

A Coevolutionary Framework for Environmental Ethics

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A coevolutionary approach to environmental ethics recognizes the extent to which cultural practices and natural processes interact with and coadapt themselves to each other, but also acknowledges the extent to which each preserves a measure of autonomy from the other. The paper begins by outlining a coevolutionary theory that sees nature and culture in transactional rather than in dualistic terms and by presenting a coevolutionary view of cultural adaptation. The paper then considers how a coevolutionary framework for ethics can be developed that sees human well-being and the environment as interrelated rather than as separate areas of ethical concern.

I. Coevolution and Transactionalism

The main question that this paper investigates is the extent to which a dichotomized view of the relationship between nature and culture, perpetuated in ongoing debates over anthropocentric versus ecocentric approaches to environmental ethics, might be overcome through the adoption of a coevolutionary perspective, which offers a more dynamic and transactional understanding of how humans interact with their natural environments. Unlike anthropocentric approaches to environmental ethics, which often privilege human concerns over ecological preservation, and some ecocentric approaches, which place more emphasis on preserving natural environments than on meeting human needs, a coevolutionary approach attempts to create more symbiotic and less conflictual modes of interaction between human cultures and natural environments, which allow for the flourishing of both.

A coevolutionary perspective is consistent with the contention of both pragmatists and process philosophers that it is better to think of reality in terms of events than in terms of objects (see Birch and Cobb 1990; Dewey 1929; Whitehead 1925; 1929). Birch and Cobb write:

Instead of taking for granted that the world is composed of the substantial objects of sense experience or of the substances which underlie them, one may think instead of a world composed of events and the smaller events which in

turn constitute them. What is to be explained, then, is why things happen as they do. And the explanation will consist in analysis of the causal relations among events and of the component occurrences which make up the larger ones. (1990, 86)

Causation, in this view, is not a single procession from *A* to *B*, but rather a complex phenomenon that cannot be explained at a single level. Different explanations of the same event can be given at both proximate and ultimate levels of causation, for example. Birch and Cobb suggest that it is possible to “seek the explanation of behavior at one level in terms of behavior at other levels and to recognize that behavior at any level is to be accounted for in terms of complex interacting. This complex interacting is an event, not a substance” (1990, 86). In mechanistic thinking, which divides the world into discrete objects (or “substances” in traditional philosophy), the relations an object has with other objects are regarded as external and as not affecting the essential nature of the object itself. In Birch and Cobb’s ecological model, however, events instead are seen as being constituted by the relations they have with other events. These relations are internal in the sense that they are “constitutive of the character and even the existence of something” (1990, 88). Given that events are constituted in part by the relations they have with other events, they cannot be fully understood apart from the larger context in which these relations occur. Events can be analyzed not only reductively by subdividing them into smaller and more basic events but also contextually by looking at how they are interconnected with other events. Depending on the level of analysis, events can be construed in a variety of different ways, precisely because they are fluid and not clearly demarcated.

Naess as well argues against an atomistic conception of objects in favor of a “relational, total-field image” (Naess 1995b, 151). There are no “completely separable objects”; reality is rather categorized according to *gestalts*, with an attempt being made to see how things “hang together” (Naess 1989, 56–57; see also 1995a). Natural environments can be seen not only in terms of the individual organisms that inhabit them but also in terms of the relations these individuals have with each other in interacting networks — in Naess’s terms as “knots in the biospherical net or fields of intrinsic relations” (1995b, 151). A tree cannot be understood apart from, and is indeed constituted by, the relations it has with the air, water, and soil that sustain it. Human persons cannot be understood apart from, and are indeed constituted by, the relations they have with the social and natural environments they inhabit. Although Naess casts his views in the language of an object ontology, it can be argued that such relations are better understood from the perspective of process philosophy, which sees “objects” as being constantly reconstituted as a result of the changing relations they have with other “objects.” In other words, changes in the relations between “objects” and in the “objects” themselves can be viewed as events.

This view is essentially transactional in the sense that the larger whole can only be explained in terms of how individuals (both human and nonhu-

man) and environments (both natural and social) coadapt themselves to each other (Steiner 1993; Weichhart 1993). Although the terms “transaction” and “interaction” are often used interchangeably (and at times will be used interchangeably in this paper), a transactional perspective technically differs from an interactionist perspective in that the former refers to internal, constitutive relations among interdependent processes, while the latter refers to what are regarded as external, non-constitutive relations among independent “objects.”

While a coevolutionary perspective embraces realism in the ontological sense—what Searle (1995), refers to as “external realism,” i.e., the view that there is a real world “out there” that exists independently of human representations—it is nonetheless compatible with a constructivist approach to epistemology and ethics that recognizes that the world itself underdetermines how it is to be thought about and acted in. Processes can be conceptualized in various ways and at various levels depending upon the cognitive concerns of the person or persons doing the conceptualizing. Since the world does not naturally divide itself into discrete objects, any linguistic classification of phenomena is in a sense arbitrary, although our constructions will nonetheless be constrained by how things actually are in the world, a position Hayles (1991) refers to as “constrained constructivism.” It is also possible to evaluate epistemological and ethical constructions by the pragmatic criteria of how well they enable humans to relate to both their natural and social environments (for an overview of pragmatic approaches to environmental ethics see Light and Katz 1996).

At the biological level organisms can also be understood not as independent “entities” but rather as “events” that are constituted in part by the relations they have with other events. In the standard Darwinian view, species do not evolve through internal factors alone (e.g., mutations), but also in response to external conditions (e.g., how well mutations help organisms adapt themselves to their environments). Coevolution, broadly defined, supplements this view by reflexively examining how organisms and environments may *both* change as a result of the interactions they have with each other. Such a view is supported by, although not dependent on, the development of hierarchy theory in evolutionary biology, which sees natural selection as occurring not only at the level of the individual organism, but at multiple levels—from “genes, cells, organisms, demes, species, [to] clades” in Gould’s formulation (2002, 681)—and which reconceptualizes “trends and stabilities not as optimalities of selection upon organisms alone, but as outcomes of interaction among numerous levels of selection” (168). This more holistic perspective, which has also been influential in ecological science (for an overview, see Wu and Loucks 1995), sees biological systems as constituting a series of nested levels, which interact with each other and which can be accorded moral significance (Buege 1997). The implication of this view for human-nature interactions is that ethics must concern itself not simply with individual actions but rather with how these

actions affect the relations individuals have with the larger biological systems with which they coevolve.

The term *coevolution* was first coined by Ehrlich and Raven (1964; for a more recent treatment see Ehrlich 2000), and subsequently developed by Nitecki (1983) and Futuyma and Slatkin (1983). The basic idea can be found, however, in Darwin's concept of "co-adaptations" (1968 [1859], 114; see also the discussion in Norgaard 1994, 196–197), i.e., cases in which organisms adapt themselves in relation to other organisms, as with parasites and hosts. Coevolutionary theory contends that in some cases species evolve not in isolation from other species, but rather in conjunction with them. Plants, for example, may evolve the capacity to resist being eaten by certain species of insects, but these insects in turn can evolve the capacity to overcome the resistance that has evolved in the plant. Coevolution is not simply a matter of organisms adapting themselves to a "fixed" environment, but rather the process by which other species may also be changed as a result of the interactions they have with those organisms.

In the coevolutionary view organisms do not simply occupy environments but rather both constitute (by their very presence) and are constituted by (through the absorption of oxygen, water, food, and so forth) the environments of which they are a part. Because these relationships are constitutive, they are also transactional; organism and environment form a seamless duality, not a dualism. Rose, Kamin, and Lewontin describe the relationship as an "interpenetration of organism and environment" (1984, 272). An organism cannot be understood apart from its environment, and environments cannot be understood apart from the organisms which constitute them; the two co-create each other.

The transactions that occur between organisms and their environments are complex and reciprocal. Coevolutionary theory calls into question traditional notions of cause and effect, basing the relationship between organism and environment instead on cybernetic feedback models. While adaptation, as it is usually understood in evolutionary biology, refers exclusively to biological changes (both mutations and the normal mixing of genes in sexual reproduction) that enable some organisms of a given species to survive better in a given environment than others, a coevolutionary view sees adaptation as also occurring with respect to the various ways in which organisms may change their external environments to make them more habitable and thus insure their survival. The various houses animals (including humans) build for themselves are an example; without them the animals would be more vulnerable to the elements and predators (Turner 2000).

Consistent with Birch and Cobb's view discussed above, then, causation is never unidirectional but always multidirectional: organisms both modify and are modified by their environments. This view accords with the contention of dialectical biology (Levins and Lewontin 1985) that while environmental conditions may influence and limit the adaptation process, environmental condi-

tions can also, to an extent, be modified by organisms in ways that contribute to their survival. Organisms may not simply *find* preexisting niches within a fixed ecosystem but rather *create* those niches. In Lewontin's words, "an environment is nature organized by an organism" (1982, 160).

The same basic concept is elaborated in Lovelock's (1986; 1991; 1995) Gaia hypothesis, which describes the evolution of life in terms of organisms not simply adapting themselves to existing conditions but actually creating the conditions which make further life possible. Lovelock writes,

Adaptation is a dubious notion, for in the real world the environment to which the organisms are adapting is determined by their neighbors' activities, rather than by the blind forces of chemistry and physics alone. In such a world, changing the environment is part of the survival game, and it would be absurd to suppose that organisms would refrain from changing their material environment if by so doing they left more progeny. (1991, 32)

It is clear, of course, that organisms may also alter their environments in ways that diminish rather than enhance their prospects for survival. While some modifications may contribute to greater adaptability, others may have consequences that can impact back on the organism in negative ways and thus prove themselves over the long run to be maladaptive, a point that will be considered more fully in the sections that follow.

II. A Coevolutionary View of Cultural Adaptation

The coevolutionary perspective is holistic in the sense that it sees parts in the context of larger wholes, but also dynamic in that it sees the relations between various processes as being in a constant state of flux. Coevolutionary theory is consistent with the standard Darwinian view that evolution is an open-ended process that is not moving towards a predetermined final state or *telos*. In accordance with chaos and complexity theory, systems are seen as being self-organizing (Rescher 1998; on the relation between chaos theory and biological evolution see Kauffman 1991; Wesson 1991) or, in Norton's term, "autogenic" (1987, chap. 4). Since relations between organisms and environments change over time, ecosystems also change over time, through both natural and human-induced perturbations, which make it difficult to derive from nature itself normative concepts of what a natural system should be like at a given point in time.

While this view, which is sometimes referred to as the "new ecology" (see Botkin 1990; Pickett and White 1985; Worster 1990; 1995; Wu and Loucks 1995; Zimmerer 1994; 2000), poses serious challenges to the long-held notion that there is an "order" or "balance" in nature that defines the "normal" state of an ecosystem, it nonetheless suggests that there are limits to the range of perturbations natural systems can endure, beyond which it is impossible for the species which inhabit these systems to adapt (see especially Pickett and Ostfeld 1995). Discovering the parameters within which species can coadapt

themselves to their environments is consistent with a coevolutionary perspective that conceptualizes ecological changes in terms of transactional processes rather than in terms of how fixed entities interact externally with each other in relatively static systems. With respect to biodiversity, a coevolutionary perspective shifts attention away from evaluating which entities are of value in nature towards “evaluating processes and paths of change and the values experienced by people and cultures within these processes” (Norton 2000, 1038–1039).

This dynamic approach is more consistent with Darwinism and offers an alternative to the Aristotelian view of flourishing and integrity offered by writers such as O’Neill (1993) and Westra (1994; 1998; see also Pimentel, Westra, and Noss 2000). O’Neill, for example, sees flourishing in terms of an organism’s tendency to develop “characteristics which are *normal* to the species” (1993, 20, emphasis added). In the Darwinian view, however, “abnormal” conditions can, on occasion, confer greater adaptive advantage (i.e., some mutations in individual organisms and / or changes in environmental conditions may increase chances for reproduction), and this is precisely what makes evolution possible. In other words, what is “normal” cannot be taken as normative. While it may be true that most deviations from what is “normal” will decrease an organism’s adaptive advantage, some deviations may increase it. It is also the case that while not all increases in adaptive advantage necessarily lead to greater flourishing, in some cases they may. Hence, flourishing is not always dependent on the development of certain characteristics thought to be “normal” to the species. Nonetheless, biological evolution takes place within relatively narrow parameters, and, when either genetic or environmental factors deviate beyond these parameters, maladaptation occurs (i.e., some mutations in individual organisms and / or changes in environmental conditions may decrease chances for reproduction). The concepts of adaptation and maladaptation are both relational concepts, in that they refer not exclusively to the specific qualities of organisms or environments, but rather to the shifting relations between changing environmental conditions and the evolving characteristics of organisms.

Cultural adaptation can also be explained from a coevolutionary perspective. To the extent that humans are social beings, their needs and wants are supplied not through individual effort alone but also through the mediation of culture. From a coevolutionary perspective cultural adaptation can be seen not simply as a matter of cultures adapting themselves to existing environments but rather as a process of coadaptation in which specific environments make certain forms of culture possible while excluding others; conversely, the modification of natural environments by cultures also makes certain forms of culture possible while excluding others. In the coevolutionary perspective possibilities for life arise out of the interaction between both cultural and environmental factors.

Durham (1976; 1977; 1978; 1991), who was perhaps the first to explore the idea that the relationship between culture and nature could be explained in coevolutionary terms, described human behavior as the “product of the coevolution of human biology and culture” (1976, 89). Durham sees both biology and culture as having adaptive significance, although the selection processes differ: biological evolution is concerned with the selection of genetic traits at the individual level, while cultural evolution is concerned with the selection of behavioral traits at the intra- and inter-group levels. Both biological and cultural evolution can contribute to the overall fitness of the human organism, however. Durham writes:

[S]elective retention in biological and cultural evolution generally favors those attributes which increase, or at least do not decrease, the ability of individual human beings to survive and reproduce in their natural and social environments. This perspective has the advantage of explaining both how human biology and culture can often be adaptive in the same sense . . . and how they may interact in the evolution of human attributes. (1978, 441)

Cultural adaptation is based on the capacity of organisms to learn from their experiences and to transmit what they have learned from generation to generation. Unlike natural evolution, which proceeds in accordance with the Darwinian principle of natural selection, cultural evolution is essentially Lamarckian in that it depends on the transmission from generation to generation of “acquired characteristics” — ideas, values, technology, artefacts, etc. Culture can thus be defined as behavior that is *learned* as opposed to behavior that is innate (see Boyden 1992). Boyd and Richerson’s (1985) dual inheritance theory similarly sees biological and cultural evolution as being phenomenologically independent, while acknowledging the overall interdependence of biological and cultural processes (see also Richerson and Boyd 2005).

The coevolutionary model avoids two forms of reductionism: genetic determinism and functionalism. An example of genetic determinism can be found in Wilson’s (1975) initial formulation of sociobiology, which held that most behavioral and cultural traits can be explained in terms of natural selection; genes that influence certain types of behavior are naturally selected for because they contribute to survivability. This view was widely criticized not only by anthropologists, such as Sahlins (1976), who argued that it could not account for cultural diversity, but also by evolutionary biologists such as Gould (1978), who suggested that biology does not determine actual behavior but merely indicates the potential for certain types of behavior. Humans are limited to what they are biologically capable of doing, but within those parameters there are manifold possibilities for action.

Wilson subsequently revised his views and in a later work (Lumsden and Wilson 2005 [1981]) set forth an explicitly coevolutionary view of the relationship between biological and cultural development that avoids genetic determinism. From this revised perspective, “coevolution cannot be effectively grasped unless the entire circuit of causation is traced as a virtually complete

process, from the genome of individual organisms to the culture pattern of the society as a whole and back around again" (Lumsden and Wilson 2005 [1981], 264–265). Unlike Durham, who sees genes and culture as having an independent influence on human behavior, Lumsden and Wilson regard genes and culture as "mutually altering each other" (257). While genes can have an influence on culture and set certain parameters with regard to which cultural patterns will prove viable, there is also scope for human choice: "The activity of genes during human brain and mind development is more accurately understood as a process that empowers individual learning and action, that is, it enables a selective, self-organizing assessment and choice of individual behavior . . . toward self-selected ends" (xix).

The extent to which other sociobiologists actually subscribe to genetic determinism is also open to question. Despite his reputation as the originator of the "selfish gene" theory, Dawkins (1989a; 1989b) sees some forms of culture as "extended phenotypes," a term which refers to any modifications organisms make in their environments that alter their own living conditions and / or chances for survival. Dawkins labels the units of cultural transmission "memes," which include not only ideas but also such phenomena as clothing fashions and building techniques (see also Blackmore 1999; memes are roughly equivalent to Lumsden and Wilson's concept of "culturgens"; see 2005 [1981]). While memes have no genetic basis, they undergo cultural mutations and replicate themselves in an evolutionary fashion. Nonetheless, neither genes nor memes ultimately *determine* human behavior. Dawkins speaks in almost revolutionary tones of overcoming "the selfish memes of our indoctrination" and of

deliberately cultivating and nurturing pure, disinterested altruism—something that has no place in nature, something that has never existed before in the whole history of the world. We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators. We, alone, on earth, can rebel against the tyranny of the selfish replicators. (1989b, 201)

One could hardly ask for a clearer denial of both biological and cultural determinism.

The second form of reductionism avoided by the coevolutionary perspective is the tendency on the part of functionalists to see all forms of culture as explicable in terms of the contribution they make to adaptability. While some cultural practices may have adaptive significance, others do not (see Morphy 1993, 143). Examples of the former might include culturally transmitted rules regarding diet, hygiene, and safety, and the acquisition of the skills necessary to function successfully in a particular society. Failure to keep oneself healthy and free from mortal danger or to attain minimal degrees of social success may diminish, in a very literal Darwinian sense, one's prospects for reproduction. There is also, however, a range of cultural practices that are adaptively neutral. Cavalli-Sforza and Feldman (1981) use the term "cultural selection" to refer

to a non-Darwinian form of selection in which cultural traits are chosen not because they increase one's chances for survival but simply because they are valued. A person may choose to purchase an automobile, for example, either on the basis of adaptively significant qualities such as safety features or on the basis of adaptively neutral qualities such as styling.

Both biological and cultural determinism can be avoided by positing a more dialectical, coevolutionary approach that acknowledges the extent to which both environmental and cultural factors influence human behavior, while allowing scope for human agency. Morphy presents a thoroughly transactional perspective in his contention that "human action in the environment is the product of [both] genetic and cultural inheritance" (1993, 109). In other words, while behavior cannot be reductionistically explained in terms of either biological or cultural factors, it is equally the case that neither of these factors can be ignored. Behavior can be seen as arising out of the interplay between organisms as they are physiologically constituted, on the one hand, and the physical and social environments they inhabit, on the other (Eldredge and Grene 1992; Haila and Levins 1992; Maffi 2001; Plotkin 2002; Stinson et al. 2000).

Further elaborations of this idea can be found in Berry et al.'s (1992) "ecocultural model" and Steiner's (1993) "ecological triangle," both of which delineate three main forms of interaction: those between the individual and the ecological context (self and nature); those between the individual and the socio-political context (self and society); and those between the ecological context and the socio-political context (society and nature). In Steiner's model such relations are seen in explicitly transactional terms, a stance that allows him to avoid either a reified or essentialized view of self, society, or nature. Although human individuals and societies are constituted by, and cannot exist apart from, natural processes, the choices they make are not exclusively determined by those processes; within the parameters set by nature, various options are open for the development of human cultures. Conversely, while humans and their societies constitute part of the total environment, they do not constitute the whole of it, meaning that there is and can be space for other species and natural systems to interact with and evolve independently from human influences.

Transactionalism thus avoids both the dualist separation of the human and the natural, criticized by writers such as Plumwood (1993; 2002), and the tendency to collapse nature and society into a new monism, which either sees "nature" itself as a social construct or suggests that no conceptual distinctions can be made between human and natural processes (for overviews of recent literature on the "social construction of nature," see Bird 1987; Demeritt 2002; for an attempt to reconcile realism and constructivism in environmental ethics, see Evanoff 2005a). A transactional ontology is fully capable of recognizing the extent to which natural and human processes interpenetrate each other to form what Swyngedouw (1999) refers to as "socio-nature" (see also Latour's [1993]

concept of “hybridity” and Haraway’s [1991] “cyborg”), but nonetheless also recognizes the extent to which natural processes may develop independently from social processes. Humans do not, need not, and probably cannot control all natural processes, leaving room for an ontological concept of the “autonomy of nature” (see Heyd 2005). Environmental ethics must correspondingly concern itself with the problem of deciding how much of the natural world should be made available for human purposes and how much should be left to other species and processes, in addition to the problem of evaluating the quality of the specific interactions humans have with their natural environments.

III. Coevolution and Ethics

The view that human values and ethical norms can also be judged in part according to their adaptive significance can be traced back to Darwin’s (1871) contention that the evolution of both human culture and the “moral sentiments” confer adaptive advantage. This position should not be confused, however, with attempts on the part of Social Darwinists to ground ethics in biology. While it can be agreed that some ethical beliefs and some forms of culture have adaptive significance, the notion that ethics can be read directly out of nature or that human biology or environmental circumstances determine human behavior, either individually or culturally, can also be rejected. This, in fact, seems to be the dominant conclusion of contemporary writers on evolutionary ethics. Ruse, for example, dismisses the idea that morality is nothing more than a biological product. While he agrees that the adoption of moral behavior does in fact confer a selective advantage on individuals, he nonetheless writes, in a passage which sounds remarkably similar to the passage from Dawkins cited above, that

although human culture as it presently stands is both a product of evolution and, in some general sense, biologically adaptive, it gives us the power to transcend our biology in certain respects. This means that we are no longer helpless pawns of our biology, but can act morally even though our basic desires drive us in other ways. (1979, 209; see also 1986, 123–126; and 1995)

Precisely because human behavior is not exclusively governed by biological processes, there is room for choice, and some of these choices may have negative consequences both for oneself and for others. The ability to consider various options in any given situation undoubtedly confers adaptive advantage because it enables humans (and some other species to a more limited extent) to develop flexible responses to a variety of sometimes unpredictable situations. Organisms operating purely on the basis of instinct do not have this flexibility. The transmission of cultural knowledge confers further advantage because it means that individuals can learn from the experiences of others instead of having to approach situations that are new to themselves purely on the basis of trial and error. The ability to make choices and to reflect on how these choices affect others, however, is also what leads humans out of the Eden of instinct into the

briars of ethics, i.e., having to work out for ourselves, both as individuals and as societies, how we will live.

The formation of ethical norms to guide behavior in human societies is, therefore, primarily a cultural phenomenon, although one that is constrained by the need on the part of members of society to coordinate their activities with one another (social ethics) and to regulate their interactions with natural environments (environmental ethics). The notion that some forms of cultural behavior have adaptive significance implies that some forms of cultural behavior, as well as the values and norms which guide them, may also be maladaptive. While some cultural choices may enhance adaptability in the literal sense that they allow the members of a given culture to both survive and reproduce, other choices may be maladaptive in the literal sense that they decrease the chances for the members of that culture to survive and reproduce, e.g., choices that are unable to provide for the basic needs of a culture’s members or that destroy the environmental conditions that enable those needs to be met.

Ethics can legitimately question the validity of norms that guide action in maladaptive directions. Polluting the atmosphere, overfishing, depleting soil and water resources, and a host of other environmentally destructive behaviors can legitimately be regarded as maladaptive (see Barash 1979, 226–230, for further examples of maladaptive behavior). Maladaptive choices involve an incongruity between human beliefs about the world (constructed facts and values) and the way the world really is. Laszlo writes,

Perceptual cognition may have evolved in . . . a survival-need context but may, in time, be put to uses which have little immediate connection with biological survival. In fact, perceptual cognitions may even come to frustrate survival needs: explorations leading to clarification of some aspect of the perceptible environment may impair actual biological survival functions. Curiosity killed the cat. (1972, 185)

It is always possible, of course, that humans may—through ignorance, denial, self-deception, or a lack of moral will—make choices which are maladaptive. Ponting’s (1991; see also Diamond 2005) analysis of the extent to which maladaptive cultural choices have contributed to the collapse of both relatively self-sufficient cultures (such as Easter Island’s) and great civilizations (such as Rome’s) can be read as a cautionary tale of how cultures that attempt to live beyond their environmental means may prove to be unviable over the longer term. The extent to which modern consumer societies, with their overconsumption of resources and degradation of the environmental conditions that sustain life, are viable over the long term needs to be questioned. Conditions can be imagined in which maladaptive cultural choices lead not only to the collapse of industrial civilization (Meadows, Randers, and Meadows 2004), but ultimately to the extinction of *Homo Sapiens* as a species (Leslie 1996).

Ortner, whose “biocultural” approach to adaptation is similar in its essentials to the coevolutionary model, writes,

[S]pecialization and differentiation of culture have allowed [humankind] to create [its] own mini-environment, and thus permit [humans] to range over the entire surface of earth. [Humankind] has done this largely without specific changes in [their] genetic equipment. Such adaptability is entirely unprecedented in the biological history of life on earth. Thus, culture confers on [humankind] enormous flexibility to the point where this very success creates cultural potentials which threaten to destroy us or at least bring about profound changes in our way of life. (1983, 132–133)

Toulmin (1983) further suggests that although our ancestors modified their environments in significant ways, the scale tended to be local, and it was possible for them to achieve high degrees of mutual adaptiveness with their environments. In the current situation, however, the scale has been vastly increased and has now reached the point where the modifications we are engaging in may no longer be adaptive but rather the reverse.

From a coevolutionary perspective, adaptation can be understood either as the process of adapting ourselves to worsening conditions—to “starless skies, treeless avenues, shapeless buildings, tasteless bread, joyless celebrations, spiritless pleasures,” in the words of Dubos (1965, 279; see also 1983)—or as the process of adapting our practices to the goal of creating better conditions for ourselves as well as for the environments we inhabit. The term adaptation thus has a double meaning: on the one hand, it can mean modifying nature in ways that enable it to satisfy our wants; on the other, it can mean modifying our wants in ways that enable nature to satisfy them. The ideal may be neither one of humans simply adapting themselves to their natural environments, which implies giving up all cultural aspirations, nor one of humans simply adapting the environment to suit their cultural aspirations, which implies increased ecological devastation, but rather a coadaptation in which our cultural aspirations are brought into line with what our natural environments are actually able to provide.

The coevolutionary perspective thus reframes the question of adaptation and sees it not as a debate over whether humans should modify their natural environments or not (something they are fated by their very presence in the biosphere to do in any event), but rather as a debate over the scale and quality of human modifications of nature. Such questions are not amenable to simple bivalent, right / wrong prescriptions for human action, but rather require considered judgements to be made in specific situations, which should be as comprehensive as possible both in understanding and in moral concern (see Evanoff 2007b).

The ethical import of this analysis is that cultural practices that reduce human adaptability or that lead to maladaptation can be legitimately contested, not only because they diminish one’s own prospects for survival but also because they may diminish the prospects for the survival of other humans and nonhuman life-forms. Cultural choices that are adaptively neutral, however, have no adaptive significance by definition and therefore cannot be evaluated

in such terms. Ethical decisions must still be made with respect to which adaptively neutral practices will be adopted by any given culture, but such decisions must be argued for and defended on grounds other than their contribution to adaptability. Within the range of choices that are adaptively neutral, some may be rejected because they come into conflict with other ethical norms that humans deem important (e.g., norms related to social interactions). Other cultural practices, however, that are “good” in the minimal sense that they are not maladaptive and that do not come into conflict with other social norms, may be adopted simply because they are desired in their own right. Within this latter range of choices there can be a great deal of diversity with respect to the goods pursued by different individuals and cultures; there is no single set of goods that all individuals or cultures are morally obliged to pursue. Although there may be both natural and social limits on the range of ethically acceptable choices, there can nonetheless be a high degree of individual freedom and cultural diversity within those parameters.

IV. A Coevolutionary Approach to the Nature-Culture Relationship

Norgaard applies the coevolutionary idea to the nature-culture relationship as follows: “cultures affect which environmental features prove fit and . . . environments affect which cultural features prove fit” (1994, 81). Coevolution implies creating forms of culture that may modify environments to a reasonable degree but without diminishing the diversity of life, both human and nonhuman, or having an adverse effect on larger evolutionary processes. A coevolutionary perspective is capable of embracing both anthropocentric and ecocentric concerns. It recognizes that nature provides the resources necessary for human life and the flourishing of human culture, and therefore must be conserved and cared for (the conservationist or stewardship ethic). At the same time it does not seek the complete colonization and domestication of nature by human culture; rather it allows for the flourishing of nonhuman life and supports the continuous unfolding of natural diversity (the preservationist or ecocentric ethic).

It can be recognized that human choices may have a negative impact not only on humans themselves, but also on other species, leading to maladaptive conditions that make nonhuman flourishing difficult or even impossible (i.e., extinction). Humanly induced perturbations in the natural world can be evaluated not only in light of the consequences they have for humans but also in light of the consequences they have for other species. Some actions may enhance overall biodiversity and long-term evolutionary processes, while other actions may inhibit them. Bookchin writes,

If we assume that the thrust of natural evolution has been toward increasing complexity, that the colonization of the planet by life has been possible only as a result of biotic variety, a prudent rescaling of man’s hubris should call for caution in disturbing natural processes. . . . To assume that our knowledge of

this complex, richly textured, and perpetually changing natural kaleidoscope of lifeforms lends itself to a degree of "mastery" that allows us free rein in manipulating the biosphere is sheer foolishness. (1982, 24–25)

The argument here is not that evolution has a specific goal or *telos*, but rather that evolution is itself a process that humans have both a prudential and an ethical interest in protecting.

The coevolutionary approach to social and cultural development is based on the notion that cultures should seek to coadapt themselves with their environments. From this perspective attention can be shifted away from the problems of which concepts are "true," which values are "right," or which forms of social organization and technology are "best," towards the more pragmatic criteria of whether the particular forms of knowledge, values, social organization, and technology we develop better help human societies and natural environments to coadapt themselves to each other. A coevolutionary perspective is consistent with Riddell's definition of ecodevelopment: "[E]codevelopment indicates a 'best fit' attempt to optimise the balance between population numbers, locally available resources, and culturally desired lifestyles" (1981, 4). Sachs similarly defines ecodevelopment as

a style of development that, in each ecoregion, calls for specific solutions to the particular problems of the region in the light of cultural as well as ecological data and long-term as well as immediate needs. Accordingly, it operates with criteria of progress that are related to each particular case, and adaption to the environment plays an important role. (quoted in Burkey 1993, 32)

The notion that environmental conditions give rise to cultural modifications and that cultural modifications in turn give rise to new environmental conditions lies at the core of the coevolutionary perspective. Wise interactions between nature and culture can contribute to the coevolution of entirely new environmental and cultural conditions that provide for both human and nonhuman flourishing. Unwise interactions, to the contrary, can diminish the prospects for evolutionary processes to continue and lead to impoverished environmental and cultural conditions.

As has been seen, the coevolutionary model is holistic rather than atomistic, in the sense that it attempts to deal with complex phenomena not by breaking them down into smaller parts, but rather by seeing how things fit together relationally. It is also developmental in the sense that it sees knowledge, values, and other forms of cultural expression as becoming increasingly differentiated as well as more highly integrated over time. Progress, therefore, is neither unilinear nor "vertical," but multilinear and "horizontal." A multilinear view of cultural development (see Steward 1955), which is more authentically Darwinian in outlook than the "evolutionary" models of unilinear theorists (e.g., Parsons 1966), contends that cultural evolution, much like biological evolution, need not proceed along a single line of development but can rather proceed in a branching movement towards greater levels of differentiation and

integration (on evolutionary branching, see Darwin 1968 [1859], 159ff. and the discussion in Bowler 1989, 232–233; for a critique of unidirectional theories of evolution, see Mayr 1982).

A coevolutionary approach to biological and cultural diversity is thus both non-essentialist and dynamic. It does not see either nature or culture as moving in a single direction towards a predetermined *telos*, but rather as unfolding in a variety of ways in response to multifarious, interacting factors. In the same way that there is no ultimate goal or *telos* which all of nature is seen as moving towards in biological evolution, neither need there be any ultimate goal or *telos* that all cultures are seen as moving towards. Rather, each culture should be free to pursue its own trajectory of development, at least to the extent that it does not undermine the environmental conditions that make that culture possible or impede the ongoing evolutionary development of both other cultures and nonhuman lifeforms. Cultural evolution can thus be viewed as what Norgaard (1994, 90) refers to as a "patchwork quilt" of diverse cultures occupying diverse landscapes. Engel similarly writes that the earth should be seen as a "mosaic of coevolving, self-governing communities" (1990, 15). From this perspective, rather than see cultures as moving progressively towards a single conception of the good, it can be predicted that different cultures would also formulate different ethical norms to regulate their interactions with specific local environments, although this would not necessarily obviate the need for cross-cultural dialogue among them to resolve problems of mutual concern that transcend cultural boundaries (see Evanoff 2007a).

V. Conclusion

If, as suggested previously, cultures provide humans with a means for adapting themselves to particular environments, then cultures themselves can be evaluated as being either well- or ill-adapted to the environments they interact with. From an ethical perspective deviations from the ways in which cultures and natural environments have historically evolved may be acceptable to the extent that they do not produce maladaptive situations for either human or nonhuman lifeforms and unacceptable to the extent that they do. This principle does not exhaust the realm of the ethical, of course, since there are many other choices that must be made if we are to create a world in which both humans and nonhuman lifeforms are not only able to survive but also to flourish.

Although there are a variety of ways in which the world can be thought about and acted in, the fact that some of these ways of thinking and acting may be maladaptive only sets, as it were, the outer parameters within which all other decisions must be made. Within those parameters a variety of additional decisions must be made about how humans will interact both with each other and with specific local environments. Environmental ethics must ultimately concern itself not only with questions of adaptability, but also with the problems of how environmental issues are related to other areas of ethical concern. Thiele defines the task of a coevolutionary perspective as being to "create and

maintain the social, economic, and political conditions that will allow both humans and the greatest variety of other species to flourish and evolve" (1999, xii). In Thiele's view, coevolution acknowledges the interdependence we have "with (past and) future generations of human beings, with human neighbors, both local and global, and with other life forms" (1999, xxiii), and thereby extends ethical relations across time (intergenerational justice), space (social justice), and species (ecological justice).

How humans are to act in relation to each other and to their natural environments cannot be derived from coevolutionary theory alone, however. Specific ethical norms must still be developed and argued for to address specific areas of concern. Consideration must also be given to the problem of how dialogue on such issues is to be conducted and how conflicts among competing views may be resolved. What coevolutionary theory provides, however, is a framework in which questions related to interactions between human cultures and the environments they inhabit can be discussed. As such, a coevolutionary perspective attempts to reconcile both anthropocentric and ecocentric approaches to environmental ethics. Rather than see ecological preservation, social justice, and human well-being as isolated issues to be treated by separate inquiries, a coevolutionary perspective offers a more holistic framework in which the *relationships* between each of these concerns can also be explored (see Evanoff, 2005b). What forms of culture are best able to provide for human well-being in ways that are both socially just and ecologically sustainable? What forms of culture can be ruled against because they are detrimental to these goals? Questions such as these expand the focus of environment ethics beyond a mere concern for "preserving nature" towards a more comprehensive consideration of how human cultures and natural processes might coevolve in ways that permit the flourishing of both.¹

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Toward a Speculative Approach to Biological Evolution

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The Singularity of the Question of Biological Evolution

The word “evolution” has many significations, but the one that poses problems, the one that can create a space of tension between scientists and philosophers, is biological evolution.¹ It is in a way a sort of *common good*, and therefore a disputed good. Of course, scientists could reclaim the exclusive rights over it, but they would then have to manage by themselves the consequences of this pretension. For the question of biological evolution is not only a question of knowledge. In one way or another, in succession since Darwin, the question of what humans *are* has not ceased to be posed. After all, these are pronouncements about the place of humans on Earth with which the Darwinian thesis has clashed. Contrary to the physical and chemical sciences, which treat the behavior of beings that they define, Darwinian evolution treats becomings and places the human species under the sign of a becoming. According to the way in which this becoming is envisioned, more or less interesting or unacceptable consequences can be derived which concern “us” directly.

I will not return here to the dark past of “social Darwinism” or eugenics, nor to the different forms of Darwinian racism (whites being the most “evolved” species). I will not indulge in a defense of human societies and the social virtues of humans against the sociobiological hypothesis, nor will

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