

Environmentalism: Death and Resurrection

Mark Sagoff

Introduction

An editorial in *The Economist* magazine quipped that the modern 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!)." 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." The "Death of Environmentalism" is much discussed. Why has the environmental movement, which waxed as a political force in the 1970s, waned today?

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."

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." 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."

In recent years, however, ecologists have come to question these assumptions. Ecologists are no longer sure that nature has a mathematical organization above the level of the organism or the population. Many ecologists wonder if human beings can be excluded from the idea of 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 which human beings disrupt because of our "wrongness"—notably our greed or ignorance or intransigence. Environmentalists invoke science to defend traditional religious views

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about the relation of humanity to nature at a time when science questions those assumptions. Because it is now caught up in a debate among environmental scientists, environmentalism has slipped from a popular spiritual or cultural cause and has become an academic research program.

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." 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. Calvin and other Reformers taught that Creation “shadows forth” divine things. Everything connects in nature in a kind of aesthetic coherence and order 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 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 economic efficiency and scientific research.

Religious experience, according to James, involves not only the belief in the unseen order of nature (whether conceived as a work of art or as a machine) but also the recognition “that there is something wrong about us as we naturally stand.” This conception 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

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than as a path to salvation—as a resource for economic activity rather than as a refuge from it. Even if we become rich or successful, we sin by replacing Creation with Commerce.

If, on the other hand, we think of God as a Watchmaker, then our wrongness is not moral but prudential. What makes humanity wrong is that our technological reach will exceed our ecological grasp. Because of our ignorance about how nature works, we exploit resources in unsustainable ways. By invoking this ignorance, environmental scientists empower themselves. What ecologists do not know can hurt us. We ignore their uncertainty at our peril. 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.

Ecological Science and Environmental Policy

Centuries ago, scientists believed God organized nature and thus was responsible for its unseen order, in other words, for the enduring structure, function, and organization of ecosystems. Today, few biologists would appeal to “intelligent design” as the explanation of ecosystem design and function. While assuming that ecological communities are governed by principles yet to be discovered, ecologists seek a secular explanation for that unseen order, that is, an explanation for the enduring organization they attribute to ecosystems. What but evolution could constitute that organizing force?

Picasso famously described a picture as “a sum of destructions.” Evolution works the same way. Evolution involves a lot of brutality—parasitism, predation, starvation, etc.; in other words, it works more through destruction, like a Calvinist Artist, than by construction, like a rational Thomistic Clockmaker. The outcome, ecologists have argued, is a beneficent equilibrium—much like what God would have ordained. Ecologist Stephen Forbes in a famous article written in 1887 described a lake in Illinois as a beneficent system; he went with the times, however, by replacing God with evolution. Whatever God can do, evolution can do better. Forbes 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?

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. 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.”

Once Forbes and Clements posited the existence of a “communal bond” or “community” linking organisms within ecosystems, ecologists saw in this bond a moral good worth preserving. Several nature religions which flourished during the period of Forbes and Clements adopted a similar view by supposing that nature self-organizes into ascendant or hierarchical units. They dropped God out of the equation—but kept the equation. For example, Theosophists followed Madame Blavatsky in describing ecological communities in terms of evolution rather than special Creation. 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. The Creation Research Institute, albeit a Christian think tank, 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.”

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 ecology with the tradition of “Great Chain of Being” cosmology associated with philosophers of nature from neo-Platonic mystics to “deep ecologists” today. According to this long-held view,

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natural communities exhibit plenitude (every niche is filled), continuity (an organization from the smallest to the largest being), diversity, and hierarchy (scale). The equilibrium theory of island biogeography endorses these ideas. According to this theory, the number of species in isolated habitats, such as oceanic islands, approximates a steady state, as rates of colonization are balanced by and may be responsible for rates of extinction. This theory (rather than observation) has lead many ecologists to believe that introduced plants displace rather than supplement native biodiversity, especially on oceanic islands.

Fundamental to the idea of the “Chain of Being” was a belief that God creates everything in rational relation to everything else and does nothing in vain. Every ecosystem is organized—by its own self-logic if not by divine intent—so that every species plays an important

role in its structure. 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.

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 super-organisms 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 system governed by rules science will someday discover. E.P. Odum, like most ecologists of the 1950s

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and 1960s, had faith in “higher levels of biological organization,” i.e., “properties of large-scale, integrated systems.” 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.”

The belief that nature comprises self-organized 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.” 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.”

By the 1980s, ecological science had taken over from natural theology the role of legitimating the values of the environmental movement. Ecological science

adopted from theology the view that living communities or systems possess an unseen order; it confirmed that ecosystems are organized under rules or principles scientists will someday discover. So many ecologists have offered differing accounts of these governing principles that it seems that anyone with a metaphor and some mathematics can model the ecosystem. Environmental scientists also accommodated the belief that something is 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." 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."

The idea of the wrongness of humanity—which excludes mankind from ecosystems—makes 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. A baseline, however, is hard to find. Ecologists concede, "Many ecosystems are

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dominated directly by humanity, and no ecosystem on Earth's surface is free of pervasive human influence."

The balance-of-nature or equilibrium theory that dominated academic ecology until the 1970s through the theory of island biogeography and which culminates in a belief in the "self-organization" of ecosystems attests to the grip of the idea of nature's hidden but 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."

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—if not by divine than by some other mysterious means—into stable, com-

plex, and beneficent communities or systems. Both ecology and Christianity lent their support to the environmental movement. More recently, however, many ecologists have come to question whether the concept "ecosystem" or "ecological community" refers to anything that 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.

After the 1970s, ecologists began to doubt the assumption that what they called ecosystems or communities exhibit 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." Ecologists such as Daniel Simberloff observed that there is little evidence that ecosystems are integrated entities with emergent properties and note "the failure of general assembly rules to pass close scrutiny." 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."

The ability of Darwinian evolution to explain the structure and function of organisms but not of ecosystems put ecologists in a quandary. On the one hand, ecologists and other environmental scientists could concede that what are called "ecosystems" or "communities" have no structure or function. Assemblages of plants and animals represent not persistent rule-governed organizations of species but blooming, buzzing, confusions of contingency, accretions of accident, happenstances of history. The living world does not seem to exist in identifiable units 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.

Rather than surrender the idea of design in nature, however, ecologists could on the other hand remain true to the belief that there is an unseen order—a "dynamic stability"—which human beings, not belonging to nature, threaten or disrupt. In other words, ecologists could continue to lend scientific sup-

port 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. Once Darwin had shown that evolutionary forces shape organisms, why not just *say, assume, or insist* that these forces—random mutation and natural selection—organize ecosystems as well? One can posit as a matter of faith that in some as yet unknown way evolutionary forces work from the “bottom up” to fashion ecosystems—to design them—as if like organisms they were units of selection.

No one 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 study the “self-organization” of ecosystems instead. Having since the

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times of Stephen Forbes promised to show that nature worked like a watch—or functioned like a community—ecologists have not identified or described that order or that organization or explained how it happened. Ecological science has taken God out of the design of nature—but what has 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 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. 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. According to historian Robert Gottlieb, “for this one-time organization of birders”—as for the Sierra Club, the National Wildlife Foundation, and other groups—“reconstituting itself also meant escaping its past.”

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. It prescribed values to society rather than responded to values society already possessed. As a result, the “environment” now comprises a collection of technical concerns that provide funding opportunities for professional environmentalists. These concerns are lost in abstractions about ecosystems, sustainability, biodiversity, ecological integrity, ecosystem services, existence values, and other forms of ecospeak.

These abstractions are understood by scientists who believe that once they find the right abstractions—models, mathematics, metaphors—they will speak truth to power. They form research teams to determine how much nature is “worth”—and thus in more ways than one, academics “green” their disciplines. They think they are politically representative as long as they are interdisciplinary. All this leaves out the religious and cultural energies that once made the environmental movement a force to reckon with. Environmentalism insofar as it relies on academic theory has little to do with the places—particular forests or vistas—that people know, care about, and want to protect. A group of ecological economists has wisely written that the test “of whether an ecosystem service will facilitate conservation is not whether academics can value it, but whether someone—or some organization—is able and willing to do what is necessary to secure it.”

Resurrection

The religious energy of the 1970s has not disappeared. The public celebration that greeted the discovery in

The Deliberative Democracy Handbook
Strategies for Effective Civic Engagement in
the 21st Century

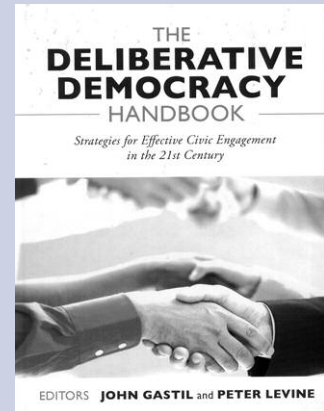
Edited by John Gastil and Peter Levine

"The Deliberative Democracy Handbook is a terrific resource for democratic practitioners and theorists alike. It combines rich case material from many cities and types of institutional settings with careful reflection on core principles. It generates hope for a renewed democracy, tempered with critical scholarship and political realism. Most important, this handbook opens a spacious window on the innovativeness of citizens in the US (and around the world) and shows how the varied practices of deliberative democracy are part of a larger civic renewal movement"

—Carmen Sirianni, professor of sociology and public policy, Brandeis University, and coauthor, *Civic Innovation in America*

"The Deliberative Democracy Handbook, edited by John Gastil and Peter Levine, is an important collection of readings for anyone interested in the role of citizen participation in the public policy process. It provides concrete examples of successful efforts to expand public input in decision-making at the local, state, and national levels. The book also grapples with emerging challenges to the continued development of these efforts in the future."

—Robert Mark Silverman, associate professor, Department of Urban and Regional Planning, University at Buffalo, the State University of New York



The Editors

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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 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 what humanity does to be risky and unsustainable, in other words, by excluding human action from the hidden order of nature which mathematicians will someday reveal. In the 1970s, legislators relied on ecologists like E.P. Odum to secularize the idea of the hidden order of nature and the essential wrongness of

humanity. Today, however, ecologists are not sure that ecosystems demonstrate a strategy of development; biologists debate whether ecological communities possess a hidden order that excludes humanity. Amid this uncertainty, ecology as a kind of priestcraft may be doing more harm than good.

The problem science poses for environmentalism is particularly poignant in its attempt to respond to questions that require theological, moral, and aesthetic answers. 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. 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? 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, especially plants, far from causing a lot of extinction, have now have doubled the richness or number of species on many islands and other places. Is this a good thing? It would seem to be if the number and diversity of species—as we are sometimes told—correlated with the “stability” or “productivity” or “resilience” 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

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“native” and “non-native” species, which depends on the role of humanity, a scientific or a theological one? Does ecology or theology—or both—insist that there is a hidden order in nature and that there is something wrong about us as we naturally stand and about the creatures we create?

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”—which 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. 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.

Many environmental scientists—including ecological economists—rely on economic arguments to protect the natural environment, for example, by inventing “existence values,” to transform moral or religious commitments into data for cost-benefit analysis. These experts argue that undeveloped nature should be preserved also for the economic services it provides. Environmentalists who favor these arguments make a Faustian bargain with economists, since

economic growth 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 vogue of attaching economic “value” to ecosystem services 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 environmental movement is dying because it expects science to maintain our faith in the rightness of nature and wrongness of humanity. But ecologists and social scientists can no longer lend credibility to the religious, aesthetic, and moral commitments that make people care about the natural environment. They have either joined a priesthood of faith in mathematical abstractions and conceptual constructs, such as “existence values,” or become disillusioned by them. As a result the environmental leadership forms a dispirited *nomenklatura*—a technocratic class competing for foundation support and governmental largess to refine its own theories. It adopts a tactical, defensive crouch as it fights a rear guard action for in 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 presents nature as a system for scientists to model and administer for the collective good rather than as an object for instruction and appreciation for every individual. Environmentalists speak as experts who will reveal the mystery of nature; they ask to be trusted as professionals—as society consulted priests centuries ago—to interpret that mystery. Environmentalism embraces an academic, anti-democratic, authoritarian, collectivist, cosmopolitan, elitist, pessimistic, 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. These include the hunters, anglers, backpackers, birders, and other sportspeople who will once again form the backbone of the environmental movement when it re-emerges, 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 is consistent with liberalism, of course, 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 trespassing upon the person and property of others, and caring for the beauty and majesty nature. Because environmentalism

is so deeply entrenched in American religious and historical experience, it will survive its current reliance on science, however self-defeating. Like the Ivory-Bill Woodpecker which ecologists had declared extinct, plainly the environmental movement will arise again.

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Sources: "The End of the World: A Brief History," *The Economist* (18 December 2004); http://www.economist.com/diversions/displayStory.cfm?story_id3490697; 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*, edited by Nick Pidgeon, Roger E. Kasperson, and Paul Slovic (New York: Cambridge University Press, 2003); William James, *The Varieties of Religious Experience* (1902; New York: Random House, 1994); W. H. Wagner, "Problems with Biotic Invasives," in *Biological Pollution*, edited by Bill McKnight (Indianapolis: Indiana Academy of Science, 1993); R. V. O'Neill, "Is It Time to Bury the Ecosystem Concept? (with Full Military Honors, of Course!)," *Ecology* 82 (2001); Stephen A. Forbes, "The Lake as a Microcosm," 1887; reprinted in *Bulletin of the Illinois State Natural History Survey* 15 (1925); Donald Worster, *Nature's Economy: A History of Ecological Ideas*, second edition, (New York: Cambridge University Press, 1994); Frederic Clements, *Plant Succession: An Analysis of the Development of Vegetation* (1916), as quoted in Donald Worster; Institute for Creation Research, *Scientific Creationism*, second edition, edited by Henry M. Morris, (El Cajon, California: Master Books, October 1974); The quote by Pope can be found in Arthur O. Lovejoy, *Great Chain of Being* (Cambridge, MA: Harvard University Press, 1956); E. P. Odum, "The Emergence of Ecology as a New Integrative Discipline," *Science* 195 (1977). For more than thirty years ecologists have been announcing this "emergence" in an optative mood. It has not happened. E. P. Odum, "The Strategy of Ecosystem Development," *Science* 164 (1969); Daniel Botkin, "Adjusting Law to Nature's Discordant

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