ENVIRONMENTAL DECLINE AND THE RISE OF RELIGION

by Matthew Orr

Abstract. Historically, crises have spawned deliberate, widespread efforts to change a culture's worldviews. Anthropologists have characterized such efforts as "revitalization movements" and speculated that many of the world's religions, including Christianity, arose through revitalization. Some responses to the planet's environmental crisis share the characteristics of both a revitalization movement and an incipient religion. They call for a science-based cosmology and an encompassing reverence for nature, and thus differ from responses to environmental decline offered by traditional religions. As environmental problems deepen, historical precedent suggests that religious shifts in affected cultures may follow.

Keywords: cosmology; environment; religiopoiesis; revitalization movement; superhuman; supernatural.

Global-scale environmental problems caused by synthetic toxins, climate change, the decline of ocean ecosystems, ozone depletion, extinction, and groundwater depletion were largely nonexistent as recently as forty years ago and have accelerated so rapidly that by many estimates there is little time to lose if we are to avert a planetwide catastrophe. The brief history of global environmental degradation might suggest that the past offers little perspective on confronting these challenges. However, humans have confronted crises for millennia. Historical responses inform current environmental challenges for at least three reasons. First, successful responses to past crises place the weight of history behind positions taken by environmental advocates over positions taken by many of the political and corporate interests that compose their strongest opposition. Second, a historical

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perspective offers some indication of where the environmental movement—and by consequence humankind—may find itself in the future. Third, placing the environmental crisis in historical context offers numerous insights into today's expanding dialogue between science and religion.

In the first section of this essay I review patterns shared among cultures in their social response to crises, which were first described by the anthropologist Anthony Wallace (1956). I then examine current responses to the environmental crisis in the context of historical patterns. Wallace noted that new religions commonly arise as a consequence of crisis. Accordingly, I then describe components of the environmental movement containing characteristics of an incipient religion. Finally, I explore implications for the science-religion dialogue.

Historical Responses to Crisis

In 1956 anthropologist Anthony Wallace made the startling argument that the majority of the world's religious phenomena arise as a consequence of crisis. According to Wallace, crisis and religion are linked by a process called *revitalization*, which contains three characteristics. First, revitalization arises in response to forces, including climate, floral and faunal change, military defeat, political subordination, economic distress, or epidemics, that stress a society and threaten its ability to function or survive. Second, revitalization involves rethinking one's "mazeway," which comprises fundamental views of personality, society, culture, and the natural environment. Third, a revitalization *movement* occurs when people attempt to make mazeway changes a mainstream part of their culture (Wallace 1956).

Wallace drew these generalities from hundreds of social histories of cultures on five continents, from the Native American Ghost Dance to Methodism in Europe to Christianity and Islam in Asia (Wallace 1956; 1966; 1970). After describing the characteristics of a revitalization movement, he concluded, "It can be argued that all organized religions are relics of old revitalization movements, surviving in routinized form in stabilized culture, and that religious phenomena per se originated in the revitalization process—i.e., in visions of a new way of life by individuals under extreme stress" (Wallace 1956, 268).

In *The Rise of Christianity*, sociologist Rodney Stark applied the idea of revitalization to Christianity. Stark used mathematical models of survival and conversion rates to argue that plague epidemics in the Roman Empire in the second and third centuries may have helped Christianity, then a minority religion, to replace paganism. Stark summarized his general argument as follows:

> Christian values of love and charity had, from the beginning, been translated into norms of social service and community solidarity. When disasters struck, the Christians were better able to cope, and this resulted in *substantially higher rates of sur-*

> *vival*. . . . Moreover, their noticeably better survival rate would have seemed a "miracle" to Christians and pagans alike, and this ought to have influenced conversion. (Stark 1996, 74–75)

If Stark is correct, Christianity's effectiveness as a social response to disease may have catalyzed its initial success.

Threats to social well-being affected not only the early spread of Christianity but also the origins of the Judeo-Christian tradition. Although the Bible begins in Eden, its first completed books were Amos, Micah, Hosea, and Isaiah (Good 1998). These prophets railed against social inequalities and ethical lapses in Israel and Judah: "There is no faithfulness, no love, no acknowledgment of God in the land. There is only cursing, lying, and murder, stealing and adultery; they break all bounds, and bloodshed follows bloodshed. Because of this the land mourns, and all who live in it waste away; the beasts of the field and the birds of the air and the fish of the sea are dying" (Hosea 4:1–3 NIV). Internal social conflicts threatened to weaken the Israelite nation and render it vulnerable to external threats: "An enemy will overrun the land; he will pull down your strongholds and plunder your fortresses" (Amos 3:11 NIV).

The Old Testament is replete with laws aimed at stemming some of the same threats that concerned the prophets (internal social disharmony: Exodus 20:12–17; 21:12–35; 22:1–31; 23:1–9; foreign armies: Deuteronomy 3:3–10; 7:1–2). Old Testament laws also address problems posed by disease (Leviticus 5:3; 22:4; Numbers 5:1–4; Deuteronomy 14:2; 23:12–14), another of the social stresses that inspire revitalization (Wallace 1956).

Natural and social threats helped to shape not only a Judeo-Christian ethos but also the Judeo-Christian cosmology. Western religion arose prescience, when beliefs about human origins were limited mainly by intuition and common sense. The leeway was used to invent a creation myth that supported the Old Testament's codes of conduct. The Being who invented life and the universe also crafted—and threatened to enforce—Old Testament laws. Obedience promised peace and prosperity (Leviticus 26:1–13; Deuteronomy 28:1–14), whereas disobedience risked disease, agricultural disaster, and invasion by foreign cultures (Leviticus 26:14–39; Deuteronomy 28:20–68). The strength of these laws and the credibility of their consequences were reinforced by Yahweh's presumed omnipotence.

Although generalizations concerning religious phenomena are difficult and often controversial (Rue 2000), Wallace's revitalist perspective raises the important point that social threats often serve as a primary inspiration of incipient religions. Thus, crisis often may precede cosmology in the rise of religion.

After outlining the characteristics of revitalization movements, Wallace described what he called "the processional structure" of revitalization, which occurs in four stages. During Stage 1, the "Steady State," chronic stresses on a society vary within tolerable limits. Stage 2, "The Period of Increased

Individual Stress," is marked by a "continuous diminution" in a culture's "efficiency in satisfying needs" (Wallace 1956, 269). In this stage, scattered individuals in a society may recognize incipient problems, but stresses remain insufficient to inspire a society-wide response. During Stage 3, "The Period of Cultural Distortion," a rift develops between those who cannot tolerate the stress and seek widespread changes and those who do not seek changes. "In this phase," writes Wallace, "the culture is internally distorted; the elements are not harmoniously related but are mutually inconsistent and interfering. . . . This process of deterioration can, if not checked, lead to the death of a society" (Wallace 1956, 269–70).

According to Wallace, the alternative to cultural disintegration occurs if a culture enters Stage 4, "The Period of Revitalization." Revitalization begins with changes in social paradigms, which Wallace termed a "mazeway reformulation." The mazeway includes a person's images of nature, society, culture, and personality. Wallace writes:

> Whenever a person who is under chronic, physiologically measurable stress, receives repeated information which indicates that his mazeway does not lead to action which reduces the level of stress, he must choose between maintaining his present mazeway and tolerating the stress, or changing the mazeway in an attempt to reduce the stress. Changing the mazeway involves changing the total *Gestalt* of his image of self, society, and culture, of nature and body, and of ways of action. (Wallace 1956, 266–67)

In Wallace's case studies (Wallace 1956; 1966; 1970), initial visions of a mazeway adjustment usually, but not always, occur to a single person within the society. This is followed by a period in which the new paradigm is communicated, and those who accept it organize to spread the new perspective, which seldom happens easily. "Resistance may in some cases be slight and fleeting but more commonly is determined and resourceful, and is held either by a powerful faction within the society or by agents of a dominant foreign society" (Wallace 1956, 274). The new paradigm may adjust in response to opposition views. If a controlling portion of the population comes to accept the new mazeway, a new steady state (Stage 1) is reached and continues until significant new stresses arise.

Environmental Decline and the Revitalist Response

The role of crises and potential crises in shaping worldviews raises the question of whether contemporary responses to the earth's environmental decline share similarities with historical responses. Wallace's paper on revitalization (1956) was published shortly before environmental problems gained mainstream recognition with the publication of *Silent Spring* (Carson 1962). Nonetheless, the emergence of the environment as an issue of concern and the development of certain perspectives for addressing environmental problems closely match Wallace's processional structure of revitalization.

In Wallace's Stage 1 of revitalization, social stresses are weak enough to be widely acceptable. The processional structure of revitalization in contemporary society began with a widespread acceptance of modern technology that flowered in the middle of the twentieth century. One year after Wallace's article was published, the influence of science and technology in daily life was accepted with almost universal optimism. Charles Piller reports that in a survey conducted by the National Association of Science Writers in October 1957, nearly 90 percent of Americans felt that the world was "better off because of science" and could not name a single negative consequence of science (Piller 1991, 5). According to Piller, this reverence for science was inspired by its contributions to medicine, living standards, and victory in World War II. Disease, economic distress, and military defeat are three of the principal social threats that lead to the adoption of new cultural paradigms (Wallace 1956); therefore it is unsurprising that science and technology garnered unblinking acceptance in the environment of the 1950s.

In contrast to the optimism of the 1950s, polls taken in the mid-1980s revealed that a quarter or more of Americans believed that technology promised more harm than good for the future of the human race (Piller 1991). To explain this shift in attitude, Piller cites a list of environmental disasters, including the mercury poisoning of Minimata Bay in Japan (1959), the carcinogenic effects of DDT revealed by Rachel Carson in *Silent Spring* (1962), the poisoning of communities at Love Canal (1978) and Times Beach, Missouri (1983), with synthetic chemicals, nuclear reactor mishaps at Three Mile Island (1979) and Chernobyl (1986), and scientific confirmation of ozone depletion (1987). Since Piller's book, scientific research has documented additional threats portending stark social consequences, including climate change (Houghton et al. 2001; Kerr 2001; Schiermeier 2001), depletion of freshwater sources (Postel 1999), endocrine disruption (Colborn, Dumanoski, and Myers 1997; Colborn and Thayer 2000), extinction (Pimm et al. 1995), ecosystem destruction (Vitousek et al. 1997; Nepstad et al. 1999; Covington 2000; Jackson et al. 2001; Tilman et al. 2001), and degradation of the services these systems provide to humanity (Costanza et al. 1997). Most or all of these problems have arisen as unforeseen side effects of technology.

By 1992, these environmental problems were sufficiently worrisome that more than sixteen hundred senior scientists from seventy-one countries, including over half of all living Nobel Prize winners, signed the "World Scientists' Warning to Humanity," which read in part, "If not checked, many of our current practices . . . may so alter the living world that it will be unable to sustain life in the manner that we know. . . . No more than a few decades remain before the chance to avert the threats we now confront will be lost and the prospects for humanity immeasurably dimmed" (Suzuki 1998, 4).

This warning attracted virtually no media attention in the United States (Suzuki 1998). Thus, at least in contemporary America, responses to environmental problems would seem to fit Stage 2 or 3 of Wallace's processional structure, in which some people find rising stresses intolerable but insufficient problems have accrued to inspire shifts—or even clear concern—society-wide.

A second characteristic of Wallace's Stage 2 widely evident in the United States today is that "Initial consideration of a substitute way is likely . . . to increase stress because it arouses anxiety over the possibility that the substitute way will be even less effective than the original, and that it may also actively interfere with the execution of other ways" (Wallace 1956, 269). This matches the way that an economic paradigm that helped the United States to win the Second World War (Cobb, Halstead, and Rowe 1995) frequently is cited to dismiss environmental concerns. For example, in 2001 the Bush administration cited U.S. business interests in rejecting the Kyoto Protocol, an international agreement to stem the greenhouse gas emissions causing climate change (Editorial 2001).

In rejecting the Kyoto Protocol, the U.S. administration ignored a government-appointed study by its own National Academy of Sciences that confirmed prior estimates of high future costs of greenhouse warming made by an international panel of scientists (Editorial 2001). A tendency to dismiss scientific concerns has become symptomatic of U.S. environmental policy (Gelbspan 1997; Rampton and Stauber 2001). This disconnect between science and social policy is consistent with Wallace's Stage 3, in which societal elements are "mutually inconsistent and interfering" (Wallace 1956, 269). Indeed, the Bush administration's stance on climate change is not easily reconciled with an estimate by Britain's largest insurance group that property damage from global warming will exceed gross world product by 2065 if costs continue to increase at current rates (Brown 2001). It also is difficult to reconcile with various estimates that conservation and a transition to environmentally friendly energy sources have boosted, and would continue to benefit, the U.S. economy (Goodstein 1999; Hawken, Lovins, and Lovins 1999; Romm 1999).

This kind of inconsistency and interference may rise in proportion to levels of corporate control of government, which by some estimations (Korten 2001; Palast 2002) has exacerbated another symptom of Stage 3, "irresponsibility in public officials" (Wallace 1956, 269). David Orr, professor of environmental studies at Oberlin College, writes:

> Relative to the problems we face, our politics are about the most miserable that can be imagined. . . . Issues that will seem trivial or even nonsensical to our progeny are given great attention, while problems crucial to their well-being are ignored and allowed to grow into global catastrophes. At best they will regard us with pity, at worst as derelict and perhaps criminally so. The situation was not always this way. The leadership of this country was once capable of responding to threats to

our security and health with alacrity and sometimes with intelligence. (Orr 2002, 104–5)

What Orr calls "the dismal performance of the U.S. political system relative to the large environmental and social issues looming ahead" (Orr 2002, 105) matches the kind of political fecklessness that characterizes Stage 3 of Wallace's processional sequence. Indeed, if levels of voter participation and corporate control provide reliable measurements of the health of American democracy, the republic stands at a historical nadir (Hertz 2001; Palast 2002).

Another symptom of Stage 3 manifest in contemporary society is "anxiety over the loss of a meaningful way of life" (Wallace 1956, 270). In addition to discussions in the popular (Spong 1998) and academic (Rue 1989) literature of the declining relevance of traditional versions of Western religion, this symptom also is apparent in declining enrollments at theological schools by students seeking to become ordained ministers (MacDonald 2002).

If warnings such as those provided by the world's scientists and insurance companies prove accurate, environmental decline poses grave threats to societies planetwide. A literature containing the threads of a revitalist response to environmental problems arose in the 1960s and continues to develop today.

In 1967 Lynn White Jr. published an article in the journal *Science* titled "The Historical Roots of Our Ecologic Crisis" (White 1967). In White's blunt estimation, Western religious attitudes were encouraging an abuse of science and technology that threatened the planet. White's view has been widely debated (Derr 1975; Sorrell 1988; Kinsley 1996), but his thesis has never been regarded in the context of historical responses to crises.

Without naming it as such, White's article promoted the crucial step in revitalization—a mazeway adjustment. White faulted ingrained worldviews for environmental problems by linking the rise of modern science and technology—and their environmentally destructive effects—to Christian dogma. According to White, perspectives engendered by Christianity, including the linearity of time, the creation of nature for man's benefit, the creation of humans in God's image, and the notion that salvation requires more action than thought, had facilitated a blind and destructive use—and misuse—of science and technology. White argued that pursuit of the status quo would engender further environmental problems. He warned, "Unless we think about fundamentals, our specific measures may produce new backlashes more serious than those they are designed to remedy" (White 1967, 1204). In terms of the general scheme described by Wallace (1956), White's analysis asserted that mounting environmental side effects were causing science, technology, and religion to lose their traditional "efficiency" in solving social problems.

In addressing "fundamentals," White raised what in Wallace's terms would be considered the personality component of the mazeway when he asserted, "What people do about their ecology depends on what they think about themselves in relation to things around them" (White 1967, 1205). Other environmental authors also have identified personality as an important component of environmental problems. In *Triumph of the Mundane,* in a section titled "Shopping for Our Personality," Hal Kane writes,

> We could develop our national identity through our education system. We could develop it through close relationships with our neighbors and extended family, or time spent in our cities. We could develop it through vigorous physical exercise and our physical well-being. Or it could be through hard work, a Puritan work ethic, public commitment, values, or many other ways. But instead, our personalities, both individual and national, are increasingly being shaped by the culture of the mall. (Kane 2001, 136)

Practitioners in the recently arisen field of ecopsychology attempt "to replace the isolated, atomistic personality that dominates psychotherapeutic theory with an ecological sense of the self" (Roy and Roy 2001a, VI-7). Ecopsychologist Sara Conn (1995) writes, "An ecologically responsible construction of the self will require what Arne Naess calls an 'ecological self,' which includes not only growth in human relationships with family and community, but a broadening of the self through identification with all beings, even with the biosphere as a whole."

In another example of a personality component of a mazeway adjustment, author Bill McKibben (1998) reviews the scientific literature to challenge the misconception that only children are at greater risk for personality deficiencies than children with siblings. For those who feel compelled to have a second child to ensure the mental health of their first, McKibben's book discredits a common misconception about personality to promote the environmentalist goal of reduced population growth.

White, Kane, Conn, McKibben, and numerous other environmental authors (see Table 1) promote a mazeway adjustment consistent with Wallace's criteria for the initial stages of revitalization. Insofar as history offers any guide to the present, a mazeway adjustment, and not just a series of externally imposed technological fixes, is required to confront environmental decline.

Environmental Revitalization and the Rise of Religion

Given the historical relationship between revitalization movements and the rise of religion, it is worth asking whether revitalist responses to the environmental crisis may provide the foundation for a new religious perspective. Addressing this question first requires a definition of religion, which is presented in the box on the following page.

What aspects of a revitalist response to environmental decline fit this definition of religion? White clearly believed that new views of religion

were needed to confront environmental problems when he wrote, "More science and more technology are not going to get us out of the present ecologic crisis until we find a new religion, or rethink our old one" (1967, 1206). However, other than to propose Saint Francis of Assisi as a patron saint for ecologists, White offered little idea of what such a religion might entail.

Other authors in Table 1, including Brian Swimme and Thomas Berry (1992), Peter Marshal (1994), Ursula Goodenough (1998), and Paul Brockleman (1999), propose a scientific view of cosmology as the foundation for a new environmental ethic (see Table 2). This marks clear progress in a religious direction. An environmental ethic founded on a science-based cosmology is consistent with a religion in which beliefs concerning the cause, nature, and purpose of the universe serve as the foundation for human conduct (see box).

These and other authors raise the following points concerning the environmental implications of a science-based cosmology. First, the long evolutionary history of life lends perspective to the rapid environmental changes wrought by humans in the past one hundred years and raises serious questions about the sustainability of our current course. Second, the shared ancestry of Earth's organisms challenges many of the suppositions used to justify the maltreatment of nonhuman species (Cavalieri and Singer 1993; Fouts 1997; Fox 2001). Third, an understanding of ecological relationships illuminates the interdependence of organisms and their environment and justifies a precautionary approach to the manipulation of chemical compounds, genomes, ecosystems, and biogeochemical cycles. Fourth, our roots in ecology and evolution discredit any interpretation of the Genesis myth suggesting that the earth was given to humans for their consumption. Fifth, the wonders of life uncovered by scientific discoveries provide inspiration similar to that of the wonders inherent in traditional religious cosmologies.

Religion involves not only a cosmology-based ethics but also reverence toward a superhuman agency (see box). By definition, superhuman agencies exceed ordinary human power, manipulation, or control. Many of the environmental problems cited in previous sections and other problems, such as rising cancer rates (Steingraber 1998), antibiotic resistance (WHO

Definitions of *religion* and *superhuman* (Stein 1982).

Religion: A set of beliefs concerning the cause, nature, and purpose of the universe, especially when considered as the creation of a superhuman agency or agencies, usually involving devotional and ritual observances and often having a moral code for the conduct of human affairs.

Superhuman: Above or beyond what is human; having a higher nature or greater powers than man has: *a superhuman being.*

TABLE 1

Examples from Environmental Literature Exhibiting the Three Traits of a Revitalization Movement: Crisis, Mazeway Reorientation, and Collective Participation of Numerous Individuals

Author	Trait	Example
White 1967	Crisis	Science and technology . . . joined to give mankind powers which, to judge by many of the ecologic effects, are out of control.
	Mazeway change and movement	No new set of basic values has been accepted in our society to displace those of Christianity. Hence we shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man.
Devall and Sessions 1985	Crisis	The environmental problems of technocratic-industrial societies are beginning to be seen as manifestations of what some individuals are calling "the continuing environmental crisis." (p. ix)*
	Mazeway change	More than just reform is needed. Many philosophers and theologians are calling for a new ecological philosophy of our time. (p. ix)
	Movement	Deep ecology is emerging as a way of developing a new balance and harmony between individuals, communities, and all of Nature. (p. 7)
Swimme and Berry 1992	Crisis	The present disintegration of the life systems of the Earth is so extensive that we might very well be bringing an end to the Cenozoic period that has provided the identity for the life processes of Earth during the past sixty-seven million years. (p. 3)
	Mazeway change	The immediate goal . . . is not simply to diminish the devastation of the planet that is taking place at present. It is rather to alter the mode of consciousness that is responsible for such deadly activities. (p. 251)
	Movement	For this new biological period to attain any degree of fulfillment will require the integral participation by all the members of the planetary community. (p. 4)
Marshal 1994	Crisis	If we continue to defile the planet at the present rate, prevailing conditions of life will be threatened. (p. 1)
	Mazeway change	What is taking place is not merely a concern with cleaning up our environment but a fundamental shift in consciousness—as momentous as the Renaissance. . . . A new vision of the world is emerging which recognizes the interrelatedness of all things and beings and which presents humanity as an integral part of the organic whole. (p. 5)
	Movement	If we are to live in a habitable world these insights must be translated into action and form part of a democratic and sustainable society. (p. 6)

Good-enough 1998	Crisis	That we need a planetary ethic is so obvious that I need but list a few key words: climate, ethnic cleansing, fossil fuels, habitat preservation, human rights, hunger, infectious disease, nuclear weapons, oceans, ozone layer, pollution, population. (p. xv)
	Mazeway change and movement	If religious emotions can be elicited by natural reality—and I believe that they can—then the story of Nature has the potential to serve as the cosmos for the global ethos that we need to articulate. (p. xvii)
Brockleman 1999	Crisis	As many ecologists have pointed out, by seeing nature simply as a backdrop and "stuff" put here merely for our pleasure and endless economic exploitation and growth, we have brought upon ourselves and all of creation a vastly destructive ecological crisis in which we ultimately threaten not only our own lives but those of myriad species around us. (p. 11)
	Mazeway change	What is called for, then, is a new way of seeing things that might help us to live more appropriately within nature. (p. 12)
	Movement	Changes in contemporary science and religion are permitting (if not at least in part causing) a paradigm shift in the worldview that pervades modern industrial cultures. (p. 13)

*Note from page numbers that symptoms of revitalization tend to be established early in each book.

2000), pesticide resistance (Bright 1998), nitrogen toxicity (Tilman et al. 2001), and invasive species (Pimentel 2002), arise largely out of a failure to predict or to control the ways that natural systems respond to human manipulation. Numerous authors have argued that our inability to fully understand or control nature has profound ethical implications that favor greater caution in the implementation of technology and a more restrained approach to economic growth, population growth, and the exploitation of nonhuman species (Ehrenfield 1993; Wilson 1998; Raffensperger and Tickner 1999; Orr 2002; McKibben 2003).

A sort of deference and humility toward nature exists in many religions and accords with Wallace's point that a mazeway reformulation commonly involves an acceptance of the "leadership, succor, and dominance of the supernatural" (Wallace 1956, 273). Supernatural and superhuman agencies are similar in that both may exceed ordinary human powers. They are different in that the supernatural requires a leap of faith beyond what is explainable by natural laws or phenomena (Stein 1982), whereas the superhuman does not. Emphasizing the superhuman instead of the supernatural liberates an environmentally-inspired religion from superstition and harmonizes it with the best state of human knowledge.

As for devotional or ritual observances (see box), the environmental movement is still in an early stage of organization and communication. Formal observances, although prominent in many institutional religions, are not

necessary components of religion in general (Jammer 1999). Nonetheless, incipient signs of organized observances may be seen in the voluntary simplicity movement (Elgin 1981) and reading groups organized through the Northwest Earth Institute on topics such as deep ecology, discovering a sense of place, and choices for sustainable living (Roy and Roy 2001a). Two environmental oaths offer specific guidelines for moral conduct. The Graduate Pledge Alliance, founded in 1987 at Humboldt State University and now coordinated by Manchester College, reads, "I pledge to explore and take into account the social and environmental consequences of any job I consider or any organization for which I work" (Nicholson Ings 2001). Similarly, the London-based Institute for Social Invention has invented a Hippocratic Oath for Scientists, Engineers, and Executives, which reads, "I vow to practice my profession with conscience and dignity; I will strive to apply my skills only with the utmost respect for the well-being of humanity, the earth, and all its species; I will not permit considerations of nationality, politics, prejudice, or material advancement to intervene between my work and this duty to present and future generations. I make

TABLE 2

Environmental Works Linking a Science-based Cosmology with Morality

Author	Example
Swimme and Berry 1992	We have only begun to read the immense amount of data that we now have before us. . . . This data has not yet been sufficiently assimilated to bring about a new period in our comprehension of ourselves and of the universe itself (p. 2). In morality we are expanding our moral sensitivity beyond suicide, homicide, and genocide to include biocide and geocide, evils that were not recognized in our civilizational traditions until recently. (p. 257)
Marshal 1994	The greatest contribution ecology has made to the twentieth century is to ethics. The assumptions and findings of ecology have transformed and revitalized traditional humanist morality. The evolutionary ethics of the Social Darwinists has given way to environmental ethics which is principally concerned with man's rightful place in nature and how he should relate to his surroundings. (pp. 345–46)
Goodenough 1998	If religious emotions can be elicited by natural reality—and I believe that they can—then the story of Nature has the potential to serve as the cosmos for the global ethos that we need to articulate. (p. xvii)
Brockleman 1999	It seems to me that a sea-change in how we think about ethics is being suggested by the new cosmology. This perspective entails an ethics that moves away from individual judgments to social contexts, away from abstractly justifying acts to feeling concerns, away from intellectual judgments to transformed character, and away from a humanistic and secular perspective to a theocentric one. (p. 164)

this Oath solemnly, freely, and upon my honor" (Albery n.d.). The institute wants the oath to become part of graduation ceremonies for scientific disciplines around the world. It has been signed by at least fifteen Nobel laureates, and a fund has been established to create institutes in Europe where scientists who lose their jobs for obeying the oath can find alternative employment.

There are a few other indications of how an environmental religion might evolve organized rituals and observances. Steve Packard instituted a project in prairie restoration with the following insight: "And then one day it dawned on him that, no, if the prairies were to survive, they needed congregations, as he started calling them, of people who could interact with the land—who could develop an emotional bond with it" (see Stevens 1995). After an infuriated logger felled a tree occupied by an activist named Gypsy, the tree became a memorial, and "people have begun to call the area by a new name—Gypsy Mountain—drawing young pilgrims to the site of one of their early martyrs" (Hitt 2003, 50). Environmental certifications, including sustainably harvested wood and seafood, dolphin-safe tuna, energy-efficient appliances, organic produce (Wortman 2002), and locally owned businesses (Mitchell 2002), may help to render unsustainably produced products taboo for some consumers. Declining enrollment in theological schools has led to at least one course in "Wilderness Spirituality" (MacDonald 2002), and, if enrollment continues to decline, theological schools could conceivably provide an organized niche for students who seek environmentally meaningful careers and are disenchanted with current graduate academic opportunities (Orr 2002, chap. 17).

On the basis of the preceding discussion, a revitalist response to environmental decline fits at least one definition of religion. Although religious generalities are difficult to make (Rue 2000), the definition used here (see box) is more detailed than some (Peterson 2001). If it fits a strict definition, the rising environmental movement is likely to fit other more general views of religion. Whether environmentalism will develop into any mainstream religious perspective depends in part on how the relationship between science and religion is developed and promoted in coming years.

Implications for Reconciling Science and Religion

Discussions of science's implications for religion have tended to emphasize the implications of a scientific cosmology for religious faith (Barbour 1990; Gould 1999; Bowler 2001; Goodenough 2000). This may place the cart before the horse. Insofar as religions, and the cosmologies that they are founded upon, arise as a consequence of crisis, crisis precedes cosmology in the origins of religion. Thus, a science-based cosmology is likely to become the foundation of an enduring and popular religious perspective only insofar as it serves some pressing need.

In early-twentieth-century Britain, an effort to reconcile science and religion was largely aborted when, according to historian Peter Bowler, economic depression and war eroded faith in the notion of progress, including religious progress, and revived Christianity as "the only bulwark against darkness" (Bowler 2001, 409). At the time a scientific version of life's origins was well established, but environmental problems were largely nonexistent. Today, in the shadow of a looming environmental crisis, a scientific view may have much to offer religion insofar as it reveals the ecological interconnectedness of life, the enormous time scales required for life and living systems to emerge, and the continuous ancestral history that humans share with other beings. As Paul Brockleman puts it, "Old and tired worldviews and cultural attitudes toward life are not overcome by dispute and argument any more than is a person's fundamental faith in life. Rather than being disproved, they simply dissolve when they no longer meet significant human needs and longings, and thus make room for new perspectives. The unholy breach between nature and spirit, science and religion, head and heart may be in the process of dissolving" (Brockleman 1999, 177).

If Brockleman is correct, a dynamic—and possibly critical—synthesis of scientific, religious, and environmental concerns may occur in the century ahead. Such a synthesis would match the pattern of social responses to crises that have defined human history and catalyzed new religions for millennia. As the world, for better or worse, evolves components of a single community, a religious perspective based on a universal scientific cosmology that is designed to address global environmental problems may hold worldwide appeal.

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