters brought in each specimen, he recorded the name they used in their own classification. In the end he found that the Arfak people recognized 136 bird species, no more, no less, and that their species matched almost perfectly those distinguished by the European museum biologists.³⁵

There are exceptions, though, to the rule that cultures have virtually identical descriptions of nature. Nabhan (personal communication) notes that both Navajo and Hopi cultures have hierarchical taxonomies, and these are quite similar at the level of genera. (Both cultures, for example, recognize pinyon pine and ponderosa pine as closely related.) Nabhan points out, however, that these cultures differ in how they classify varieties of domesticated plants.

The same is true in "Western" cultures. In fact, intracultural differences in the intricacy and accuracy of classifications are likely to be much greater than intercultural differences. This is because taxonomic discrimination is often based on need or intensity of use. Most educated inner-city Americans could not name five species of native American plants or birds, and they would not know that blue jays and ravens are more closely related than starlings and blackbirds. Nor could they discriminate between garter snakes (*Thamnophis*) and rattlesnakes (*Crotalus*). The point is that one's description of the natural world is determined less by culture than by need, but where the need is great (hunter-gatherers, ecologists, taxonomists), the con-

structions are quite similar. This point too was made by E. O. Wilson:

Many years later, when I was twenty-five years old, . . . I made a long trek through the Saruwaget Mountains of northeastern New Guinea to collect ants. I repeated the cross-cultural test and found that the Saruwaget people could not tell one ant from another. An ant was an ant was an ant. This should come as no surprise. It was not that Saruwaget ants and natives failed the test, only that Papuans have no practical need to classify ants. The Arfak people are hunters who use their knowledge of bird diversity to make a living, just as European ornithologists do. In Mayr's time at least, wild birds were their principal source of meat.³⁶

Aboriginal hunter-foragers need to know about the pharmaceutical and nutritional qualities of local plants. Such knowledge, however, accumulates slowly over centuries and millennia. Recent colonists, especially those who obtain their food in other ways, such as farmers and pastoralists, may have less need for a precise natural history and probably acquire it more slowly. The Navajo are relatively recent colonists to the Southwest, having arrived about the same time as the Spanish conquistadors. As they were new to the desert Southwest and soon relied on sheepherding, it would not be surprising if their knowledge of natural history were less than that of the Hopi. But the important point, I think, is that detailed aboriginal or folk taxonomies recognize the same species as do those of Western biologists. To me this suggests that cultural determinism is less important than the structure of the human sensory/perceptual apparatus, though this conclusion rests, to some extent, on the debatable premise that science is becoming extracultural (universal).

This idea—that the views from distinct cultures about the biophysical world converge—might surprise some antiscience, anti-Western social critics. Bruno Latour, for example, demonstrates that scientists are subject to fashion, bias, and ambition just like the rest of humanity.³⁷ Indeed, the frequent exploitation of scientists by industrialists, militarists, and other elites also undermines any claim of objectivity and neutrality. Thus it is tempting to conclude that the scientific enterprise is biased and value-ridden and that, as a project that seeks knowledge, it is no better than astrology. Though these conclusions do not follow from their premises, it is understandable that de-

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constructionists would argue that scientific texts are just stories, no better or worse than novels, no more authoritative than religious canons or science fiction.

But such a critique of modern science is shallow. It is easy to confuse the behavior of individual scientists with the behavior of the institution of science. Science, as an institution, is self-corrective. Science episodically but ultimately undermines the interests and even the beliefs of its own adherents. Thus the postmodern premise that individuals cannot escape from their values or from their expectations about reality is fair, but it sticks only to scientists, not science.

Stephen Jay Gould has written recently:

The factual correction of error may be the most sublime event in intellectual life, the ultimate sign of our necessary obedience to a larger reality and our inability to construct the world according to our desires. For science, in particular, factual correction holds a specially revered place for two reasons: first, because we define the enterprise as learning more and more about an external reality; second, because we know in our hearts that we can be as stubborn and resistant to change as petty bureaucrats and fundamentalist preachers—and undeniable factual correction therefore becomes a kind of salvation from our own emotional transgressions against a shared ideal.³⁸

Therefore, I conclude that the nihilism and relativism of radically constructionist critiques of science and the materiality of nature, while popular in some academic circles, is sophomoric. Further, it is harmful because, as we shall see, it undermines efforts to save wilderness and biodiversity. Nevertheless, the postmodern insistence on being attentive to bias and privilege, as well as its current emphasis on communication, contingency, and solidarity, are constructive, but these same elements should be applied to all species. The other constructionist myth—that nature today is not natural because it has been produced or fundamentally transformed by the economic activities of native peoples—might also be considered a corollary of the Third Myth, and is discussed in the following section.

Virginity Lost: The Myth of Pristine Nature

In one way or another, many of the contributors to this book ask us to consider and reject the following false syllogism: True nature—wilderness—is pristine; there are no completely pristine or virgin places

left; therefore true nature or wilderness is illusory; it exists no longer. If this syllogism were true, then all so-called wildlands must be artificial (Graber in Chapter 8). And if they are artificial, physically constructed, one can make the facile argument that they have no value as “nature” and so, like “subjects of rape . . . are reduced to the role of passive victims” (Nabhan in Chapter 6). Once having made this fantastic leap of logic, the ideologists license themselves and their benefactors to exploit or abuse living nature, either for profit or for human welfare, depending on which end of the political/economic spectrum they represent.

But as many authors in this volume argue, the virgin metaphor is inappropriate because virginity, like pregnancy, knows no degrees. Living nature, to the contrary, is nothing but inconstant; it knows nothing but degrees. Variability is nature's other name. Worster (Chapter 5) notes that living nature changes from one place to the next, from one moment to the next, and that change (ecological and historical) comes in many forms: cyclical, linear, fast, slow, modest, catastrophic. He then says: “But loose talk about all change being ‘natural,’ while true, is meaningless. We must pick and choose, consistent with ethical reasoning. We cannot know which changes are vital and which are deadly.” The idea that all changes are equivalent, that the loss of virginity is absolute, is a dangerous oversimplification. Borgmann (Chapter 3) makes the identical point in his “real vs. hyperreal” argument. The deceptiveness of the virgin metaphor can cause egregious mischief. As I write, at least three very distinct political movements are attempting to bolster their claims of moral superiority with this false metaphor and dichotomy: the Wise Use movement, the Animal Rights movement, and the Social Ecology and Justice movement.

The Wise Use movement, a loose consortium of conservative, anticonservation, commercial interests (real estate, cattle grazing, mining, logging, motorcycle and ORV manufacturers), argues that disturbance is not only pervasive and natural, but that disturbances caused by clearcutting, grazing, and off-road vehicles mimic natural processes and are good for ecosystems. Some of the Wise Use literature contends that because the West is no longer pristine, there should be no regulatory constraint on the pursuit of maximal short-term profits from public lands, including clearcutting and resort development in national parks and wilderness areas. Armed with such

illogic, they defend government subsidies of cattle grazing on public lands and are quite successful at arousing public and political support, particularly in the western states.³⁹

Essentially the same false dichotomy is exploited in a tract distributed by People for the Ethical Treatment of Animals (PETA) in 1993. It contains the following argument: The Nature Conservancy and other agencies should stop their efforts to snare pigs in Hawaii; even if the pigs are destroying the last vestiges of native forests where the few remaining species of native birds and snails still persist in remote, mountainous regions of several islands, Hawaii is not natural anymore because of the introduction of many species of plants and animals by Polynesian and European colonists; and because it is no longer natural, the native species should not be given greater weight than the survival of the pigs, who are suffering in snares, which, incidentally, are set only in remote areas where hunting is virtually impossible. (The pigs, by the way, are descendants of hybrids between large, aggressive European domesticated swine and smaller, more docile Polynesian pigs.) Thus by claiming that Hawaii is not part of nature anymore, PETA feels justified in giving greater ethical weight to the suffering of individual mammals than to the survival of entire, endemic species.

Some social ecologists use the "fallen virgin" metaphor, arguing that nature has been physically produced, and that nature is, therefore, an invention of culture:⁴⁰

Travelers [in the Amazon] today, as over the last four centuries, believe they are observing "natural" forest, but this forest is most likely the product of human decisions of the past and even today. . . . Wherever one turns, the landscape almost invariably bears the imprint of human agency, starting with fire. ⁴¹ Harkit + (whisper)

The authors then go on to claim that this fallen state legitimates further humanization and exploitation, even by people who have had no cultural contact with the forest until this century. The basis for their theory of human construction is that the Amazon forests, as well as forests in other parts of the tropics, have been perturbed by human activities for thousands of years, as evidenced by charcoal in the soil and by the widespread abundance of native fruit and nut trees. The conclusion of human biophysical "production" of the forest by Amerindians is then used to justify further material refashioning.⁴²

Is it true that wildlands have been materially fashioned by the economic activities of humans? And if so, does this mean that living nature is produced or constructed by people? Nabhan (Chapter 6) and Graber (Chapter 8) agree that aboriginal groups have indeed altered ecosystems by the use of fire, selective harvesting, selective plantings, and similar economic activities. Nabhan notes that the American biota and landscape were significantly altered by fire before the arrival of Europeans. Moreover, the ancestors of the American Indians probably exterminated most of the native megafauna (75 percent of the genera of large mammals, including mastodons, ground sloths, camelids, equids, and indirectly their large predators) of the New World about ten thousand years ago.⁴³ Such depredations have no doubt led to major changes in the relative abundances and geographic distributions of these native species. Nabhan also mentions the case of palms that have been planted outside their original ranges.

Can it be claimed, though, that such changes in the absolute and relative abundances of species constitute the invention, fashioning, or construction of nature? The answer is a matter of definition. I might claim, for example, to have invented a new language because I use certain words (such as "invent" or "species") more frequently than other writers. By this artifice, every utterance is an invention of language—an utterly trivial truism. Similarly, if all the species living in a region evolved in place (or on that continent or island) and exist nowhere else, then quantitative changes in the distribution and abundance of some economically important plant species hardly constitute an "invention."

(To claim that *Homo sapiens* has produced or invented the forest ignores the basic taxonomic integrity of biogeographic units: species today still have geographic distributions determined largely by ecological tolerances and geological history and climate, rather than by human activities.) With some exceptions, such as the higher latitudes in the Northern Hemisphere, geological and other biogeographic influences have led to the evolution of distinctive continental biotas, particularly in tropical, southern, and oceanic regions. This is because Africa, South America, South Asia, and Australia have been isolated by climate or oceans for more than one hundred million years. For these reasons, the floras and faunas of subtropical and tropical regions on different continents contain less than 1 percent of their species in common, excluding commercially exploited zones and towns.

The species that occur in most seminatural places (except islands) are predominantly species that evolved in situ. During the last five thousand to forty thousand years, however, depending on the continent, human economic activities, particularly hunting, farming, pastoralism, logging, irrigation, and urbanization, have altered the distributions and abundances of some species and have caused the extinctions of larger prey species and their predators. Moreover, humans have introduced species including thousands of kinds of plants plus rats, mongooses, house cats, pigs, sheep, goats, starlings, predatory snails, toads, earthworms, and fish, among others. Many of these species have become naturalized—particularly in disturbed situations (such as cultivated lands) and on islands, where they have caused the extinction of many endemic species (species occurring nowhere else). It is noteworthy, though, that cases of successful colonization in relatively undisturbed, closed-canopy wildlands on continents are exceptional.⁴⁴ It is bending the language, therefore, to state that human beings have physically constructed the wild or semiwild parts of living nature, even if the intention behind this conceptual construction is humanistic.

A corollary, I think, of the fallacy of human construction of living nature, at least the wilder parts, is the politically correct assertion that local peoples are always the best managers. According to Hecht and Cockburn: "Those who have made the forest their home are also its most accomplished masters."⁴⁵ Such a statement may require qualification. Much depends on how long they have been in the region, how mechanized they are, and their population density. Local peoples must be participants in conservation, at least where they have a stake in the resources or where their hostility will doom the project. But long-term tenure does not necessarily guarantee a benign attitude toward biodiversity or even toward the natural resources on which long-term economic welfare depends. Witness the destruction of soils, old-growth forests, and fisheries in the United States, often by local people who have been exploiting the resource for many generations.

In summary, then, the myths of Western moral inferiority, construction, and ecosystem virginity are not without policy implications. These myths are used to justify human hegemony, expansionism, and the conversion of wildlands to human uses. If policymakers were to accept these postmodern myths they might become even

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more accommodating to invasive or destructive practices, believing that "nature isn't natural anyway." Conservationists should warn the public from the sacred grail of Pristine Nature while warning of the opposite extreme: the profane grail of Sustainable Development—the odd delusion of having your cake and eating it too. In most cases, *Homo sapiens* destroys the very resources on which it depends, especially under conditions of rapid population growth and technological/social change. And one or both of these conditions prevail virtually everywhere.

Management Implications

Why this book? Gary Lease and I were concerned that the wave of relativistic anthropocentrism now sweeping the humanities and the social sciences might have consequences for how policymakers and technocrats view and manage the remnants of biodiversity and the remaining fragments of wilderness. The foregoing chapters do not assuage our anxiety. It is apparent that the myths of postmodernism are politically potent, and to treat them as if they were merely quaint, academic curiosities would be a mistake. The following section outlines some of the policy and management implications of the postmodern myths.

Should We Actively Manage Wildlands and Wild Waters?

The decision has already been made in most places. Some of the ecological myths discussed here contain, either explicitly or implicitly, the idea that nature is self-regulating and capable of caring for itself. This notion leads to the theory of management known as benign neglect—nature will do fine, thank you, if human beings just leave it alone. Indeed, a century ago, a hands-off policy was the best policy.

Now it is not. Given nature's current fragmented and stressed condition, neglect will result in an accelerating spiral of deterioration. Once people create large gaps in forests, isolate and disturb habitats, pollute, overexploit, and introduce species from other continents, the viability of many ecosystems and native species is compromised, resiliency dissipates, and diversity can collapse. When artificial disturbance reaches a certain threshold, even small changes can produce large effects, and these will be compounded by climate change.⁴⁶ For

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example, a storm that would be considered normal and beneficial may, following widespread clearcutting, cause disastrous blow-downs, landslides, and erosion. If global warming occurs, tropical storms are predicted to have greater force than now.

Homeostasis, balance, and Gaia are dangerous models when applied at the wrong spatial and temporal scales. Even fifty years ago, neglect might have been the best medicine, but that was a world with a lot more big, unhumanized, connected spaces, a world with one-third the number of people, and a world largely unaffected by chain saws, bulldozers, pesticides, and exotic, weedy species.

The alternative to neglect is active caring—in today's parlance, an affirmative approach to wildlands: to maintain and restore them, to become stewards, accepting all the domineering baggage that word carries. Until humans are able to control their numbers and their technologies, management is the only viable alternative to massive attrition of living nature. But management activities are variable in intensity, something that antimanagement purists ignore. In general, the greater the disturbance and the smaller the habitat remnant, the more intense the management must be. So if we must manage, where do we look for ethical guidance?

Where Are the Oracles?

Conceptual constructions of wild nature differ greatly among world cultures, and there is a tendency in the West to consider the Judeo-Christian-Baconian culture, as it pertains to wild nature, to be morally inferior to non-Western traditions (Kellert in Chapter 7). This myth has led guilt-ridden Westerners to glorify the environmental ethics of non-Western traditions. Thus environmentalists (and a few conservationists) hold up Oriental, aboriginal, and Third World perspectives as models for emulation.

In the same vein, the belief that Third World and Fourth World (aboriginal) peoples manage wildlands with more grace and sympathy than do dualistic Westerners needs to be carefully examined. As David Johns has pointed out,⁴⁷ the benign treatment of wildlands that is often associated with tribal or clan societies depends on two factors: a low population density (high mortality or birth control) and their limited exposure to consumerism and modern technology. Thus it is risky to conclude that non-Western peoples are always the best stewards of relatively undenatured wildlands, particularly when

they are being integrated into the growth- and consumption-oriented mainstream. Policymakers should look carefully when any group makes claims of ethical superiority.

To read this as vilification of peasants would be wrong. Nevertheless, both the elite owners and managers of large estates and the poor refugee-settlers who are forced to farm and ranch on the marginal soils of tropical forests often degrade these lands and wipe out their biodiversity. The fact that the settlers are typically victims of economic discrimination, government ineptness, and corruption does not bear on whether the poor African or South American farmer is a good manager of wild nature and natural resources. Some indigenous peoples can provide excellent guidance, some not. In most cases, the best policy is a mix of science, economics, anthropology, sociology and local native knowledge, if it still exists.

Who Really Makes Policy?

Management implies the imposition of human values on living nature. We must ask: Whose values are being implemented? Has the social siege made inroads into policy? Adherents of the Wise Use movement certainly have a great deal of access to powerful politicians. Anyone who has followed the odyssey of many environmental bills in the United States Congress knows this. Further, no one in the biomedical field doubts the power of the Animal Rights movement.

What about the power of the Social Justice movement? Today's management policies for wildlands, particularly at the level of international conservation agencies and lending institutions, are guided more by postmodern humanism than by conservation biology. Biologists rarely make biodiversity policy. Conservation policy is made by bureaucrats, technocrats, planners, development specialists, lawyers, and economists. Their views often determine how governments decide to manage wildlands and biodiversity, or if they should be managed at all. These professionals are employed by governments, by international development agencies, by large environmental and conservation organizations, and by the World Bank. They are trained by professors in the humanities and social sciences, many of whom are sympathetic to constructionist views. The best of these professionals bring to their work a solidarity with the poor who are struggling against systemic corruption, North/South inequities, and injustice, and they remind us all of the dangers of ethnocentrism,

bias, and the myths of Western superiority that nourish them. But these sentiments do not suffice.

These same professionals were trained by people who may be uncritical about claims of the moral inferiority of Western concepts of biodiversity protection, who may accept outmoded myths of ecology, including balance and homeostasis, who may be uncritical about the myth of pristine nature, who often distrust or fear genetics, who are usually uncomfortable discussing human population stabilization and optima, who may believe that sustainable development is possible in a context of economic and population growth, and who are often sympathetic to the view that scientific evidence is no different than literary criticism.

Finally, most politicians and bureaucrats are city people. The influence of city people will increase as the world becomes more urban. This is one of the quietest and most profound changes of consciousness that has occurred in the twentieth century. It does not portend well for informed, compassionate decisions about the future of wild nature.⁴⁸

Notes

1. I refer to human beings as *Homo sapiens* because I wish to emphasize that our species is just one among millions of species of animals, although we are the most powerful animal to have evolved here, in terms of both number and destructive capability.

2. J. S. Adams and T. O. McShane, *The Myth of Wild Africa* (New York: Norton, 1992), p. 239; S. Hecht and A. Cockburn, *The Fate of the Forest: Developers, Destroyers and Defenders of the Amazon* (New York: Harper Perennial, 1990).

3. By living nature I mean biodiversity: organisms and their interactions, including nonliving constructions (nests, mounds, burrows, reefs, cavities, dams) and the conditions they create. This idea differs from the definition of "biosphere" only in that the emphasis is on living organisms, not the three-dimensional regions they occupy. "Wild nature" or wilderness is that section of living nature that is relatively unperturbed and retains a sense of solitude and independence; it is a subset of living nature. See D. Foreman and H. Wolkie,

The Big Outside: A Descriptive Inventory of the Big Wilderness Areas of the United States (New York: Harmony Books, 1992).

4. See M. Oelschlager, *The Idea of Wilderness* (New Haven and London: Yale University Press, 1991).

5. I do not wish to sound pejorative; these New Age activities have important personal and social functions. This construct of nature resembles, I think, the synergetic cosmic wilderness of Oelschlager (chap. 10).

6. Robert Bly, *Iron John: A Book About Men* (Reading, Mass., and New York: Addison-Wesley, 1990); Warwick Fox, *Toward a Transpersonal Ecology: Developing New Foundations for Environmentalism* (Boston: Shambhala, 1991).

7. For "wild nature" see G. Snyder, *Turtle Island* (New York: New Directions, 1969); see also N. Evernden, *The Social Creation of Nature* (Baltimore and London: Johns Hopkins University Press, 1992). Evernden's reference (p. 118) to "ultrahuman" is similar.

8. J. S. Lovelock, *Gaia: A New Look at Life on Earth* (Oxford: Oxford University Press, 1979). Notwithstanding evidence for a degree of atmospheric feedback or homeostasis, this idea, as discussed in the following section, is generally inapplicable at spatial and temporal scales relevant to the distribution and survival of plant or animal species. It therefore leads to a false sense of security.

9. Fox, *Toward a Transpersonal Ecology*, p. 160; see also Roderick Nash, *Wilderness and the American Mind*, 3rd ed. (New Haven: Yale University Press, 1992).

10. I do not incorporate, except as a kind of cultural, scientific weltanschauung, the Einsteinian and related contributions of modern physics such as relativity, quantum mechanics, and uncertainty, which, in most situations, are irrelevant anyway because most processes affecting living nature occur in the middle "Newtonian" range of spatial and temporal scales.

11. See P. Ehrlich and A. Ehrlich, *Extinction: The Causes and Consequences of the Disappearance of Species* (New York: Random House, 1981); E. O. Wilson, *The Diversity of Life* (New York: Norton, 1992). For example, even a species as "extinction-prone" as the California

condor would be doing fine if it were not for people. Condors are very sensitive to lead poisoning; it is the presence of lead shot and spent bullets, plus poaching and the usurpation of much of their habitat, that has caused their near extinction.

12. This and other ecological myths have been discussed by many writers. See E. C. Pielou, *After the Ice Age: The Return of Life to Glaciated North America* (Chicago: University of Chicago Press, 1992); D. B. Botkin, *Discordant Harmonies: A New Ecology for the Twenty-First Century* (New York and Oxford: Oxford University Press, 1990); D. Ehrenfeld, *Beginning Again: People and Nature in the New Millennium* (Oxford and New York: Oxford University Press, 1993); S. L. Pimm, *The Balance of Nature?* (Chicago: University of Chicago Press, 1991); M. B. Davis, "Climatic Instability, Time Lags and Community Disequilibrium," in *Community Ecology*, edited by J. Diamond and T. J. Case (New York: Harper & Row, 1984), pp. 269–284. See also Worster (Chapter 5 in this volume).

13. For references see M. E. Soulé, "The Onslaught of Alien Species, and Other Challenges in the Coming Decades," *Conservation Biology* 4 (1990):233–239.

14. The cells of plants and animals, however, are symbioses in the sense that their organelles are descendants of microorganisms that lived independently before the evolution of eucaryotic cells.

15. Regardless of cultural context, we behave like any other species: selfishly. Even antiscience critics of Western approaches to nature conservation note that "given the chance, indigenous people will exploit their environment to their advantage, using whatever technology is available"; Adams and McShane, *The Myth of Wild Africa*, p. 239.

16. J. S. Lovelock, *The Ages of Gaia* (New York: Norton, 1988); L. Margulis, "God, Gaia, and Biophilia," in *The Biophilia Hypothesis*, edited by S. R. Kellert and E. O. Wilson (Washington, D.C.: Island Press, 1992), pp. 345–364.

17. J. Raloff, "The Gender Benders," *Science News* 145 (1994):24–27. It is thought that ethynylestradiol from birth control pills is excreted into the urine and finds its way, via toilets and sewage treatment plants, to rivers and coastal waters. A sad irony is that as some

humans attempt to regulate their own fecundity with birth control pills, the pharmaceuticals they employ may inadvertently be regulating the fecundity of the very species they are trying to help.

18. Wilson, *The Diversity of Life*, chap. 12.

19. Botkin, *Discordant Harmonies*, p. 192.

20. The International Whaling Commission has been an exception, as has the Convention on International Trade in Endangered Species (CITES). CITES, however, does not regulate habitat destruction or trade within countries.

21. Timothy Egan, "Fishing Fleet Trawling Seas That Yield Many Fewer Fish," *New York Times*, 8 March 1994, p. 1.

22. P. M. Vitousek, P. R. Ehrlich, A. A. Ehrlich, and P. A. Matson, "Human Appropriation of the Products of Photosynthesis," *BioScience* 36 (1986):368–373.

23. Nor will many aboriginal groups. They are meeting a parallel fate, but the linkage between the two is frequently overstated by spokespersons of the international conservation community. Indeed, the loss of either may exacerbate the condition of the other, but it is much easier to save biodiversity than cultural diversity. See M. Gadgil and F. Berkes, "Traditional Resource Management Systems," *Resource Management and Optimization* 8 (1991):127–141. The belief that cultural diversity and biodiversity are interdependent has become a central dogma of the sustainable development community, but it is a slim reed on which to build conservation in many parts of the world. It may work for a time in special situations where population densities are relatively low, where traditional human groups such as tribal peoples in India or Amerindians in Brazil protect certain components of biodiversity, and where political pressures to protect these ethnic minorities can be brought to bear.

24. Here "myths" means conceptual models of nature or even specific premises of natural law that may or may not have empirical support but nevertheless are culturally influential.

25. D. M. Johns, "Wilderness and Human Habitation," in *Place of the Wild: A Wildlands Anthology*, edited by D. Burks (Washington, D.C.: Island Press, 1994).

26. M. E. Soulé, "Conservation: Tactics for a Constant Crisis," *Science* 253 (1991):744–750.

27. This dethroning of objectivism would create a dilemma for exploiters, including the backers of the Wise Use movement, at least according to Evernden in *The Social Creation of Nature*. He remarks that modern, materialistic biology has found no evidence for the soul; even worse, biology views human antics in purely materialistic (objective) and Darwinian (sociobiological) terms. Such audacity, according to Evernden, amounts to a "categorical heresy" undermining the axiom that human beings have free will. To reject this biological materialism creates an ontological crisis: if human beings lack a special soul (or if there are no dependable criteria—such as sentience—that distinguish us from beasts), then our privileged position (to dominate the earth) cannot be logically sustained, striking at the heart of anthropocentrism (humanism) and leaving us in a "schizoid" state, "accepting the system called 'Nature' while resisting attempts to explain ourselves by it." This so-called dilemma, according to Evernden, requires the abandonment of the old Cartesian dualism and the adoption of a new "ultrahumanistic" monism that somehow en-folds divinity, wildness, and the world (p. 95nn). But will this existential dilemma prevent Weyerhaeuser and MAXXAM from logging the last stands of ancient forests in North America?

28. From a forthcoming book by David Abram: *Inconceivable Earth: Animism, Language, and the Ecology of Sensory Experience* (New York: Pantheon Books), chap. 4. It may appear paradoxical that city-dwelling intelligentsia donate more money to environmental charities than do similarly educated rural people. I suspect this urban generosity represents a nostalgia for nature, a flickering biophilia that can be evoked by fund-raisers seeking monetary sacrifices to totems such as bears, elephants, wolves, whales, owls, and other mythic creatures.

29. Some philosophers believe that Jacques Derrida, one of the founders of this school, never claims that all interpretations are equal in value; they say that he is not a relativist and that his point is that a text has no final or right interpretation. But his countryman Bruno Latour castigates Derrida and his followers for "mak[ing] fun of the belief in reality" and for stating that belief in reality "would betray

enormous naiveté." See Bruno Latour, *We Have Never Been Modern* (Cambridge: Harvard University Press, 1993), p. 6. Nevertheless, social and political ecologists—for example, Carolyn Merchant, *Radical Ecology: The Search for a Livable World* (New York: Routledge, 1992)—often exaggerate the subjectivity of scientific knowledge.

30. *Earthwatch*, Nov./Dec. 1993 issue.

31. Here reverberates an ancient philosophical discourse: the trustworthiness of sensory data about the natural world. Even in pre-Socratic philosophy there was a tension between those, such as Heraclitus, who trusted the senses as honest witnesses of the ever-changing flux, though he acknowledged that facts alone are not a sufficient basis for insight. In contrast, Parmenides of Elea, anticipating Plato, suspected that the senses could not be trusted and that reality was insubstantial and the phenomenal world was unitary, eternal, and undifferentiated—in other words, illusory. Perhaps Parmenides, like Socrates, was a city-man. In Buddhist thought, too, there is the appearance of a similar tension. In this case it is between Samsara (everyday, ordinary life) and Nirvana (the absoluteness, oneness, or emptiness of reality); the two poles are resolved in the Mahayana synthesis as different facets or dimensions of the same reality. As the sutra says: "The absolute works together with the relative, like two arrows meeting in midair."

32. The Western doubt about the concreteness of the natural world (Lease in Chapter 1) was given a giant push when the Hebrew God married the Greek soul—psyche (Oelschlager in Chapter 2). The monotheistic supernaturalism of the Hebrews removed divinity from nature and placed it outside. The Socratic-Platonic belief in the eternal soul and the idea of the Divine Artisan, catalyzed by Christian conceptualization of time as the linear unfolding of history, all combined to cause a revolutionary shift of consciousness. Oelschlager (p. 66) quotes Ortega y Gasset's summary of the momentous change of perspective, for "what had seemed real—nature and ourselves as part of it—now turns out to be unreal, pure phantasmagoria; and that which has seemed unreal—our concern with the absolute or God—that is the true reality. This paradox, this complete inversion of perspective, is the basis of Christianity." See José Ortega y Gasset, *Man and Crisis*, translated by Mildred Adams (New York: Norton, 1962),

p. 135. The result was a profound and irreversible drift away from the identification of our species with the divinity of the vital world; earthly things were of no significance. "Nature" became an unimportant region within the universe, humanity outside, divinity in hominid body above (Borgmann in Chapter 3). Reality became a stuff to study and control, a collection of objects, and the process of objectification and distancing (Shepard in Chapter 2) had begun, at least, in Europe. This separation has been repeated in thousands of other places and times, often with the aid of trade, occupation, and colonization—first when Greek, then Roman, then European culture diffused through the rest of the species. This Western invention of separation is blamed (I think incorrectly) for the rapaciousness of Japanese industrial culture (Kellert in Chapter 7).

33. See, for example, D. J. Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991). Apparently deaf to this discourse, scientists go right on digging up facts and building models of natural processes, many of which appear to work in daily life, including the computer on which this is written. This stubborn provincialism of scientists may be the reason why many nonscientists appear surprised to learn that "truth" in science is acknowledged by most mature scientists to be contingent, a matter of consensus.

34. C. H. Brown, *Language and Living Things: Uniformities in Folk Classification and Naming* (New Brunswick, N.J.: Rutgers University Press, 1984); B. Berlin, P. H. Raven, and D. Breedlove, *Principles of Tzeltal Plant Classification: An Introduction to the Botanical Ethnography of a Mayan-Speaking People of Highland Chiapas* (New York: Academic Press, 1974).

35. Wilson, *The Diversity of Life*, p. 42.

36. *Ibid.*, p. 43.

37. B. Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Milton Keynes, England: Open University Press, 1987).

38. S. J. Gould, *Eight Little Piggies: Reflections in Natural History* (New York: Norton, 1993), p. 452. Any experienced scientist will admit that most of his or her colleagues would almost prefer to die, clutch-

ing their ideas to their breasts, than admit error or give up a favorite theory. Recognizing this simple psychological truth, Thomas Kuhn points out that the mechanism of change in scientific thought is not gradual and evolutionary but punctuated and revolutionary; see T. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962). Many paradigm shifts await the accumulation of an enormous weight of anomalous results plus a new theory that accommodates these perplexing data. However, the truism that personal ambition and pride often motivate the attacks on current paradigms is not an effective critique of science, only of human nature.

39. Alston Chase argues some of these points in his syndicated columns. See *Range Magazine* (Winter 1994).

40. For an excellent description of the Social Ecology movement see R. Eckersley, *Environmentalism and Political Theory: Toward an Ecocentric Approach* (Albany: State University of New York Press, 1992).

41. Hecht and Cockburn, *The Fate of the Forest*, pp. 34–37.

42. Some commentators on the tropical rainforests of West Africa argue similarly. See Adams and McShane, *The Myth of Wild Africa*, n. 21.

43. P. S. Martin, "Catastrophic Extinction and Late Pleistocene Blitzkrieg: Two Radiocarbon Tests," in *Extinctions*, edited by M. H. Nitecki (Chicago: University of Chicago Press, 1984), pp. 153–190. See also J. M. Diamond, "Quaternary Megafaunal Extinctions: Variations on a Theme by Paginini," *Journal of Archaeological Science* 16 (1989):167–175; J. M. Diamond, "The Present, Past and Future of Human-Caused Extinction," *Philosophical Transactions of the Royal Society of London*, series B, 325 (1989):469–477; Wilson, *The Diversity of Life*, p. 249.

44. Aquatic habitats have demonstrated much less resistance. See J. D. Allan and A. S. Flecker, "Biodiversity Conservation in Running Waters," *BioScience* 43 (1993):32–43.

45. Hecht and Cockburn, *The Fate of the Forest*, pp. 238–239.

46. For examples see R. L. Peters and T. E. Lovejoy (eds.), *Global Warming and Biological Diversity* (New Haven: Yale University Press, 1992); P. M. Kareiva, J. G. Kingsolver, and R. B. Huey, *Biotic Inter-*

actions and Global Change (Sunderland, Mass.: Sinauer Associates, 1993).

47. Johns, "Wilderness and Human Habitation."

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