Living with the Land Ethic

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The legacy of Aldo Leopold includes the concept of ethical responsibilities toward the land, and the establishment of ecological restoration both for environmental learning and for land management. For more than a half-century, the land ethic has been a major paradigm for ethical and environmental thinking.

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In 1988, Alvin W. Trivelpiece, then executive director of the American Association for the Advancement of Science, mailed a questionnaire to professional scientists asking them to look back at their training in science and identify the most important omissions in their own education. Their responses identified the highest priority as a need for a better background in ethical principles (Trivelpiece 1988). This is in line with the perception by Derek Bok (1988) that universities had exhibited a decline in ethical teaching since the 1800s. Bok sensed a growing need to provide students with training in ethical thinking about complex issues, especially in the face of increasing reductionism in the sciences.

Although there may have been a drift away from education about ethical principles, a substantial interest in ethics persists. Yet the focus on ethical issues among academic faculties seems to be hugely dominated by anthropocentric concerns—ethical relations among people, and particularly between professionals and their clients or colleagues (including medical ethics, business ethics, and honesty ethics). This anthropocentric focus is evident in the Encyclopedia of Applied Ethics (Chadwick et al. 1998), a four-volume set of definitions of ethics relating to interactions among people, which contains only one entry about ethical relationships between people and the environment.

Estrangement from nature

Given the evidence that professional training in the sciences has been short on education about ethical issues, and especially about ethical relations to the environment, we might ask how our society has become estranged from these ethical concerns. Why has there been so little concern for ethics relating to the biological system that sustains us (Orr 1992)?

Surely our sense of identity with nature has changed as our culture has changed. For example, people living in low-technology settings, such as the Inuits in the Arctic and hunter-gatherers in Africa and Australia, must maintain a high level of sensitivity to their environmental resources. Their survival depends upon it. Indeed, not only are people in those societies directly dependent on the natural world, but in many cases they maintain a sense of affection for its living components (Lopez 1986)—a sort of environmental aesthetic.

In an agrarian society such as the one that brought farming and ranching to the settlement of North America, people must have retained some sensitivity to environmental issues as they derived their livelihood directly from the land. But with the advance to an urban or metropolitan society, there has been a major disconnect between humans and nature. Our urban society is provided with mowed parks, paved playgrounds, plush automobiles to move us around on asphalt roads, housing with automatically regulated heat and cooling, and supermarkets with wheely baskets in which we can gather our food supplies from orderly shelves. This human-built environment (the techno-ecosystem of Navéh 1982) serves to buffer urban society from the untamed biological world. The buffering is evident in homes, in play, in recreation, in travel, and in the act of acquiring food and supplies. It is

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easy to see how families can become alienated from the system of nature that sustains us. And the contemporary expansion of affluence and consumer lifestyles can further promote alienation from nature.

The 2003 AIBS symposium on bioethics (Dybas 2003) was intended to increase awareness of our dependence on the natural world and to promote awareness of the extent to which we are insulated from it. Ethical teaching should be promoted in science programs, including an emphasis on ways to encourage an ethical relationship with the land and on the mutual enhancement between ethics and aesthetics (Orr 1992). Might we do that through our own lifestyles as well as through our educational system? Teaching the concept of ethical responsibility for maintaining (and restoring) quality environments may promote a gentler lifestyle and a greater realization of the aesthetic qualities of the world around us. This may be the paramount heritage from Aldo Leopold’s land ethic (Leopold 1949).

Reentry into the natural world
Awareness of the natural world and its resources, and subsequent concern for their preservation, can be generated by nurturing a knowledge of and affection for the land. I would like to describe the development of my own awareness of an ethical–aesthetic relationship to the land and how it was nurtured by my father, Aldo Leopold, beginning with our happy family immersion into ecological restoration. At the same time, I may give you a glimpse into Aldo Leopold’s most important professional experiment, his effort to use ecological restoration as a viable part of environmental learning.

In 1934, a group of professors at the University of Wisconsin persuaded the administration to allow them to revamp the university arboretum, restoring the various types of native vegetation that were typical of the region. Besides Aldo Leopold, this group included Professors John Curtis, Norman Fassett, and Bill Longenecker. In a speech celebrating the start of the arboretum remodeling, Leopold stated, “The function of the Arboretum is to serve as a...starting point in the long and laborious job of building a permanent and mutually beneficial relationship between civilized men and a civilized landscape” (cited in Meine 1988). I infer that in mentioning a mutually beneficial relationship, Leopold was thinking of the beneficial effects on the landscape through the efforts of people doing the restoration and, conversely, the beneficial effects on the people involved through their better understanding of the landscape.

As the effort at restoration of native landscapes began in Madison, Leopold became so intrigued with the concept of restoration that he wanted to try the idea for himself. The next year he purchased 80 acres along the Wisconsin River for his “shack”—a place where he could attempt restoration for himself and, at the same time, walk his entire family through the venture.

When my father announced at the dinner table that he had purchased a piece of property along the Wisconsin River, I entertained illusions of a place of beauty and comfort, perhaps a vine-covered cottage from which we would gaze down at the flowing river. It was a considerable surprise to me, then, when the newly acquired place turned out to be a devastated landscape. It was a marginal property in a floodplain that had been farmed until the sandy soil was exhausted and the wind blew it away. After the farmer gave up and left, the farmhouse was used by a bootlegger who stayed until his mash caught fire and the house burned down. The property was abandoned, after which the bank sold the place to Aldo Leopold for taxes at $8 per acre.

On the abandoned farm, there remained one crumbling shed. The family’s first project was to clear the manure from the shed and rebuild it into a place where we could stay on weekends and vacations. Once the shack had been rebuilt (figure 1a), my father began the work of ecological restoration. With the help of his family, relatives, and friends, he started planting (figure 1b). There were thousands of pine seedlings to be planted; bushels of acorns and nuts to be heeled in; carloads of aspens, shrubs, and wildflowers to be hauled in and transplanted; heavy mats of prairie grasses to be laid; and seeds of prairie flowers to be sown.

The shack now stands in a mixed pattern of restored forest, prairie, and wetlands (sites after restoration are shown in figure 1, photographs c, d, and e). For my father, the property became a sanctuary of ecological beauty and inspiration. For 14 years, he lived to enjoy the product of his personal restoration program. It fueled his love affair with writing, especially about his observations and the joys that he found there. His essays in A Sand County Almanac (1949) illustrate the delights that the restoration work evoked in him. In fact, on the day of his death (while fighting a neighbor’s grass fire), he was out on the farm planting pine trees.

For his children, the family efforts at ecosystem restoration resulted in a deep enthusiasm for environmental issues. Each of my four siblings and I became a professional in some aspect of environmentalism. Each of us has published treatises on some aspect of restoration ecology, and each has been given an honorary doctorate for our work. My sister Nina became an expert on the restoration of prairies in Wisconsin, and I have been working over the past 10 years on an effort to restore tropical rain forest in Costa Rica (Leopold et al. 2001). My siblings and I have combined our resources to form the Aldo Leopold Foundation, an organization centered on the property around the shack, where restoration work continues. The foundation is dedicated to the promotion of ecological literacy and the land ethic.

The story of the shack is not just a tale of a happy family project. It is the story of the origin of two new concepts in environmentalism: ecological restoration and ethical responsibility toward nature. Each of these concepts has become a major component of contemporary environmentalism. The story is a metaphor of the contagious value of restoration in bringing people back to the natural world in a mutually beneficial relationship. At the same time, it forifies a personal sense of ethical responsibility to the natural world.
Figure 1. Samples from Aldo Leopold's restoration on his shack property in Wisconsin. (a) The shack in 1935, before land restoration had begun. (b) Aldo and his wife, Estella, at an early stage in the restoration planting. The next three photographs show the site 65 years later: (c) the restored shack environs, (d) restored prairie, and (e) Leopold's restored forest. Color photographs: Courtesy of Michael Sewell/Visual Pursuit.
Conservation has traditionally focused primarily on the preservation of ecological capital (Daily et al. 1997)—on reducing consumption and acting to preserve ecological remnants. Aldo Leopold's example added a distinctive new component to conservation: positive actions to restore ecological communities. Again we see the mutually beneficial relationship that can come from restoration, which not only serves to increase the ecological quality of a site but also generates environmental thinking on the part of the participants. Ecological restoration may be a prime way to educate people in developing an ethical attitude toward the land.

Of course, the concept of ethics and aesthetics playing important roles in conservation was leavening in Leopold's mind for much of his life. Ethical concepts began to appear in his writings as early as 1933, in his book *Game Management* (Leopold 1933a) and then in his article “The Conservation Ethic” (1933b). After three years of his own restoration work at the shack, he began to focus on conservation aesthetics (Leopold 1938), writing a series of essays that celebrate the role of beauty and inspiration in conservation. Ultimately, Leopold's major statement combining the ethic with the aesthetic was assembled in his collected essays *A Sand County Almanac* (1949).

There is more to say about the aesthetic issue. It is rare indeed for a scientist to write professionally about love and affection. But Aldo Leopold repeatedly called on these aesthetic values; for example, he stated that "we can be ethical only in relation to something we can see, feel, understand, love, or otherwise have faith in" (Leopold 1949). Leopold's emphasis on aesthetic values along with ethics has been paraphrased nicely by Schmidt and Willott (2002), who write, "Environmental ethics teaches us how to enjoy the world, not just how to fix it."

**Ontogeny of bioethical concepts**

Writers of natural history who preceded Leopold, such as Henry Thoreau, George Marsh, and John Muir, perceived nature as beautiful in its complexity and suffering damage from human exploitation. But it remained for Aldo Leopold to develop the concept of people having an ethical responsibility toward nature. He was the first to write about a "conservation ethic" and, later, a "land ethic." There has been a subsequent array of variations on the theme of environmental ethics (some examples are outlined in figure 2). Albert Schweitzer (1959) included the idea of "an ethical world" in his discussion of "reverence for life." He stated that human beings are ethical when they obey the compulsion to help all life. Rachel Carson (1962) may be included in this ethical sequence; she argued that it is insufficient to concern ourselves with the relation of humans to one another. Instead, she stressed the relation of humans to all life. Later, in the 1970s, a drift began toward bioethical concepts in which mankind is not taken to be the central orientation of nature but instead is considered to be only a member of the planet's natural community of life. An example is the concept of "deep ecology" (Naess 1973, 1989), which rejects the human-centered perspective on nature and shifts the ethical issue to a biocentric base. This point of view resonates with Aldo Leopold's assertion that the "land ethic... changes...the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it" (Leopold 1949).

The drift away from anthropocentric and toward more biocentric ethical concepts has continued over the past 25 years of ecological thought. Examples of biocentric environmental thought include Potter's bioethic (1971) and global bioethic (1988) and Griffin's postmodern ethic (1992). Contemporary ethical thought along a more anthropocentric line might include Edward O. Wilson's proposal of "bio-

![Figure 2. Some examples of bioethical concepts that have emerged since the land ethic was introduced in Aldo Leopold's A Sand County Almanac (1949).](image-url)
phia" (1984) and Rozzi's mutually interactive ecological science and ethics (1999). Weiss's "patrimony of the planet" (1989) proposed a planetary ethic centered on an inherent responsibility for providing a legacy for future generations.

Such variations on the theme of environmental ethics reflect an elaboration and refinement, progressing beyond the simple statement of the "golden rule" toward a set of ecological guiding principles—principles that can bring aesthetic dividends even as they promote a state of harmony between humans and the natural world. Collectively, they seem to me to open the way toward a more balanced sense of responsibility—a moral baseline for human behavior toward our natural world systems.

**The land ethic as a new paradigm**

The entry of ethical concepts into ecological thinking has provided a powerful new guiding principle. Kuhn (1970) defined the difference between guiding principles and ordinary professional contributions. Guiding principles provide an intellectual structure that reorients thought in a way that is persistent over a relatively long period of time. By contrast, ordinary contributions have a relatively limited persistence in professional thinking. To illustrate the difference, one can appraise the usefulness of a concept over time. The duration of a publication's usefulness can be defined by the period of time over which it is used or cited. Professional librarians have described the frequency at which books are checked out from libraries as a decaying curve, with a midpoint (a half-life) occurring on average about 5 or 6 years after publication (Margulis 1967). Data from the Institute for Scientific Information now permit an alternative means of estimating the duration of a book's usefulness, using the frequency of citations in the published literature. For example, figure 3 shows a plot of the frequency of citations of my book *Plant Growth and Development* (Leopold 1964). The usual type of decay curve of citation frequency has occurred, showing a half-life of approximately 6 years. Using the frequency of citations of Aldo Leopold's *A Sand County Almanac* (1949), a contrasting time course is seen. There were almost no citations for more than a decade, after which citations have been rising consistently for the subsequent 50 years (figure 3). It is evident that Aldo Leopold's book is having an impact over a long period of time, as is consistent with the definition of a new guiding principle.

Following the terminology of Thomas Kuhn, a new guiding principle constitutes a new paradigm. A new paradigm provides an altered sense of order, a new center of orientation. Its persistence is consistent with its effecting a long-term change on science. The occurrence of a new paradigm is the structural basis for revolution in science. True to Kuhn's expectation, Aldo Leopold's new paradigm of the land ethic—a new perspective on conservation ecology through ethical precepts—has led to the appearance of new journals, new professional societies, and numerous new books concerned with environmental ethics.

**Fostering ethical concerns**

There remains a major question of how to nurture an awareness of the land ethic in the public arena. For individuals, such ethical nurturing is often triggered through the influence of an inspirational mentor—a parent, a teacher, or a peer group. A reading experience can also be a powerful stimulus of concern for the land; for example, people often tell members of Aldo Leopold's family that reading *A Sand County Almanac* changed their lives and motivated them to enter an environmental profession. The sense of ethical concern can also be nourished by participation in community actions such as planning boards, land trusts, recycling, and resource conservation functions. Of course, any of these ways of becoming engaged in ethical concerns can be strengthened by hands-on involvement in land restoration.

**Forces in conflict with bioethics**

As part of a discussion on bioethics in a changing world, we should take the measure of the conditions or forces that clash with or simply override ethical considerations. Some examples include greed, poverty, and war. Greed can be a major force in driving excessive exploitation of natural capital, such as excessive mining, excessive removal of oceanic resources, or reckless cutting of forests. Insatiable appetites for personal aggrandizement and ostentation often override ethical considerations. Poverty, too, can be expected to nullify ethical considerations in relation to the stewardship of the environment: Impoverished people often use natural resources badly. The occurrence of wars leads to the suspension

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*Figure 3. Comparison of the frequency of citations of Aldo Leopold's book A Sand County Almanac (1949) with those of A. Carl Leopold's book Plant Growth and Development (1964).*
of practically all ethical principles, not only at the personal, social, and political levels but also at the biological and environmental levels. These three examples of forces in opposition to ethical actions occur with alarming frequency in our nation and in many other parts of the world.

The extent to which Aldo Leopold's ethical concept will persist in our society is likely to depend upon the extent to which such conflicting forces can be restrained. It is reasonable to assume, for example, that involvement of people in the restoration and protection of quality land may increase their sensitivity to rates of resource consumption and possibly to issues of poverty and peace. As we discuss the positive values of bioethical principles, we must keep a special awareness of the massive ethical costs of war.

Conclusion
There is a perceived need among professional scientists for more knowledge about ethics. As human lives have come to revolve around urban centers, the need for a better understanding of bioethics, and specifically for an ethics-based strategy for environmentalism and conservation, has become more acute. Aldo Leopold's statement of the land ethic, which extended the concept of conservation to include restoration ecology, fills such a need. The emergence of Leopold's land ethic has been followed by an elaboration of ethical concepts in relation to biology and conservation, as would be expected with the advent of a new scientific paradigm.

It is important to be aware that bioethics are susceptible to violation, or even destruction, by social dysfunctions such as greed, poverty, and war. A part of the costs of this social dysfunction will necessarily be a corrosive effect on bioethical principles and a deterioration of harmony between humans and their natural environment. Remember Aldo Leopold's statement of the land ethic (1949): "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." Despite these obstacles, we can hope that the land ethic will continue to grow, that mentors and teachers will guide students toward this goal, and that ecological restoration will be used to provide leverage for fostering ethical ideals in students, coworkers, family, friends, and ourselves.

References cited