

Title: The Environmental Ethic Implicit in Three Theories of Evolution

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Abstract

This paper examines the environmental ethic that is implicit in three different interpretations of evolution that are intended for the general public, and which attempt to explain the past and future developments of the world's cultures. The three interpretations include: (1) the computer-futurist thinkers who claim that we are entering the post-biological phase of evolution and that the diversity of cultural knowledge systems is being replaced by a global intelligence; (2) the genocentric interpretation of evolution articulated by E.O. Wilson that also represents evolution as a linear process leading to the extinction of non-scientifically based cultures; and (3) the Brian Swimme/Thomas Berry interpretation ([The Universe Story](#)) that adapts the mainstream account of evolution to account for religious themes—but still is based on western cultural assumptions about the linear nature of progress and the need to abandon the mythopoetic narratives of other cultures in favor of the theory of evolution. The paper also considers how the three interpretations reinforce the “survival of the fittest” ethic that underlies the current efforts to globalize the western technology/consumer dependent lifestyle.

A comparative cultural and an historical perspective supports the claim that the environmental ethic of a culture is derived from its mythopoetic narratives. The environmental ethic that guided the cultural practices of Christians over the last two centuries was spelled out in the [Book of Genesis](#). According to this narrative, as the first human, Adam was given responsibility for naming the natural world created by God. This hierarchical relationship, which set “man” over nature, became the basis of an environmental ethic that sanctioned treating the environment as a resource—and, in the best sense, as involving a custodial relationship. In various versions of the Hindu mythopoetic narratives of creation Nature (sometimes translated as “cosmic matter”) is sacred, and thus not reducible to an economic resource. To cite another example, the mythopoetic narrative of the Quechua of the Andes represents human/Nature relationships as nurturing through a continual dialogue. The environmental ethic of the Quechua requires listening and responding to what Nature communicates. Thus, as the many dimensions of nature—plants, soils, rivers, weather, etc.—nurtures humans, humans must reciprocate with nurturing behaviors and thoughts toward the environment. The environmental ethic implicit in other mythopoetic narratives, ranging from major

religions such as Islam and the various traditions of Buddhism to the mythopoetic narratives of indigenous cultures such as the Hopi and Inuit, point to the fact that environmental ethics are as varied as the knowledge systems of the world's cultures.

Today, the globalization of the western system of a consumer/technology dependent form of individualism is undermining the mythopoetic narratives of many of these cultures. This process can be seen in how the spread of computers, and increasing adoption of other western technologies and science are undermining linguistic diversity, which is essential to maintaining biodiversity. The role of western science in this process of globalization is complex and contradictory. Scientists are working to increase the world's food supply and to reverse environmental degradation. Their research is also leading to the development of new technologies such as genetically altered seeds and computers that undermine the intergenerational knowledge essential to traditions of self-sufficiency. And with the loss of cultural traditions of self-sufficiency comes increasing integration into the western economic system—and its accompanying technological dependency. But these aspects of globalization are not the main concern here. Rather, what needs to be considered here is the way in which the western account of evolution is being extended as the explanatory framework of everything from biological systems to cultural beliefs, values, and practices. And, as its explanatory power is being represented as presenting a scientific basis for understanding a whole range of cultural phenomena, it can be seen as taking on the role of “the true evolutionary epic,” as E. O. Wilson put it (1998a, p. 265).

Thus, the question that needs to be asked of this “true evolutionary epic” or narrative is: What is the nature of the environmental ethic that is consistent with its account of natural selection? A second question also needs to be asked: namely, At what point does evolution as an explanatory model become an ideology that undermines cultural diversity? The growing body of knowledge of how genes work has emboldened leading scientists to make predictions about areas of culture that previously were considered beyond the boundaries of empirical investigation. For example, scientists such as Francis Crick now claim that the “aim of science is to explain all aspects of the behavior of our brains, including those of musicians, mystics, and mathematicians” (1994, p. 259). Other scientists have taken on the Promethean task of explaining how

values are the outcome of natural selection. Richard D. Alexander, for example, writes in The Biology of Moral Systems (1987) that “each person is programmed by the history of natural selection to maximize the likelihood of survival of his/her genetic material through reproduction and nepotism...” (p. 108). There are, in fact, dozens of books that now attempt to explain the genetic and thus evolutionary basis of values and religious systems.

Perhaps the most widely known among these scientists is E.O. Wilson. As the founder of sociobiology and as a prolific author who is able to write with such clarity that he now has a wide following among the general public, Wilson has become one of the most visible spokespersons for the argument that, as he puts it, “the development of moral sentiments are products of the interaction between genes and the environment” (1998a, p. 64). Wilson attempts to avoid the criticism that he is a genetic determinist by suggesting that moral conventions are the outcome of “gene-culture coevolution.” But even this attempt to bring culture into the picture is negated by his continual reference to how Darwinian fitness is the ultimate test of what will survive. And as surviving longer and leaving more offspring is interpreted as the measure of evolutionary success, Wilson concludes that “all mammals, including humans, form societies based on a conjunction of selfish interests” (1998a, p. 171).

Before taking on the task of clarifying the environmental ethic that is consistent with the three different interpretations of evolution now being encountered by the general public, it would be useful to quote Richard Dawkins’ conclusion about the nature of a Darwinian universe—a conclusion shared by scientists who represent the western scientific paradigm as the only valid approach to knowledge. As Dawkins put it, “The universe we observe has precisely the properties we should expect if there is, at bottom, no design, no purpose, no evil and no good, nothing but blind, pitiless indifference....DNA neither knows nor cares. DNA just is. And we dance to its music” (1995, p. 133). As I will show in the following analysis, while many interpreters of evolution embrace Dawkins’ radical reductionism, which Wilson repeats when he writes that “the genes...feel nothing, care for nothing, intend nothing....Their writ extends to the level of molecule, cell, and organs” (1998a, p. 165), they also impose on the idea of natural selection the western cultural view of linear progress. In addition, they interpret

evolution as leading to a world monoculture—which contradicts the understanding that the interplay between mutations within organisms and natural selection accounts for the Earth’s diversity of species.

An example of how evolution is being interpreted as a linear form of progress can be seen in Aldo Leopold’s classic effort to articulate a land ethic. The most arguably important and famous essay in A Sand County Almanac begins with an account of how Odysseus treated his slaves as property, and how over a thousand years the moral norms guiding moral behavior evolved from the Mosaic Decalogue to relations between individuals and society. “This extension of ethics,” Leopold wrote, “so far studied only by philosophers, is actually a process of ecological evolution” (1996 edition, p. 238, italics added). Leopold goes on to claim that “all ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts” (p. 239). Leopold relies upon the idea of instincts, a metaphor that contemporary biologists have abandoned in favor of explaining the genetic basis of survival, to explain the individual’s relationship to the larger community. As Leopold put it, “his (the individual’s) instinct prompts him to compete for his place in the community, but his ethic prompts him to also co-operate (perhaps in order that there may be a place to compete for)” (p. 239). The evolution of ethical norms, as Leopold understood it, has led to enlarging the unit of survival from that of a community of individuals to a community which includes “soils, waters, plants, and animals, or collectively: the land” (p. 239).

Leopold was not the first to interpret evolution as the basis of a linear form of progress where the process of natural selection sorted out the fit from the unfit cultural practices. Herbert Spencer, for example, turned Darwinism into an ideology that was used to justify business practices and governmental policies during the latter part of the nineteenth and early part of the twentieth century. But it was Leopold’s genius that led to shifting the focus from individual organisms and species as the unit of survival to understanding that ecological systems are the unit of survival. Indeed, his famous formulation of a land ethic anticipated one of the more central ideas of Gregory Bateson. The moral imperative of Leopold is that “a thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise” (p. 262). Bateson put it this way “in no system which shows mental

characteristics can any part have unilateral control over the whole. In other words, the mental characteristics of the system are immanent, not in some part, but in the system as a whole" (1972, p. 316).

While Leopold's environmental ethic is clearer than his historical account is accurate, the environmental ethic implicit in other interpretations of evolution is deeply problematic. And as the theory of evolution is again being extended to explain cultural developments, and thus is again taking on the role of an ideology, there is the danger that it will contribute to undermining the environmental ethics of cultures whose development was guided by ancient mythopoetic narratives that represented humans and the non-human forms of life as participants in the same spiritual, interdependent universe.

The three interpretations of evolution now being given the greatest exposure in the public realm include: (1) the computer-futurist argument that natural selection will shortly lead to computers replacing humans; (2) the genocentric argument promoted by Richard Dawkins and E. O. Wilson; and (3) the universe story of Brian Swimme and Thomas Berry that represents humans as confronted with a choice about the future course of evolution. It needs to be emphasized here that debates within the scientific community, such as the issues raised by Stephen Jay Gould, R. C. Lewontin, and Brian Goodwin, will not be the focus here. Nor will the arguments about "intelligent design" be given attention. Rather, the three ways in which evolution is being explained to the public, as well as how the explanations support public policies relating to environmental issues, will be the main focus. In effect, the focus here will be on the non-scientifically based extrapolations of scientists and self-proclaimed experts who are transforming the theory of natural selection into an ideology. The extrapolations will be examined in terms of the form of environmental ethic they support.

Before examining these three interpretations it is first necessary to clarify how I am using the phrase "environmental ethics," and, more importantly, how language reproduces the moral templates of a cultural group. Language, as linguists tell us, is used to communicate the culture's way of understanding relationships, the attributes of the participants in the relationships, and thus the taken-for-granted moral codes that govern relationships. For example, the moral codes that governed for centuries the relationships between men and women in our culture were dictated largely by the way the attributes of

each was understood and encoded in the language. Thus, as individuals learn the language of their culture they are also learning the taken-for-granted moral patterns that treated women as inferior. Similarly, in western cultures based on mythopoetic narratives that represent humans as rational agents surrounded by a wilderness that is both hostile and an exploitable resource, the languaging processes reproduced the culture's way of understanding what constitutes the normal and thus moral relationships with the environment. Using rivers to carry off toxic wastes, clear-cutting of old growth forests, and exploiting fisheries through the use of more efficient technologies represented the environmental ethic of these cultures. It's a destructive environmental ethic, but is nevertheless a set of moral norms encoded in the language of the culture—and given legitimacy by the mythopoetic narratives that are the basis of the culture's world view. An environmental ethic may be destructive of the life-sustaining characteristics of local ecosystems, or it may be based on minimizing the human impact on natural systems. Ultimately, a culture's environmental ethic, including the mythopoetic narratives it is based upon, must meet the long-term test of Darwinian fitness. That is, an environmental ethic will not ensure the survival of a culture if the practices of the culture destroy the life-sustaining capacity of the environment. But what is important to note here is that the development of an environmental ethic can be traced back to the mythopoetic narratives of a culture, or to powerful evocative experiences that have shaped the culture's deepest ways of understanding. The three interpretations of evolution to be examined here start with a different assumption: namely, that the process of natural selection dictates the culture's environmental ethic, and that mythopoetic narratives play no part in the process.

The Cultural Extrapolations of Three Interpretations of Evolution

The three books that have received the widest public exposure are Ray Kurzweil's *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (1999), E. O. Wilson's *Consilience: The Unity of Knowledge*, and Brian Swimme and Thomas Berry's *The Universe Story* (1992). Each book represents a distinct set of cultural extrapolations and an equally distinct interpretation of the competitive interactions that govern natural selection. They also share a number of Darwin's basic insights about the

survival of the better adapted species—including the idea that life is an ongoing competition and that it is the environment that determines what constitutes the fittest.

Kurzweil’s arguments represent one of the more extreme extrapolations that now characterize a growing body of literature purporting to explain how computers are on the verge of displacing humans in the evolutionary process. Using metaphors derived from the field of computing, Kurzweil claims that “evolution is the master programmer.” He goes on to explain that “the software programs have been written down, recorded as digital data in the chemical structure” of the DNA molecule—which “controls the vast machinery of life” (1999, p. 40). Having established that the human genetic code is similar to the software that is the basis of computer intelligence, Kurzweil goes on to explain the many ways in which computers will surpass humans, and thus lead to their extinction. Powerful computers, he claims, will be trillions of times more capable than human intelligence. And this increased data processing capacity will enable them to program themselves to have human personalities, religious experiences, create music, and perform physical tasks. The further evolutionary advantage of computers is that they will not be subject to irreversible illnesses that lead to death. Kurzweil’s certainty leads him to predict that by the year 2029 the conscious nature of computers will be widely recognized—which will lead to the acceptance that computers have legal rights. He further predicts that by 2099, “most conscious entities (will) not have a physical presence” (p.280).

Kurzweil is not a lone voice with the community of computer-futurist thinkers. Others such as Hans Moravec, Gregory Stock, and George Dyson also agree that the emergence of computers is being dictated by natural selection—and not by human choice. In Mind Children: The Future of Robot and Human Intelligence (1988), Moravec announced that we are “entering a postbiological world dominated by self-improving machines” (p. 5). And in the End-of-the-Millennium Special Issue of Scientific American, he explains how the brain “evolved into a universal machine of sorts.” As he put it, “honed by hundreds of years of millions of years of evolution, the brain became a kind of ultrasophisticated—but special purpose—computer” (1999, p. 126).

Gregory Stock’s book, Metaman: The Merging of Humans and Machines into a Global Superorganism (1993), explains how the extinction of the world’s languages and

knowledge systems is the result of natural selection. Stocks' arguments that politics have nothing to do with which cultures survive, and which go extinct, is echoed in Keven Kelly's concluding observation that "we should not be surprised that life, having subjugated the bulk of inert matter on Earth, would go on to subjugate technology, and bring it also under its reign of constant evolution, perpetual novelty, and an agenda out of our control" (1994, p. 472, italics added).

The mainstream genocentric interpretation of how cultural developments are under the control of the evolutionary process is best articulated in the writings of E. O. Wilson—especially in Consilience: The Unity of Knowledge. For Wilson, the evolution of cultures is not leading to the ascendancy of computers over the human brain; rather, it is leading to the ascendancy of the scientific over the pre-scientific ways of knowing. Religious experiences, including the mythopoetic narratives that are the basis of a culture's belief and moral system are, according to Wilson, expressions of the neurobiological activity of that brain that has evolved as a survival mechanism. The future survival of humans, he argues, requires that the basis of this adaptive behavior undergo a radical change. This change will require that what Wilson calls the "true evolutionary epic" replace the religious cosmologies of Christianity, Islam, Hinduism, and so forth (1998a, p. 265). Even this new "sacred narrative" will require continual revision as new scientific discoveries are made. As Wilson put it, "science for its part will test every assumption about the human condition and in time uncover the bedrock of moral and religious sentiments" (p. 265).

Wilson wants to avoid the criticism that his interpretation of cultural evolution is based on a genetic determinist argument that exceeds what can actually be scientifically verified. He also wants to maintain that humans are faced with fundamental questions about the environmental ethic they should live by. Yet if we read carefully Wilson's explanation of the role that genes play in the formation of the epigenetic rules that supposedly guide the evolution of cultural beliefs and behaviors (what he calls "gene-cultural coevolution) we find that he continually identifies genes as the critical components in the process of natural selection. The primacy of genes in determining which cultural patterns of thinking and values (cultural "memes) survive and which do not is summarized in the following way:

Genes that confer higher survival and reproductive success on the organisms bearing them, through the prescribed traits of anatomy, physiology, and behavior, increase in the population from one generation to the next. Those that do not, decrease. Similarly, populations or even entire species with higher survival and reproductive success prevail over competing populations or species, to the same general end in evolution (1998a, p. 129)

The important question now becomes: How does Wilson explain the nature of the genes that supposedly share in the evolutionary fate that is partly determined by the collective mental decisions we call culture? In perhaps the most important passage in Consilience, he undermines his own attempt to establish that genes and culture co-evolve with the following explanation:

The genes prescribing the epigenetic rules of brains and behavior (culture) are only segments of giant molecules. They feel nothing, care for nothing, intend nothing. Their role is simply to trigger the sequence of chemical reactions within the highly structured fertilized cell that orchestrate epigenesis. Their writ extends to the level of molecule, cell, and organ. This early stage of epigenesis, consisting of a series of sequential physiochemical reactions, culminates in the self-assembly of the sensory system and brain. Only then, when the organism is completed, does mental activity appear as an emergent process. The brain is a product of the very highest levels of biological order, which are constrained by epigenetic rules implicit in the organism and physiology 1998a, p. 165, italics added

As I read this summary of the primacy of genes in the formation of cultural behaviors, the activities of the brain—metaphorical thinking, memory, conscious awareness, experience of meaning, value judgments, intentionality, sense of personal identity—are the outcome of sequential physiochemical reactions. Genes, according to Wilson’s own explanation, create brains and brains (by extension, cultures) must meet the test of Darwinian fitness. This means, “that statistically they survive longer and have more offspring than brains (cultures) that choose badly” (p. 165).

The third interpretation of evolution that is gaining popularity within the more religiously oriented segment of society is also based on the argument that what survives

is the outcome of natural selection. Evolution, which Brain Swimme and Thomas Berry explain as the story of the universe, is represented as possessing characteristics ignored in the two other accounts presented here. Swimme and Berry frame the story of the universe's 15 billion year history as reaching a critical juncture for the Earth's human inhabitants. The juncture, as they explain it, is whether the human choice will result in the evolutionary process moving into what they call the Technozoic Era (which they envision as destroying the life-sustaining ecosystems) or into the Ecozoic Era. Avoiding ecological collapse, they warn, will require fundamental changes in consciousness—changes based on an awareness that the entire planet is interdependent and governed by the same life forming processes.

Swimme and Berry face the same problem that Wilson failed to address adequately because of his genocentric arguments that extend well beyond what scientific evidence supports: namely, how to reconcile human choice with the unrelenting force of natural selection. Swimme and Berry accept Darwin's basic insight, and write in The Universe Story that natural selection is "life's power to sculpt diversity in a creative fashion" (1992, p. 127). In another statement that is consistent with the mainstream theory of evolution they write "that natural selection is a survival of the 'fittest' in the same sense that the genes enabling a particular phenotype to succeed relative to all others are selected and passed on" (p. 128).

Having accepted the basic tenets of Darwin's theory of evolution, they are faced with the problem of explaining how human choice can supercede the inexorable and humanly unpredictable dynamics of natural selection. As neither Swimme nor Berry are scientists, they introduce a different vocabulary and thus a radically different way of understanding evolution. Evolution, they claim, is based on what they term the "Cosmological Principle," which accounts for the processes of "differentiation, autopoiesis, and communion throughout time and space and at every level of reality" (p. 71). Differentiation is simply another term for the process of mutation and niche selection, and is a core feature of the mainstream interpretation of evolution articulated by Wilson and Dawkins (1976). Autopoiesis, which refers to the self-organizing characteristics of all organisms, is also essential to mainstream interpretations of evolution. But communion is not! Swimme and Berry summarize the nature of

communion as the state of being related to everything else, for “relationship is the essence of existence” (p. 77).

The communion that exists even as natural selection sorts out the better from the less well adapted, according to Swimme and Berry, needs to be both understood and experienced if humans are to ensure that evolution enters the Ecozoic Era. The experience of communion-- the experience of being connected and interdependent in the multi-layered ecosystems that sustain life--becomes essential to another theme not found in the more orthodox interpretations of natural selection. That is, Swimme and Berry see communion as basic to citizenship in the Ecozoic Era, and as a way of re-integrating a traditional religious distinction into the life-shaping process of evolution. As they put it:

The loss of relationship, with its consequent alienation, is a kind of supreme evil in the universe. In the religious world this loss was traditionally understood as an ultimate mystery. To be locked up in a private world, to be cut off from the intimacy with other beings, to be incapable of entering into the joy of mutual presence—such conditions were taken as the essence of damnation. p. 78

Swimme and Berry suggest there is another characteristic of evolution that has been overlooked in the other interpretations. That is, they explain the process whereby natural selection fits an organism to a particular niche in a way that invests the organism with intentional choice. Their example is the evolution of the horse and the bison, which they claim involved a conscious choice on the part of the horse to evolve in a way that made survival dependent upon speed of movement. The bison, according to their theory of choice, evolved its more massive physical features by consciously choosing to stand and confront its enemies. Unlike the computer-futurist and genocentric interpretations of evolution, Swimme and Berry need to introduce conscious intentional choice into the process of natural selection in order to make the case that humans have a choice between a Technozoic-life-destroying future and an Ecozoic-life-sustaining future.

As they are not scientists, Swimme and Berry do not face the problem of accountability in the way a scientist does. Their audience is largely uninformed about the science of evolution; it is also an audience that is accustomed to merging religious and politically liberal themes and values. What Swimme and Berry give them is a way of understanding that their ecologically oriented theology is compatible with the theory of

evolution. Swimme further blurs the line separating science from eco-spirituality when he writes in The Hidden Heart of the Cosmos (1996) that “the center of the Cosmos is each event in the cosmos. Each person lives in the center of the cosmos” (p. 112, italics in original). To be consistent with his earlier argument that natural selection determines what will become extinct and what will survive, his new doctrine can only be interpreted as saying that all forms of behavior are expressions of what the cosmos is doing—and that the individual does not need to take responsibility. In effect, Swimme has restated Kelly’s reductionist statement that nature is in control.

Back to the Question: What is the Environmental Ethic Implicit in the Three Interpretations of Evolution?

This brief overview of three interpretations of evolution highlights the fundamental differences in how the cultural implications of natural selection are understood by leading scientists and eco-spirituality writers. It also clarifies the differences in how the process of natural selection is being used to explain the problem of degrading the natural systems that humans and other species depend upon. The hubris of the computer-futurist thinkers leads them to ignore entirely the ecological crisis, and to be equally indifferent to the culturally destructive side of their vision of a post-biological world. Wilson’s representation of the genocentric interpretation of natural selection gives an account of how a belief in God (1998b), the formation of values (1998a, pp. 53-70), and a caring attitude toward nature (the biophilia hypothesis, 1984), are “hardwired” in our genes—which makes them the outcome of natural selection. His concern about whether humans will change their cultural practices and thus their ecological impact is genuine. But his “genes create brains that create culture” argument undermines his appeal for a transformation in human agency. As he repeatedly states, “through natural selection the environment ultimately selects which genes will do the prescribing” (1998, 137).

The Swimme/Berry interpretation of evolution as having reached a juncture where human choice will affect the future direction of life on this planet also suggests that an environmental ethic is their central concern. Their appeal for a change in human consciousness, one that makes communion and moral reciprocity central to all human

behavior, appears on the surface to be essential elements of an environmental ethic. However, by embedding their environmental ethic in the story of the universe (that is, the evolution of life's diversity through natural selection), they also undercut their argument for human agency. To reiterate their most important statement about Nature's process of design: "natural selection is a survival of the 'fittest'" in the sense that the genes enabling one particular phenotype to succeed relation to all others are selected and passed on (1992, p. 128).

In all three interpretations of evolution, the ultimate source of agency is the environment where natural selection determines which genes will survive the test of Darwinian fitness—and which will go extinct. If the basic premise of these three interpretations of natural selection is correct, then the suggestion by Wilson, as well as those of Swimme and Berry, that humans need to take responsibility by changing their environmentally destructive behavior is merely wishful thinking. All three interpretations, in effect, echo Kevin Kelly's observation that Nature's process of design is "out of our control."

At the beginning of this paper it was suggested that the historical evidence indicates that the environmental ethic of different cultures is derived from their mythopoetic narratives, and that while natural selection explains much about the development of biological processes it does not explain the origin of the mythopoetic narratives of different cultures. A further point that needs to be emphasized is that the environmental ethic derived from many of the mythopoetic narratives of different cultures, while often making universal claims about the sacredness of nature as well as positing principles of moral reciprocity, have led to complex bodies of knowledge about local ecological systems—and how to sustain the needs of the community without degrading them. In effect, while the mythopoetic narratives, like other aspects of a culture's symbolic world, cannot be explained as being genetically hardwired, they can become extinct if they do not lead to understanding the characteristics of the bioregion as well as the difference between sustainable and unsustainable practices. A culture's environmental ethic, and its underlying mythopoetic narrative, are not unaffected by the Darwinian test of fitness that operates in the biological realm.

Since none of the three interpretations of evolution take seriously which aspects of culture can be scientifically explained, and what is beyond scientific verification, it is necessary to return to the original question: What is the environmental ethic that is consistent with the process of natural selection? Another question also needs to be asked, namely: Do the attempts to explain cultural developments in terms of the theory of evolution transform it into an ideology that undermines the diversity of the world's cultures and the environmental ethics they are based upon? When we recognize that all three interpretations are based on a number culturally specific assumptions that contradict the characteristics of natural selection the answer to the above questions becomes clear. It is the cultural assumptions taken-for-granted by the computer-futurist thinkers, Wilson, Swimme and Berry that turn their explanations of the evolution of cultural development into an ideology that justifies the current process of economic and technological globalization as being dictated by Nature. In effect, the environmental ethic implicit in their theories of evolution turns out to be the same set of moral norms used to give legitimacy to the earlier industrial phase of western colonization. The cultural assumptions include the following:

1. That Change is a Linear Form of Progress. The argument that evolution is replacing humans with computers that can process information at a higher rate is an example of the western way of equating change with linear progress, Wilson's claim that pre-scientific cultures were "trapped in a cognitive prison" and the scientists should now take responsibility for passing final judgment on what people should believe and value (1998a,p. 265) is also an example of thinking of change as a linear form of progress—where cultures evolve from primitive to a scientifically based civilization. Likewise, the universe story is an epic account of linear progress, including progress in the evolution of moral insight—a way of thinking that Leopold shares with Swimme and Berry. The major problem with interpreting evolution as consistent with the western assumption that equates change with linear progress is that the constant interplay between mutations and the selective work of the environment can more accurately be understood as leading to greater complexity and increasing diversity. Increased diversity, which should not be interpreted as an example of linear progress, is the hallmark of natural selection. One consequence of equating evolution with progress is that it gives the

appearance that various expressions of western colonization (technological, economic, and epistemological) are dictated by natural selection—and not by greed and a messianic form of ethnocentrism. In effect, the argument that natural selection determines which are the most progressive cultures and thus best adapted to the changing contingencies of the environment, is simply a restatement of the nineteenth century slogan of “survival of the fittest.” This way of thinking, in turn, supports the idea that the corporations that are able to out-compete their rivals in adapting to niche markets, and in driving their competitors completely from the field, are simply following Nature’s logic.

2. Evolution is Leading to a World Monculture. All three interpretations of evolution are based on the same western assumption that motivated Christian missionaries, industrialists, and the leaders of western universities to view their task as that of remaking all the world’s cultures in the image of the West. Indeed, the ideal of a world monculture is deeply entrenched in western consciousness. And the three interpretations of the evolution of cultures revitalize this vision by giving it the appearance of a scientific fact. To reiterate the basic arguments: the computer-futurists argue that the developments in computer-based technologies are leading, as Stock put it, to a “global superorganism”—which Dyson calls a “global intelligence.” The predictions of Moravec, Dyson, and Kurzweil ignore cultural differences entirely, and are based on the assumption that computers will displace all humans—regardless of culture. In Moravec’s latest predication, humans will not disappear entirely, but instead will be relegated to a life “not unlike today’s comfortable retirees or wealthy leisure classes” living in Sun City style environments (1999, p. 135).

Wilson’s interpretation of evolution, as Wendell Berry notes in Life is a Miracle: An Essay on a Modern Superstition (2000), is also imperialistic in that he only recognizes the legitimacy of scientific knowledge and the new technologies it spawns (p. 30). In effect, Wilson is repeating the late nineteenth century Social Darwinist argument that cultures are at different stages of evolutionary development, and the West, with its more evolved scientific way of knowing, has a mission to accelerate the evolution of other cultures in achieving the same advanced way of knowing. The Swimme/Berry interpretation acknowledges the importance of cultural diversity, but they undermine this

insight by claiming that there is only one story of creation—which is the scientifically based account of evolution. Their argument that humans stand at the threshold of a momentous decision of whether to turn toward an ecologically-centered form of culture ignores the many indigenous cultures had made that turn centuries ago. The Quechua, for example, have lived somewhere between eight and ten thousand years by a mythopoetic narrative that represents all forms of life in the Andes as mutually nurturing and interconnected—a fact that cannot be reconciled with the linear, teleological interpretation of Swimme and Berry. There are many other indigenous cultures that have similar histories of being ecologically centered.

The reductionist, monocultural way of thinking shared by the three interpretations of evolution has a number of implications for the survival of the diverse environmental ethics that have enabled many indigenous cultures to live within the limits and possibilities of their bioregions. The aggressive way in which western science is being promoted throughout the world as the only valid source of knowledge, as well as the equally aggressive promotion of computer mediated thought and communication, support the current globalization of an individually, consumer dependent lifestyle. And with the spread of market economies and the new scientifically derived technologies, the intergenerational knowledge that has served as the basis of relative cultural self-reliance is being further undermined. While many scientists are working to reverse the environmental degradation, the promoters of evolution as the one true explanatory model for understanding the development of cultures continue to give scientific legitimacy to the ideology that represents the West as the model for global development. This, in turn, contributes to undermining the indigenous knowledge systems about how to live less ecologically destructive lives.

The Environmental Ethic Implicit in Three Theories of Evolution

All three interpretations of evolution must also be understood as sanctioning a specific environmental ethic. The ethic has been the basis of the earlier phases of the Industrial Revolution, and continues to underlie the digital phase we are now entering. Wilson's genuine concern with reversing the rate at which species are disappearing, and the Swimme/Berry arguments for a change of consciousness that will lead to the Ecozoic

Era are laudable. Both expressions of environmental concern, however, are nullified by the key features of natural selection they accept as omnipresent in all aspects of life. As we have seen, Wilson summarizes Nature's design process, and thus Nature's environmental ethic, in such statements as "genes that confer higher survival and reproductive success...increase in the population....Those that do not, decrease" (1998a, p. 129). To recall another statement by Wilson that supports his view of an environmental ethic as the "survival of the fittest," "Brains that choose wisely possess Dawinian fitness, meaning statistically they survive longer and leave more offspring than brains that choose badly" (1998a, p. 165). Swimme and Berry also identified the survival and reproductive success of genes as the principal measure of success.

The implications of locating moral questions within an evolutionary framework that equates the right moral choice with what contributes to the survival and reproductive success of future generations are problematic for a number of reasons. On one level the ethic dictated by natural selection can be summed up in the late nineteenth century slogan "survival of the fittest." That is, the moral choices in the area of human relationships, and between humans and the environment, are those that promote reproductive success—which easily translates into amassing as much wealth as possible as it leads to better health, longer longevity, and the ability to ensure that the offspring have the same material advantages. For corporations it translates into making decisions that increase profits and adopting new technologies that surpass what is possessed by competitors. Strategies that ensure long-term survival also include increasing market share by undermining the traditions of intergenerational knowledge of cultures that have developed, over hundreds of years, lifestyles that have a smaller ecological footprint. A world monoculture, as envisioned by the computer-futurists and E. O. Wilson, is the ultimate goal of this strategy. Even the evolutionary thinkers who attempt to emphasize that cooperation is the best strategy for long-term survival cannot avoid the logic of natural selection where the better adapted approaches to cooperation survive over their competitors—which may be other forms of cooperation. Indeed, competition within the limit situations of local environments is as basic to the process of natural selection as oxygen is to sustaining human life, and both the American public and corporate sub-culture readily embrace it as their guiding environmental ethic.

There is another problem with the argument that Nature selects the better adapted organisms and cultural patterns (memes). While humans may decide that adopting a new technology or way of thinking may give them a competitive advantage, their judgments are made within a different time frame than the time frame within which evolution operates. The longer time frame of evolution means, in effect, that what individuals and corporations decide is the more progressive technology, idea, or public policy may not over, the longer term, be what survives the process of natural selection. An example of misreading what constitutes a more evolved form of culture is Wilson's argument that the scientifically based cultures of the West should displace indigenous cultures. That is, his reading of the Rosetta Stone of evolution leads him to claim that the scientific way of thinking is the most evolutionarily advanced—and to claim that the rest of the world should adopt it. Yet he is unable to guarantee that a world monoculture is better adapted for survival in an environment that is undergoing rapid changes in its life sustaining capacity. What Wilson is proposing, in effect, is an experiment with the symbolic foundations of the world's cultures that is on a colossal scale—one that does not replicate the way in which natural selection has been the basis of diversity.

Hubris and the old problem of ethnocentrism supercede caution in judging the form of culture that is the most evolved. Similarly, using evolution as the basis for a social and environmental ethic will also increase the chances of a collective disaster. At some point the billions of people who are not likely to accept the scientific explanation that the process of natural selection has dictated that their genes are fated for extinction are going to rebel. And if their rebellion does not take the form of revitalizing their traditions of self-reliance, as we are witnessing among many indigenous cultures today, it will take a more violent form. We in the West may then find that the scientific, competitive, and individualistic form of consciousness does not lead to the same level of personal sacrifice and commitment that is now being expressed in cultures based on more ancient mythopoetic narratives. The futuristic thinking of the computer optimists, the promoters of a secular scientific narrative that justifies colonizing the rest of the world with industrial approaches that range from the preparation of food to entertainment and health care, and the increasing use of military force to gain control over natural resources and to suppress alternative cultures, are increasingly being viewed as a threat to the

majority of the world's population. Unfortunately, the advocates of the evolutionary model of thinking about cultural development will be the least able to clarify the nature of the double bind whereby the model that predicts reproductive success actually prevents us from recognizing the alternatives to the ecologically and culturally destructive lifestyle that the West is attempting to impose on the rest of the world.

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