

The land ethic

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The Darwinian roots of the land ethic

Of all the environmental ethics so far devised, the land ethic, first sketched by Aldo Leopold (1887–1948), is most popular among professional conservationists and least popular among professional philosophers. Conservationists are preoccupied with such things as the anthropogenic pollution of air and water by industrial and municipal wastes, the anthropogenic reduction in numbers of species populations, the outright anthropogenic extinction of species, and the invasive anthropogenic introduction of other species into places not their places of evolutionary origin (see *LAND AND WATER AND BIODIVERSITY*). Conservationists as such are not concerned about the injury, pain, or death of non-human specimens – that is, of individual animals and plants – except in those rare cases in which a species' populations are so reduced in number that the conservation of every specimen is vital to the conservation of the species. On the other hand, professional philosophers, most of them schooled in and intellectually committed to the modern classical theories of ethics, are ill-prepared to comprehend morally such "holistic" concerns. Professional philosophers are inclined to dismiss holistic concerns as non-moral or to reduce them to concerns about either human welfare or the welfare of non-human organisms severally (see *NORMATIVE ETHICS*). And they are mystified by the land ethic, unable to grasp its philosophical foundations and pedigree.

Without a grasp of its philosophical foundations and pedigree, however, it is difficult to know how the land ethic might be related to the more familiar moral concerns that loom large in the modern era (roughly the seventeenth through the twentieth centuries) – such as human happiness, human dignity, and human rights – and how it might be applied to and illuminate cases other than those Leopold himself considers in his brief sketch of it in *A Sand County Almanac* (1949). In this chapter, I outline the philosophical foundations and pedigree of the land ethic and indicate how it might be related to more familiar modern moral concerns and how it might be applied to a range of novel environmental concerns, some of which Leopold himself does not consider. In addition, I also address some of the theoretical and practical challenges to the land ethic raised by professional philosophers.

To discover its philosophical foundations and pedigree, we may begin by looking for clues in the text of Leopold's "The land ethic," the capstone essay of his *A Sand County Almanac*. Leopold provides the most important clue in the second section of the essay, entitled "The ethical sequence." Having observed that ethics have grown consider-

ably in scope and complexity during the 3,000 years of recorded history in western civilization. Leopold writes:

This extension of ethics, so far studied only by philosophers [and, Leopold's insinuation is clear, therefore not very revealingly studied] is actually a process in ecological evolution. An ethic, ecologically, is a limitation on freedom of action in the struggle for existence. An ethic, philosophically, is a differentiation of social from anti-social conduct. These are two definitions of one thing. The thing has its origin in the tendency of interdependent individuals or groups to evolve modes of cooperation. (1949, p. 202)

Leopold, I should hasten to point out, was no better a student of philosophy than most professional philosophers are of conservation and its concerns. Hence his characterization of an ethic, "philosophically," is, put most charitably, incomplete. In any case, what he hints at, rather insistently and unmistakably, is some sort of evolutionary interpretation of ethics. Leopold's use here of such words and phrases as "evolution," "struggle for existence," "origin," "evolve," "social and anti-social conduct" evokes not only a general evolutionary context in which to locate an understanding of ethics, it alludes, more particularly, to the classical evolutionary account of ethics in *The Descent of Man* (1871) by Charles Darwin (1809–82), the fourth chapter of which is devoted to "the moral sense." Doubtless, therefore, Darwin's account of "the thing"'s origin and development is what mainly informed Leopold's thinking about ethics.

The evolutionary origin of ethics

The existence of ethics presents a problem for Darwin's attempt to show how all things human can be understood as gradually evolved by natural (and sexual) selection, from traits possessed by closely related species, his project in *The Descent of Man*. Ethics demands that moral agents selflessly consider other interests in addition to their own. The theory of evolution would seem to predict, however, that the selfish would out-compete the selfless in the "struggle for existence," and thus survive and reproduce in greater numbers. Therefore greater and greater selfishness, not selflessness, would seem to be nature's choice in any population of organisms, including those ancestral to *Homo sapiens*. But history indicates the opposite: that our remote human ancestors were more callous, brutal, and ruthless than are we. At least so it seemed to a refined English gentleman who, while serving as naturalist on the round-the-world voyage of the HMS *Beagle*, had observed first hand what he and his contemporaries regarded as states of savagery and barbarism similar to those from which European and Asian civilizations were believed to have emerged.

In the absence of a convincing evolutionary explanation of its existence and progressive development, Darwin's pious opponents might point to ethics among human beings as a clear signature by the hand of Providence on the human soul.

To the conundrum presented him by the existence and putatively progressive development of ethics, Darwin's resolution is straightforward and elegant. For

many kinds of animals, and especially for *Homo sapiens*, life's struggle is more efficiently prosecuted collectively and cooperatively than singly and competitively. Poorly armed by nature, as solitaries hominids would fall easy prey to their natural enemies or starve for lack of the wherewithal to obtain food. Together our primate ancestors might stand some chance of fending off predators and attacking prey larger than themselves. Like many other similarly situated species, evolving human beings thus formed primitive societies; or, put more precisely, those hominids that formed primitive societies evolved. But without some rudimentary ethics, human societies cannot stay integrated. As Darwin puts it: "No tribe could hold together if murder, robbery, treachery, &c., were common; consequently such crimes within the limits of the same tribe 'are branded with everlasting infamy'; but excite no such sentiment beyond these limits" (1871, p. 93).

Darwin's speculative reconstruction of the evolutionary pathway to ethics begins with altruistic "parental and filial affections" which motivate parents (perhaps only the female parent in many species) to care for their offspring and their offspring to desire the company of their parents. Such affectionally bonded nuclear families are small and often ephemeral societies, lasting, as in the case of bears, only until the next reproductive cycle. But the survival advantage to the young of being reared in such social units is obvious. Should the parental and filial affections chance to spill beyond the parental-filial relationship to that between siblings, cousins, and other close kin, such plurally bonded animals might stick together in more stable and permanent groups and defend themselves and forage communally and cooperatively. In which case there might also accrue additional advantages to the members of such groups in the struggle for life. Thus do mammalian societies originate in Darwin's account.

By themselves, the social impulses and sentiments are not ethics. An ethic is a set of behavioral rules, or a set of principles or precepts for governing behavior. The moral sentiments are, rather, the foundations of ethics, as David Hume (1711–76) and Adam Smith (1723–90) argued, a century or so before Darwin considered the matter. In addition to the social sentiments and instincts, *Homo sapiens* evolved a high degree of intelligence and imagination and uniquely possesses a symbolic language. Hence we human beings are capable of generally representing those kinds of behavior which are destructive of society ("murder, robbery, treachery, &c.") and articulating prohibitions of them in emotionally colored formulae – commandments – which today we call moral rules (see META-ETHICS and EARLY MODERN PHILOSOPHY).

The development of ethics correlative to the development of society

So much then for the origin of ethics; Darwin goes on to account for the development of ethics. As human social groups competed with one another for resources, the larger and better organized out-competed the smaller and less well organized. Hence clans, firstly, merged into tribes; tribes, next, into nations; and nations, eventually, into republics. The emergence of each of these levels of social organization was attended by a corresponding extension of ethics. Darwin sums up this parallel growth of ethics and society as follows:

As man advances in civilisation, and small tribes are united into larger communities, the simplest reason would tell each individual that he ought to extend his social instincts and sympathies to all the members of the same nation, though personally unknown to him. This point being once reached there is only an artificial barrier to prevent his sympathies extending to the men of all nations and races. (1871, pp. 100–1)

Quite remarkably, the influence of Hume, who lived long before evolutionary thinking was habitual, can be found even in Darwin's speculations about the development of ethics correlative to that of society. Compare the passage quoted from Darwin in the previous paragraph with this one from Hume:

But suppose the conjunction of the sexes to be established in nature, a family immediately arises; and particular rules being found requisite for its subsistence, these are immediately embraced; though without comprehending the rest of mankind within their prescriptions. Suppose that several families unite together into one society, which is totally disjoined from all others, the rules which preserve peace and order, enlarge themselves to the utmost extent of that society. . . . But again suppose that several distinct societies maintain a kind of intercourse for mutual convenience and advantage, the boundaries of justice still grow larger in proportion to the largeness of men's views and the force of their mutual connexions. History, experience, reason sufficiently instruct us in this natural progress of human sentiments, and in the gradual enlargement of [them]. (1957 [1751], p. 23)

Further, with the emergence of each new level in the social hierarchy – the clan, the tribe, the nation, the republic, the global village – the content of the moral code changed or was supplemented to reflect and facilitate the novel structure of each newly emerged level. At the tribal level of society, “when the question is put . . . is it worse to kill a girl of a foreign tribe, or to marry a girl of one's own, an answer just opposite to ours would be given,” Darwin (1871, p. 91) observes. Since Darwin's day, matrimonial ethics have developed further still. In contemporary post-patriarchal society, we would still answer that it is certainly wrong to *kill* a girl of any ethnic group, but we would add that neither is it right to marry a *girl* of one's own ethnic group or, for that matter, any other. Among ourselves, mature men are allowed to marry only women some four to six years beyond menarche – otherwise they would be guilty of “statutory rape” – and it is, though lawful, “inappropriate” for men to marry or sexually consort with women much younger than themselves.

The land ethic as the next step in the Darwinian society-ethics pas de deux

During Darwin's lifetime, as during Hume's, a universal ethic of human rights was only dimly visible on the horizon. By the mid-twentieth century, when Leopold was gestating the land ethic, a universal human rights ethic may have seemed more nearly attainable. In any case, Leopold, often called a prophet, looked farther ahead than did Darwin himself, indeed farther ahead than Darwin could have looked in the absence of a well-developed ecological world-view. Leopold (1949, p. 203)

summarizes Darwin's natural history of ethics with characteristic compression: "All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts." Then he adds an ecological element, the community model of the biota espoused most notably by Charles Elton (1900–91): ecology "simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land" (*ibid.*, p. 204). When we all learn to "see land as a community to which we belong" not as "a commodity belonging to us" (*ibid.*, p. viii), that same "simplest reason," of which Darwin speaks, might kick in. And, when it does, what results will be a land ethic that "changes the role of *Homo sapiens* from conqueror of the land community to plain member and citizen of it" (*ibid.*, p. 204).

So, now the philosophical foundations and pedigree of the land ethic should be manifest. Basically, what Leopold did to cook up the land ethic was to take over Darwin's recipe for the origin and development of ethics, and add an ecological ingredient, the Eltonian "community concept." Darwin in turn had taken over a sentiment-based theory of ethics from Hume and Smith. Leopold may never have studied Hume's or Smith's moral philosophies; certainly he never cites them; indeed he may have known of Hume only as a historian and Smith only as an economist. But because he surely did read Darwin and allude in "The Land Ethic" to Darwin's account of the origin and development of ethics, the philosophical foundations and pedigree of his land ethic are traceable through Darwin to the sentiment-based ethical theories of Hume and Smith.

The holism of the land ethic and its antecedents

According to Leopold, "a land ethic implies respect for . . . fellow-members *and also for the community as such*" (1949, p. 204, emphasis added). The land ethic, in other words, has a holistic dimension to it that is completely foreign to the mainstream modern moral theories going back to Hobbes. The holistic dimension of the land ethic – respect for the community as such, in addition to respect for its members severally – is, however, not in the least foreign to the Darwinian and Humean theories of ethics upon which it is built. Darwin could hardly be more specific or emphatic on this point:

Actions are regarded by savages and were probably so regarded by primeval man, as good or bad, solely as they obviously affect the welfare of the tribe, – not that of the species, nor that of an individual member of the tribe. This conclusion agrees well with the belief that the so-called moral sense is aboriginally derived from the social instincts, for both relate at first exclusively to the community. (1871, p. 96–7)

Gary Varner states flatly that "concern for communities as such has no historical antecedent in David Hume" (1991, p. 179). But it does. Demonstrably. Hume insists, evidently against Hobbes and other social contract theorists, that "we must renounce the theory which accounts for every moral sentiment by the principle of self-love. We must adopt a more publick affection, and allow that the interests of society are not, even on their own account, entirely indifferent to us" (1957 [1751], p. 47). Nor is this an isolated remark. Over and over we read in Hume's ethical works such

statements as this: "It appears that a tendency to public good, and to the promoting of peace, harmony, and order in society, does always by affecting the benevolent principles of our frame engage us on the side of the social virtues" (ibid, p. 56). And this: "Everything that promotes the interests of society must communicate pleasure, and what is pernicious, give uneasiness" (ibid, p. 58).

That is not to say that in Hume, certainly, and even in Darwin there is no theoretical provision for a lively concern for the individual members of society, as well as for society per se. The sentiment of sympathy being so central to it, I should expressly acknowledge that in the moral philosophy of Adam Smith one finds little ethical holism. Sympathy means "with-feeling." And that "all important-important emotion of sympathy," as Darwin (1871, p. 81) styles it, can hardly extend to a transorganismic entity, such as society per se, which has no feelings per se. Hume and Darwin, however, recognized other moral sentiments than sympathy, some of which – patriotism, for example – relate as exclusively and specifically to society as sympathy does to sentient individuals. In Leopold's "The land ethic," in any event, the holistic aspect eventually eclipses the individualistic aspect. Toward the beginning of his essay, Leopold, as noted, declares that a land ethic "implies respect for fellow-members" of the biotic community, as well as "for the community as such." Toward the middle of the essay he speaks of a "biotic right" to "continue" but such a right accrues, as the context indicates, to species, not to specimens (1949, p. 210). Toward the end of the essay, Leopold writes a summary moral maxim, a golden rule, for the land ethic: "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" (ibid, pp. 224–5). In it, there is no reference at all to "fellow-members." They have gradually dropped out of account as "The Land Ethic" proceeds to its climax.

Why? One reason has already been noted. Conservationists, among whom Leopold counted himself, are professionally concerned about biological and ecological wholes – populations, species, communities, ecosystems – not their individual constituents. And the land ethic is tailored to suit conservation concerns, which are often confounded by concerns for individual specimens. For example, the conservation of endangered plant species is often most directly and efficiently effected by the deliberate eradication of the feral animals that threaten them. Preserving the integrity of a biotic community often requires reducing the populations of some component species, be they native or non-native, wild or feral. Another reason is that ECOLOGY is about metaorganismic entities – biotic communities and ecosystems – not individuals, and the land ethic is expressly informed by ecology and reflects an ecological world-view. Its holism is precisely what makes the land ethic the environmental ethic of choice among conservationists and ecologists. In short, its holism is the land ethic's principal asset.

Whether by the end of the essay he forgets it or not, Leopold does say in "The Land Ethic" that "fellow-members" of the "land community" deserve "respect." How can we pretend to respect them if, in the interest of the integrity, stability, and beauty of the biotic community, we chop some down, gun others down, set fire to still others, and so on. Such brutalities are often involved in what conservationists call "wildlife management." Here again, to resolve this conundrum, we may consult Darwin, who indicates that ethics originated among *Homo sapiens* in the first place to serve the

welfare of the community. Certainly, among the things that threaten to dissolve a human community are “murder, robbery, treachery, &c.” However, as ethics evolve correlatively to social evolution, not only do they widen their scope, they change in content, such that what is wrong correlative to one stage of social development, may not be wrong correlative to the next. In a tribal society, as Darwin observes, exogamy is a cardinal precept. It is not in a republic. Nevertheless, in all human communities – from the savage clan to the family of man – the “infamy” of murder, robbery, treachery, etc. remains “everlasting.” But the multispecies biotic community is so different from all our human communities that we cannot assume that what is wrong for one human being to do to another, even at every level of social organization, is wrong for one fellow-member of the biotic community to do to another.

The currency of the economy of nature, we must remember, is energy. And it passes from one member to another, not from hand to hand like money in the human economy, but from stomach to stomach. As Leopold observes of the biotic community, “The only truth is that its members must suck hard, live fast, and die often” (1949, p. 107). In the biotic community there are producers and consumers, predators and prey. One might say that the integrity and stability of the biotic community depends upon death as well as life; indeed, one might say further, that the life of one member is premised squarely on the death of another. So one could hardly argue that our killing of fellow-members of the biotic community is, *prima facie*, land-ethically wrong. It depends on who is killed, for what reasons, under what circumstances, and how. The filling in of these blanks would provide, in each case, an answer to the question about respect. Models of respectful, but often violent and lethal use of fellow-members of the biotic community are provided by traditional American Indian peoples (Callicott and Overholt 1993).

The holism of the land ethic and the problem of eco-fascism

Its holism is the land ethic’s principal strength, but also its principal liability. Remember that, according to Leopold, evolutionary and ecological biology reveal that “land [is] a community to which we belong” not “a commodity belonging to us” and that from the point of view of a land ethic, we are but “plain members and citizens of the biotic community.” Then it would seem that the summary moral maxim of the land ethic applies to *Homo sapiens* no less than to the other members and citizens of the biotic community, plain or otherwise. A human population of more than six billion individuals is a dire threat to the integrity, stability, and beauty of the biotic community. Thus the existence of such a large human population is land-ethically wrong. To right that wrong should we not do what we do when a population of white-tailed deer or some other species irrupts and threatens the integrity, stability, and beauty of the biotic community? We immediately and summarily reduce it, by whatever means necessary, usually by randomly and indiscriminately shooting the members of such a population to death – respectfully, of course – until its numbers are optimized. It did not take the land ethic’s critics long to draw out the vitiating – but, as I shall go on to argue directly, only apparent – implication of the land ethic. According to William Aiken, from the point of view of the land ethic, “massive

human diebacks would be good. It is our duty to cause them. It is our species' duty, relative to the whole, to eliminate 90 per cent of our numbers" (1984, p. 269). Its requirement that individual organisms, apparently also including individual human organisms, be sacrificed for the good of the whole, makes the land ethic, according to Tom Regan, a kind of "environmental fascism" (1983, p. 262). Frederick Ferré echoes and amplifies Aiken's and Regan's indictment of the land ethic:

Anything we could do to exterminate excess people . . . would be morally "right"! To refrain from such extermination would be "wrong"! . . . Taken as a guide for human culture, the land ethic – despite the best intentions of its supporters – would lead toward classical fascism, the submergence of the individual person in the glorification of the collectivity, race, tribe, or nation. (1996, p. 18)

Finally, Kristin Shrader-Frechette adds her voice to those expressing moral outrage at the land "ethic": "In subordinating the welfare of all creatures to the integrity, stability, and beauty, of the biotic community, then one subordinates individual human welfare, in all cases, to the welfare of the biotic community" (1996, p. 63).

If the land ethic implies what Aiken, Regan, Ferré, and Shrader-Frechette allege that it does, it must be rejected as monstrous. Happily, it does not. To think that it does, one must assume that Leopold proffered the land ethic as a substitute for, not an addition to, our venerable and familiar human ethics. But he did not. Leopold refers to the various stages of ethical development – from tribal mores to universal human rights and, finally, to the land ethic – as "accretions." "Accretion" means an "increase by external addition or accumulation." The land ethic is an accretion – that is, an addition – to our several accumulated social ethics, not something that is supposed to replace them. If, as I here explain, Leopold is building the land ethic on theoretical foundations that he finds in Darwin, then it is obvious that with the advent of each new stage in the accreting development of ethics, the old stages are not erased or replaced, but added to. I, for example, am a citizen of a republic, but I also remain a member of an extended family, and a resident of a municipality. And it is quite evident to us all, from our own moral experience, that the duties attendant on citizenship in a republic (to pay taxes, to serve in the armed forces or in the Peace Corps, for example) do not cancel or replace the duties attendant on membership in a family (to honor parents, to love and educate children, for example) or residence in a municipality (to support public schools, to attend town meetings). Similarly, it is equally evident – at least to Leopold and his exponents, if not to his critics – that the duties attendant upon citizenship in the biotic community (to preserve its integrity, stability, and beauty) do not cancel or replace the duties attendant on membership in the human global village (to respect human rights).

Prioritizing the duties generated by membership in multiple communities

The land ethic involves a limited pluralism (multiple moral maxims, multiple sets of duties, or multiple principles and precepts) not a thoroughgoing pluralism of moral philosophies *sensu* Stone (1987) – Aristotelian ethics for this quandary, Kantian

ethics for that, utilitarianism here, social-contract theory there. Thus, as Shrader-Frechette points out, the land ethic must provide “second-order ethical principles and a priority ranking system that specifies the respective conditions under which [first-order] holistic and individualistic ethical principles ought to be recognized” (1996, p. 63). Leopold provides no such second-order principles for prioritizing among first-order principles, but they can be easily derived from the communitarian foundations of the land ethic. By combining two second-order principles we can achieve a priority ranking among first-order principles, when, in a given quandary, they conflict. The first second-order principle (SOP-1) is that obligations generated by membership in more venerable and intimate communities take precedence over those generated in more recently emerged and impersonal communities. I think that most of us, for example, feel that our family duties (to care for aged parents, say, to educate minor children) take precedence over our civic duties (to contribute to United Way charities, say, to vote for higher municipal taxes to better support more indigent persons on the dole), when, because of limited means, we are unable to perform both family and civic duties. The second second-order principle (SOP-2) is that stronger interests (for lack of a better word) generate duties that take precedence over duties generated by weaker interests. For example, while duties to one’s own children, all things being equal, properly take precedence over duties toward unrelated children in one’s municipality, one would be remiss to shower one’s own children with luxuries while unrelated children in one’s municipality lacked the bare necessities (food, shelter, clothing, education) for a decent life. Having the bare necessities for a decent life is a stronger interest than is the enjoyment of luxuries, and our duties to help supply proximate unrelated children with the former take precedence over our duties to supply our own children with the latter.

These second-order principles apply as well in quandaries in which duties to individuals conflict with duties to communities per se. In a case made famous by Jean-Paul Sartre (1905–80) in *L’Existentialisme est un Humanisme* (1960), a young man is caught in the dilemma of leaving his mother and going off to join the French Free Forces in England, during the Nazi occupation of France in World War II. Sartre, of course, is interested in the existential choice that this forces on the young man and in pursuing the thesis that his decision in some way makes a moral principle, not that it should be algorithmically determined by the application of various moral principles. But the second-order principles here set out apply to the young man’s dilemma quite directly and, one might argue, decisively – existential freedom notwithstanding. SOP-1 requires the young man to give priority to the first-order principle, “Honor Thy Father and Thy Mother”, over the other first-order principle at play, “Serve Thy Country.” But SOP-2 reverses the priority dictated by SOP-1. The very existence of France as a transorganismic entity is threatened. The young man’s mother has a weaker interest at stake, for, as Sartre reports, his going off – and maybe getting killed – would plunge her into “despair.” His mother being plunged into despair would be terrible, but not nearly as terrible as the destruction of France would be if not enough young men fought on her behalf. So the resolution of this young man’s dilemma is clear; he should give priority to the first-order principle, “Serve Thy Country.” Had the young man been an American and had the time been the early 1970s and had the dilemma been stay home with his mother or join the Peace Corps and go to Africa,

then he should give priority to the first-order principle “Honor Thy Father and Thy Mother” and stay home. Had the young man been the same person as Sartre constructs, but had his mother been a Jew whom the Nazis would have sent to a horrible death in a concentration camp if her son does not stay home and help her hide, then again, he should give priority to the first-order principle, “Honor Thy Father and Thy Mother” and stay home.

The priority (second-order) principles applied to the old-growth forest quandary

Let me consider now those kinds of quandaries in which our duties to human beings conflict with our duties to *biotic* communities as such. Varner supplies a case in point:

Suppose that an environmentalist enamored with the Leopold land ethic is considering how to vote on a national referendum to preserve the spotted owl by restricting logging in Northwest forests. . . . He or she would be required to vote, not according to the land ethic, but according to whatever ethic governs closer ties to a human family and/or larger human community. Therefore, if a relative is one of 10,000 loggers who will lose jobs if the referendum passes, the environmentalist is obligated to vote against it. Even if none of the loggers is a family member, the voter is still obligated to vote against the referendum. (1991, p. 176)

The flaw in Varner’s reasoning is that he applies only SOP-1 – that obligations generated by membership in more venerable and intimate communities take precedence over those generated in more recently emerged and impersonal communities. If that were the only second-order communitarian principle then he would be right. But SOP-2 – that stronger interests generate duties that take precedence over duties generated by weaker interests – reverses the priority determined by applying SOP-1, in this case. The spotted owl is threatened with preventable anthropogenic extinction – threatened with biocide, in a word – and the old growth forest biotic communities of the Pacific Northwest are threatened with destruction. These threats are the environmental-ethical equivalent of genocide and holocaust. The loggers, on the other hand, are threatened with economic losses, for which they can be compensated dollar for dollar. More important to the loggers, I am told, their lifestyle is threatened. But livelihood and lifestyle, for both of which adequate substitutes can be found, is a lesser interest than life itself. If we faced the choice of cutting down millions of 400-year-old trees or cutting down thousands of 40-year-old loggers, our duties to the loggers would take precedence by SOP-1, nor would SOP-1 be countermanded by SOP-2. But that is not the choice we face. The choice is between cutting down 400-year-old trees, rendering the spotted owl extinct, and destroying the old growth forest biotic community, on the one hand, and displacing forest workers in an economy which is already displacing them through automation and raw-log exports to Japan and other foreign markets. And the old growth logging lifestyle is doomed, in any case, to self-destruct, for it will come to an end with the “final solution” to the old growth forest question, if the jack-booted timber barons (who disingenuously blame the spotted owl for the economic insecurity of loggers and other workers in the timber industry)

continue to have their way. With SOP-2 supplementing SOP-1, the indication of the land ethic is crystal clear in the exemplary quandary posed by Varner, and it is opposite to the one Varner, applying only SOP-1, claims it indicates.

The land ethic in the time of a shifting science of ecology

Leopold penned the land ethic at mid-century. ECOLOGY then represented nature as tending toward a static equilibrium, and portrayed disturbance and perturbation, especially those caused by *Homo sapiens*, to be abnormal and destructive. In view of the shift in contemporary ecology to a more dynamic paradigm (Botkin 1990), and in recognition of the incorporation of natural disturbance to patch- and landscape-scale ecological dynamics (Pickett and Ostfeld, 1995), we might wonder whether the land ethic has become obsolete. Has the paradigm shift from “the balance of nature” to the “flux of nature” in ecology invalidated the land ethic? I think not, but recent developments in ecology may require revising the land ethic.

Leopold was aware of and sensitive to natural change. He knew that conservation must aim at a moving target. How can we conserve a biota that is dynamic, ever changing, when the very words “conserve” and “preserve” – especially when linked to “integrity” and “stability” – connote arresting change? The key to solving that conundrum is the concept of scale. Scale is a general ecological concept that includes rate as well as scope; that is, the concept of scale is both temporal and spatial. And a review of Leopold’s “The Land Ethic” reveals that he had the key, though he may not have been aware of just how multiscale change in nature actually is.

Leopold writes: “Evolutionary changes . . . are usually slow and local. Man’s invention of tools has enabled him to make changes of unprecedented violence, rapidity, and scope” (1949, p. 217). As noted, Leopold was keenly aware that nature is dynamic, but, under the sway of mid-century equilibrium ecology, he conceived of natural change primarily in evolutionary, not in ecological terms. Nevertheless, scale is equally normative when ecological change is added to evolutionary change, that is, when normal climatic oscillations and patch dynamics are added to normal rates of extinction, hybridization, and speciation.

Homo sapiens is, in Leopold’s opinion, a part of nature, “a plain member and citizen” of the “land-community.” Hence, anthropogenic changes imposed on nature are no less natural than any other. Nevertheless, because *Homo sapiens* is a moral species, capable of ethical deliberation and conscientious choice, and evolutionary kinship and biotic community membership add a land ethic to our familiar social ethics, anthropogenic changes may be land-ethically evaluated. But by what norm? The norm of appropriate scale.

Let me first, as a model, recount Leopold’s use of the temporal scale of evolutionary change as a norm for evaluating anthropogenic change. Consider the current episode of abrupt, anthropogenic, mass species extinction, which many people, I included, intuitively regard as the most morally reprehensible environmental thing going on today. Episodes of mass extinction have occurred in the past, though none of those has been attributed to a biological agent. Such events are, however, abnormal. Normally, speciation out-paces extinction – which is the reason why biological

diversity has increased over time. So, what is land-ethically wrong with current anthropogenic species extinction? Species extinction is not unnatural. On the contrary, species extinction – anthropogenic or otherwise – is perfectly natural. But the current *rate* of extinction is wildly abnormal. Does being the first biological agent of a geologically significant mass extinction event in the 3.5-billion-year tenure of life on planet earth morally become us *Homo sapiens*? Doesn't that make a mockery of the self-congratulatory species epithet: the sapient, the wise species of the genus *Homo*?

Now let us apply this model to a quandary that Leopold himself never considered. Earth's CLIMATE has warmed up and cooled off in the past. So, what's land-ethically wrong with the present episode of anthropogenic global warming? We are a part of nature, so our recent habit of recycling sequestered carbon may be biologically unique, but it is not unnatural. A land-ethical evaluation of the current episode of anthropogenic climate change can, however, be made on the basis of temporal scale and magnitude. We may be causing a big increase of temperature at an unprecedented rate. That's what's land-ethically wrong with anthropogenic global warming.

Temporal and spatial scale in combination are key to the evaluation of direct human ecological impact. Long before *Homo sapiens* evolved, violent disturbances regularly occurred in nature. And they still occur, quite independently of human agency. Volcanoes bury the biota of whole mountains with lava and ash. Tornadoes rip through forests, leveling trees. Hurricanes erode beaches. Lightning-set fires sweep through forests and savannas. Rivers drown flood plains. Droughts dry up lakes and streams. Why, therefore, are analogous anthropogenic disturbances – clear cuts, beach developments, hydroelectric impoundments, and the like – environmentally unethical? As such, they are not. Once again, it's a question of scale. In general, frequent, intense disturbances, such as tornadoes, occur at small, widely distributed spatial scales, while spatially more extensive disturbances, such as droughts, occur less frequently. And most disturbances at whatever level of intensity and scale are stochastic (random) and chaotic (unpredictable). The problem with anthropogenic disturbances – such as industrial forestry and agriculture, exurban development, drift net fishing – is that they are far more frequent, widespread, and regularly occurring than are non-anthropogenic disturbances; they are well out of the spatial and temporal range of disturbances experienced by ecosystems over evolutionary time.

Proponents of the new “flux of nature” paradigm in ecology agree that appropriate scale is the operative norm for ethically appraising anthropogenic ecological perturbations. For example, Pickett and Ostfeld note that

the flux of nature is a dangerous metaphor. The metaphor and the underlying ecological paradigm may suggest to the thoughtless and greedy that since flux is a fundamental part of the natural world, any human-caused flux is justifiable. Such an inference is wrong because the flux in the natural world has severe limits. . . . Two characteristics of human-induced flux would suggest that it would be excessive: fast rate and large spatial extent. (1995, p. 273)

Among the abnormally frequent and widespread anthropogenic perturbations that Leopold himself censures in “The Land Ethic” are the continent-wide elimination of large predators from biotic communities in North America; the ubiquitous

substitution of domestic species for wild ones; the ecological homogenization of the planet resulting from the anthropogenic “world-wide pooling of faunas and floras”; the ubiquitous “polluting of waters or obstructing them with dams” (1949, p. 217).

The summary moral maxim of the land ethic, however, must be dynamized in light of developments in ecology over the past quarter-century. Leopold acknowledges the existence and land-ethical significance of natural environmental change, but seems to have thought of it primarily on a very slow evolutionary temporal scale. Even so, he thereby incorporates the concept of inherent environmental change and the crucial norm of scale into the land ethic. In light of more recent developments in ecology, we can add norms of scale to the land ethic for both climatic and ecological dynamics in land-ethically evaluating anthropogenic changes in nature. One hesitates to edit Leopold’s elegant prose, but as a stab at formulating a dynamized summary moral maxim for the land ethic, I will hazard the following: A thing is right when it tends to disturb the biotic community only at normal spatial and temporal scales. It is wrong when it tends otherwise.

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Further reading

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