

“Sunflower Forest”: Ecological Restoration as the Basis for a New Environmental Paradigm

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I first encountered the writing of Fred Turner, my partner in this dialogue, in the summer of 1985, when I read his essay “Cultivating the American Garden” in the August issue of *Harper’s Magazine*. The essay made a profound impression on me, and since then Fred’s thinking has contributed immeasurably to my own work at the University of Wisconsin-Madison Arboretum, and in particular to my thinking about the process of ecological restoration and its implications for the environment and for our relationship with nature.

Briefly, what Fred was suggesting was that the act of gardening offers a model for a healthy relationship between human beings and the rest of nature. His argument, in part, was that the gardener handles nature with respect but without self-abnegation—that is, he or she manipulates nature intelligently and creatively, benefiting and nurturing plants (and of course animals as well; we are speaking of “gardening” in a broad and even metaphoric sense here), while at the same time exercising a wide range of human aptitudes and leaving a distinctively human mark on the landscape. This struck me immediately, both because Fred’s idea was in accord with my own experience as an amateur gardener and beekeeper (activities that I had long felt provide a basis for communion with other species) and also because it was close to my own thinking about ecological restoration and its implications for the environment and our relationship with it. By the time I read Fred’s essay, I had already identified restoration as a form of gardening, and had begun to think that it represented a model for a healthy relationship between human beings and

the natural landscape. The weakness of Fred's conception, from an environmentalist's point of view, was that it placed little emphasis on that natural landscape, but this was where my own idea of ecological restoration came in. If gardening provides a model for a healthy relationship with nature, then restoration is that form of gardening concerned specifically with the gardening, maintenance, and reconstitution of wild nature, and is the key to a healthy relationship with it.

Shortly after reading Fred's essay I called him and we began a conversation that has continued, on and off, ever since. One result has been the linking of our two lines of thought into the more comprehensive idea that the more general process of *ecosystem construction* provides the basis for healthy interaction between human beings and the rest of nature. The key idea here is that we can best come to understand ecosystems, and to enter into a relationship with them that engages the full array of human activities, by attempting to reconstruct them. Like all forms of agriculture, however, the process of ecosystem construction has two poles: a creative pole, most clearly represented by traditional forms of agriculture, which not only construct ecosystems but create or invent new ones, and a conservative pole, exemplified by the form of gardening we term ecological restoration, the attempt to create ecosystems that resemble as closely as possible natural or historic models.

My purpose in this chapter is to explore the left limb of this axis, and to make a case for the idea that ecological restoration provides a basis—actually, a paradigm—for a healthy, mutually beneficial relationship between ourselves and the natural landscape. I will begin by stating what I consider to be at least some of the essential elements of such a relationship.

First, in order to have a relationship with anything we need the thing itself—in this case the natural or historic ecosystems, the forests, prairies, wetlands, lakes, rivers, dunelands, reefs, and so forth, and all the plants, animals, and abiotic elements, all of which comprise the natural landscape.

Second, we need an ecological relationship with these systems. By this I mean an economic transaction that entails a genuine exchange of goods and services between ourselves and the natural community. This must be reciprocal, or, as Aldo Leopold and others have said, mutually beneficial, involving both taking and giving back.

Third, this relationship must engage all our abilities—those that are innate or “hard-wired” into us by evolution and those that have emerged

in the course of cultural evolution. These include our physical, mental, emotional, and spiritual capacities.

Fourth, because one of these abilities is a sense of history, and of history as a kind of progress, or at least change, the relationship must acknowledge and deal with the past—the history of our interaction with a particular landscape, and the deeper history of the general relationship of our species with the rest of nature.

Fifth, because our relations with nature continue to change as a result of ongoing intellectual advances and cultural evolution, the paradigm defining that relationship must also be flexible and capable of a creative expansion and development.

Sixth, we are a language-using, social, and highly self-conscious species, so we need a way not only to explore and redefine the terms of our relationship with nature, but also to articulate and celebrate that relationship in a personally and socially satisfying way.

Now let us turn to the question of how ecological restoration provides a paradigm that satisfies each of these criteria.

1. *The object.* Restoration is difficult and uncertain at best, and the craft of restoration is in its infancy. Even the highest-quality examples, such as parts of Greene Prairie at the University of Wisconsin-Madison Arboretum, or Ray Schulenberg's tall-grass prairie at the Morton Arboretum near Chicago, are defective—that is, they are not precise replicas of their natural counterparts. In fact, some environmentalists insist that restoration is impossible and argue that conservation of natural systems depends, ultimately, on preserving those that already exist. Yet if restoration in the strictest sense is impossible, so is preservation. It is impossible either to stop a living ecosystem from changing or to prevent its change from reflecting our influence. Restoration, however, holds out at least the possibility of conserving the system, not by stopping change, but by directing it, and not by ignoring human influences, but by acknowledging and seeking to compensate for them.

In this sense, then, preservation is impossible and restoration merely more or less difficult. All systems are constantly changing, and as this change reflects at least some degree of human influence, all systems must be supposed to be moving continually toward some novel condition. This effect is especially dramatic here in the Midwest on our tall-grass prairies and oak openings, where the entire native ecosystem has been virtually eliminated as a direct or indirect result of new kinds of human activities. This situation is actually paradigmatic, however, and is true in

the final analysis of all ecosystems everywhere—not because we are a peculiar or pernicious species, but simply because, as John Muir said, everything is hitched together so that everything interacts with everything else. Acknowledging our membership in the land communities is the first crucial step toward our reenfranchisement in it.

The consequence is that in the long run the best natural areas—the ones most closely resembling their historic counterparts—will not be those that have simply been protected from human influences (complete protection is impossible) but those that have been in some measure restored through a process that recognizes human influences and then effectively compensates for them. This is already evident for the midwestern prairies and oak openings, and sooner or later will be true of all ecosystems.

This being the case, it is encouraging to keep in mind that this does not necessarily imply a gradual decline in the quality of these systems through the process of copying and recopying. The criticism that restoration is impossible generally applies only in the strictest sense. One cannot duplicate a natural system root hair for root hair and bird for bird, but there is no reason to try to do this. What is called for, rather, is the reassembly of a system that *acts* like the original. This implies not only complete species lists and the reproduction of crucial aspects of community structure, but also the reproduction of function and of dynamics—both ecologically and in the evolutionary sense. In other words, it means not just setting the system up, like a diorama, but actually setting it in motion. It also means, however, setting certain limits to this motion: the system conserved in this way may be supposed to be moving around in a defined zone of change judged to be appropriate for the system. This does imply a certain conservatism (we are concerned, after all, with the conservation of the historic system), which implies continual monitoring and specific measures to, as it were, nudge the system back toward its historic condition. But this approach by no means implies a static conception of the system, or of our relationship with it. In fact, quite the contrary: this approach involves a kind of dynamic equilibrium (within certain, often rather wide, limits) and a perpetual effort to sustain the system against the pressure of change in response to new influences. In the long run, this will be the only way to ensure the existence of classic (and in a sense obsolete) ecosystems in the landscape of the future. This is real conservation, something we will want to do, not everywhere, but in some places. The result, of course, as we invent novel ecosystems, in cer-

tain cases including new, genetically engineered species, will increase rather than decrease biological diversity and richness.

2. *The ecological dimension.* The real challenge of environmentalism is not to preserve nature by protecting it from human beings or rescuing it from their influence, but to provide the basis for a healthy relationship between nature and culture. What this means most obviously is a working relationship with the natural landscape in which a human individual or community can achieve full citizenship in the biotic community. This is what Leopold had in mind when he called for a "mutually beneficial relationship" between nature and culture, but exactly what such a relationship would actually look like has remained unclear.¹ Presumably it would include an actual ecological interaction with the natural landscape that benefits both it and us—and would do so without requiring us to repudiate the achievements or abandon the accoutrements of civilization. From the point of view of modern environmentalism, however, with its strong sense of distance between humans and nature and its idealization of wilderness as nature "untrammelled by man,"² such a relationship has proved inaccessible. What environmentalism has offered instead is a severely limited relationship characterized by an ethic of "minimal impact" and the admonition to "take nothing but pictures; leave nothing but footprints." The concern here is almost exclusively for the landscape and hardly at all for the human participant, and the resulting relationship, though valuable as far as it goes, is extremely attenuated. It is largely nonparticipatory, and engages only a small fraction of human interests and skills. The person is confined to the role of visitor—an observer of nature rather than an active element of the land community. Ironically, such a perspective turns us all—hiker, birder, and strip miner alike—not into members of the community but into users and consumers of the natural landscape.

This may be useful as *part* of a healthy relationship with the natural landscape, but it falls far short of what we have to accomplish if we are to save the classic ecosystems and share the landscape with them. A comment in Thoreau's *Journal* illustrates the point. Thoreau was deeply concerned with achieving an intimate relationship with nature, and most of his writing is the account of his attempt to do so. Not infrequently he imagines himself literally rejoining the natural community by taking the part of one of its members. In an early entry in his *Journal* he wrote: "Would it not be a luxury to stand up to one's chin in some retired swamp for a whole summer's day, scenting the sweet-fern and bilberry

blows, and lulled by the minstrelsy of gnats and mosquitoes? . . . Say twelve hours of discourse with the leopard frog.”³

Here Thoreau is seeing himself as a turtle or muskrat. The problem is that he doesn't push his own figure far enough—this is not what muskrats or turtles do in a marsh. They don't sit there, watching the sun go overhead. They go about their business, which is the construction and maintenance of the marsh. This, of course, is precisely what the restorationist does. He or she is not merely an observer of the marsh or prairie, but, like the muskrat, a maker of the marsh, a direct participant in its ecology, carrying out business there in the fullest—in fact, in the Thoreauvian—sense of that word, exercising skill and ingenuity, exchanging goods and services, influencing and helping to shape the community, communicating with nature in nature's terms.

Thus the restorationist resolves a dilemma that has troubled—and weakened—environmentalism since Thoreau's time. Through the constructive process of restoration he or she breaks out of the essentially negative relationship with the natural landscape implicit in the preservationist program and establishes a relationship with that landscape that is both positive and mutually beneficial—and does so, moreover, without leaving civilization behind. This leads to a way of solving the practical problem of overuse of natural areas. The traditional approach to this problem is to discourage use and place restrictions on activities, a policy based on the presumption that “use” is destructive or consumptive and necessarily compromises the natural landscape. From this point of view the visitor is just that: a visitor and a consumer at best, and at worst an out-and-out destroyer. The more such visitors there are in a natural area, the more “pressure” will be placed on it, and the more it will decline in quality.

Limiting use is one way to address this problem, but it is only a stop-gap measure that does nothing either to satisfy the human hunger for immersion in nature or to deal with the unavoidable problem of ecosystem drift in response to human influence, however subtle. The real key to conservation is not restricting human participation, which is merely another way of fighting nature, but to find a constructive way of participating. Much better than proscribing involvement, then, is to change its sign, so to speak, from positive to negative. The visitor then becomes a positive and contributing rather than a negative, consuming force in the landscape. The range of experiences available in the landscape increases dramatically, and the situation shifts from having too many people using up nature to not having enough to keep it in shape.

I mean this quite literally. For years we at the University of Wisconsin Arboretum believed that our greatest problem was overuse. Too many people were, in that ugly and desperate phrase, “loving us to death.” Today we have the opposite attitude: we don’t have enough people to keep up with the restoration we could be doing. This is also true in the suburbs of Chicago, where the recovery of prairies and oak openings in the splendid system of preserves surrounding the city has depended almost entirely on a growing cadre of volunteer restorationists.⁴ Both of these examples are from heavily used areas, but the principle applies everywhere. Eventually it will be applied to our national parks and other wilderness areas, and it will be their salvation. In my view this restoration will become the principal outdoor activity of the next century, and the result will be the conversion of nature—in its classic forms—from an “environment” into a habitat for human beings.

Briefly, then, restoration is the key to the reinhabitation of nature and, in the long run, to its preservation. In its absence our influence on nature is necessarily consumptive; in the context of a restoration program, however, use becomes the first step in achieving a reciprocal relationship, which is completed in the act of restoration. Restoration in this sense is nothing but the acknowledgment of human influence on the landscape and the attempt to compensate for it in a precise way so that the classic landscape may be maintained.

3. *The gamut of human abilities.* In his book *The Invisible Pyramid*, Loren Eiseley wrote that human beings must not only reenter the “sunflower forest” of original nature, but they must do so without abandoning the lessons learned “on the pathway to the moon.”⁵ Eiseley’s assertion underscores a crucial weakness of the traditional environmental response to the challenge of reinhabitation: its failure to deal with the full range of human abilities, interests, and values, including those that are the achievements of culture. It is relatively easy to imagine reentering nature destructively on the one hand, or by shedding the accoutrements of civilization, on the other, or by simply leaving behind most of what makes us who we are when we step into the forest. But when we do this we limit our relationship with nature; we cease to be fully ourselves, and this makes nature not our habitat but some “other place”—not a whole world in which we “go and come with a strange liberty in Nature, part of herself,” as Thoreau wrote,⁶ but just another facility with a specialized purpose, like a bank or car wash.

Restoration meets this problem head-on. As a comprehensive process, it includes traditional nature-oriented activities such as hiking, birding, and botanizing, but also a wide range of other, more participatory activities, including hunting, fishing, gathering, and cultivating. All of these are integrated into an event that is constructive rather than consumptive—as each of these particular activities is in its traditional form. Restoration engages a range of physical, intellectual, social, and emotional faculties and actually entails a kind of recapitulation of cultural evolution, a redeployment of all the skills exercised and achieved by human beings, in Eiseley's phrase, "on the pathway to the moon."

Of special interest is the observation that restoration challenges our understanding of the ecosystem being restored, and so is an effective research technique, a way of raising questions and testing ideas about the systems under construction and (not incidentally) about our relationship with them. This notion is embedded in ecological thinking and practice, and has recently been explored and given the name "restoration ecology."⁷ This recognition of restoration as a form of dialogue with nature has important implications. First, restoration then does for ecology what the indeterminacy principle did for physics: it recognizes the researcher as an active participant, interacting with and influencing the system being studied. It also places us in a position to develop restoration as a powerful tool for exploring the ecological aspects of our interaction with nature because, although we can change nature without knowing what we are doing, it is virtually impossible to change it *back* without comprehending in some detail both the system and the precise ways in which we have influenced it. Thus restoration brings to our attention aspects of our relationship with nature that otherwise we might not recognize.

4. *The past.* Civilization is characterized by the sense of history and the discovery of cultural change. Archaic peoples, according to Mircea Eliade, had a past that was largely mythic, and they devoted considerable energy to world renewal rites and other activities that had the effect of obliterating history.⁸ We, however, know something of history and realize that our relationships with particular landscapes and with nature generally have undergone dramatic changes, especially during the past few thousand years.

Because this awareness is integral to our worldview, presumably it is also an important component of our relationship with nature, and our paradigm must accommodate this. We need the modern equivalent of the world renewal rituals of archaic peoples, not merely to renew the earth in

a literal sense (which, in fact, restoration does, offering a fascinating parallel to these classic rituals), but also to explore the past and have access to the experiences of nature that have shaped us as a species, as a culture, as a community, and as individuals.

Ecological restoration offers this opportunity in various ways—or, perhaps more accurately, it provides access to several octaves⁹ of historic experience: the immediate experience of the individual in a particular place; the usually longer history of the community and of a particular society or civilization; the still deeper history of cultural evolution; and ultimately the “history” of nature as chronicled by students of evolution and biogeography.

In the first instance, the restorationist revisits history while trying to reverse it. Restoration is, in fact, a form of time travel. To carry it out the restorationist first has to understand the historic system he or she is trying to restore, and then must understand the various influences that have brought about change in order to reverse them. In some cases the lessons involved may be trivial or obvious. But they may also be subtle and may lead to a more complete comprehension of the system and its history; a convenient example is the rediscovery of the role of fire in the ecology of tall-grass prairies, which emerged from early attempts to restore these systems during the 1930s and 1940s.¹⁰ In either case, the process involves the revisiting of history and the acknowledgment, at a practical level, of its implications for the present. Thus restoration is an exploration of change and its implications, and one of its lessons is the cost of change, as well as the crucial distinction between change that is reversible and change that is not.

Restoration explores history, but it also explores the slower rhythms of prehistory and cultural evolution. The restorationist not only attempts to reverse history but also to a certain extent recapitulates the major phases of cultural evolution, from hunting and gathering, to gardening and farming, to science. All the varieties of human experience of nature are repeated. The restorationist approaches a species of plant, for example, first as a gatherer, with an economic motive and a sense of appreciation for the plenitude of nature, not as “other” exactly, but as “given”; then as a gardener or nurturer of nature, who repays what he or she takes in kind as well as in gratitude; and finally as a scientist, who observes and manipulates nature in order to satisfy curiosity, and gives back to the world the gift of its greater self-awareness.

In this way the restorationist may travel back 10,000 years in a single afternoon. Of course to benefit fully we would like to know more about the classic relationships with nature that the restorationist revisits. For this we will be depending on anthropologists for precise descriptions of the subjective experience of nature characteristic of other cultures, but from what I have been able to discover so far, anthropology has little to say on this point. Anthropologists seem to have concentrated almost exclusively on the objective aspects of the nature-culture relationship—on calories and foraging patterns and the like, which are useful but only part of the information that we need. Perhaps the task of restoration will challenge anthropology as it has challenged ecology, and maybe restoration itself will allow us to test directly ideas about the subjective experience of nature by reducing these ideas to practice.

5. *Change and adaptation.* The reason underlying all so-called environmental problems, and in fact the general human sense of alienation from nature, is simply the speed of cultural change. Culture, like nature, evolves; but while the rest of nature evolves slowly, stuck, as it were, in the old, slow lane of chemical-based Darwinian evolution, cultural change has shifted into a computerized mode faster by many orders of magnitude than most of the ecological or evolutionary changes we see—or can barely see—going on in the world around us. Thus culture is always diverging from nature, and at increasingly higher speed as the rate of cultural change accelerates.

This causes considerable despair within the old environmental paradigm, with its defensive posture toward the conservation of natural areas. The problem, however, is not that change within the human community is necessarily inimical to the classic landscape, but that environmentalism, in its necessary defense of nature, has stressed protection from human influence and has by and large failed to come to grips with the problem of human interaction with nature. As a result its whole agenda, based on the idea of minimizing impact, becomes less and less tenable as human influence on wild nature becomes more pervasive and exotic. Because the fundamental problem is not influence, which is inevitable, but a failure to acknowledge this influence and a tendency to wish it away, the solution is not more protection and the erecting of higher and higher fences in a fruitless attempt to isolate nature from culture, but a program that frankly recognizes human influence on the natural landscape and then sets out to compensate for it.

Restoration does precisely this. The salient point is that, whereas environmentalism has tended toward a kind of idealism in its conception of nature, restoration is relentlessly pragmatic. It asks not how nature may be kept pure and uncontaminated but rather just how it is actually being affected by human activities, and how this influence can be reversed. What is involved is a continual dialogue rather than a program, paralleling in our dealings with the biotic community the dialogue that sustains a democratic society and makes it adaptable to change. The restoration-based paradigm reenters nature from the vantage point of any kind of culture and works out a new relationship in practical and psychological terms as change continues and as a culture diverges further and further from its native landscape.

6. *Celebration.* Environmentalism is a complex movement, embodying a wide variety of attitudes and ideas, but I think it is fair to say that the environmentalism of the past generation has generally not been optimistic about the prospects for a positive relationship with wild nature. This follows from the assumption that humans stand somehow outside nature, and that nature is therefore irreversibly compromised by the influence of culture.

There are valid reasons for this attitude. Culture is encroaching on nature nearly everywhere, and threatens both the biotic richness and the normal functioning of the biosphere. Yet it seems obvious that as the fate and well-being of the biosphere depend ultimately on us and our relationship with it, we must find out not only how to have a healthy ecological relationship with the world but also how to articulate and celebrate that relationship in a personally and socially effective manner.

Restorationists have discovered in recent years that the act of restoration can achieve and celebrate this relationship. An excellent example is the burning of the prairies in many areas of the Upper Midwest each year, usually in the spring. These prairies are in many ways the birthplace of the idea of ecological restoration. The dependence of these systems on fire was an early discovery of restorationists and one of their first fundamental contributions to the science of ecology. The burns are really the quintessential or emblematic act of prairie restoration. They have even become a rite of spring, eagerly anticipated by the growing number of "prairie people" involved in restoration efforts in the Midwest, and are often surrounded by a festive, joyful, atmosphere. Reflecting on this development, several years ago, Fred Turner put forward what I believe is a good explanation for it. It is not, he pointed out, just that burns are

often spectacular, exciting events, tinged even with an element of danger, or that the fire is a powerful tool that can change the landscape drastically; the need of the prairie for fire dramatizes *its* dependence on *us*, and so liberates us from our position as naturalists or observers of the community into a role of real citizenship.¹¹

The burning of the prairies is more than a process or a technology, it is an expressive act—and what it expresses is our membership in the land community. The implication is that we have a role here: we *belong* in this community, and so perhaps we belong on this planet after all. This, quite simply, is good news that makes people happy.

The implications obviously go far beyond the conservation of the prairies, offering an escape from the excessive and unrelieved negativism that is a kind of occupational hazard of environmentalists. This new perspective is revealed in the response of Steve Packard, a restorationist with The Nature Conservancy in Illinois, to *The End of Nature*, by Bill McKibben. This recently published book is a classic variation on the theme of human alienation from nature and the hopelessness of our present situation. Very briefly, his theme is that nature is everything in the world except people and their works, and that because all nature—including the atmosphere, McKibben's special concern—has been touched and contaminated by human beings, nature has actually come to an end. In reading this gloomy and destructive book, I hope that the elaboration of the logical consequences of its initial premises will at least serve the purpose of emphasizing how desperate and paralyzing these hypotheses are. In one particularly ugly passage, McKibben predicts, and in a sense even offers a justification for, a growing despair over the future of nature: "The end of nature," he writes, "probably also makes us reluctant to attach ourselves to its remnants for the same reason that we don't usually choose new friends from among the terminally ill."¹² Packard, reflecting on his experience with the prairies and oak openings of the Chicago area—terminally ill ecosystems if there ever were any—replies simply, "Our experience is the opposite. Unprecedented numbers of people are becoming passionately involved with the environment. It's an honor to be among the first to have a nurturing relationship with wild nature."¹³

Packard knows what he is talking about. He has direct experience as a pioneer restorationist and as the leader of a growing army of restorationists—now numbering over 4,000—who are reversing more than a century of deterioration in the Forest Preserve system of Chicago, rescuing the preserves from preservation, as it were, and bringing them

back to nature. The work of Packard and others like him now points toward what I believe will prove to be most important about ecological restoration: its value not just as a process or a technology or a strategy for conserving bits and pieces of the natural landscape, but its significance as a performing art and as the basis for a new ritual tradition for mediating the relationship between nature and culture.¹⁴

This brings us to a crucial point in the development of the restoration-based environmental paradigm—the role of performance or ritual in mediating the relationship between nature and culture. This aspect of restoration has remained invisible to environmentalism for at least two reasons. First, in its preoccupation with nature as object, environmentalism has been concerned exclusively with the products of restoration (the restored communities themselves and their quality) and has paid little if any attention to the process of restoration and its implications for people, both those carrying out the restoration and those looking on—the audience, as it were. Environmentalism has then missed restoration’s value as a way of reentering nature. The second reason is environmentalism’s blindness to the performative or expressive aspect of restoration—to what might be called its ritual value—and to the crucial role of ritual in mediating relationships.¹⁵

Of course this is not peculiar to environmentalism but rather is characteristic of our entire society, with its reduced sense of the efficacy of ritual. Perhaps this is another “root” of the so-called environmental crisis that has developed in the West since the sixteenth and seventeenth centuries. Surely the emergence of science, and later the technologies based on it, played a role by increasing the distance between nature and culture. Even as that gap widened, however, the Reformation mounted an explicit attack on symbolism and ritual, and largely did away with the ritual traditions that human beings had always depended on in their contact with nature. The result, it may be, was a worldview within which real union with nature is impossible.

This blindness to the performative experience and its implications may be understandable in historic terms, but it is a deficiency in environmental thought and could prove to be fatal. Certainly it is at the root of much of the debilitating pessimism that environmentalism generates, because perhaps, from its own, puritan point of view, environmentalism has been right. A fully satisfactory relationship with nature actually may be impossible, and accessible only through recourse to another dimension, that of performance, ritual, and make-believe.

The underlying mistake here may be the perception that indigenous cultures are “natural” people who live more or less unself-consciously in harmony with nature. (Perhaps this is why we have traditionally put them, along with evidence of their often-impressive technologies and other cultural achievements, in our natural-history museums.) This seems to be a fairly widespread notion within environmentalism, where it serves as a kind of ideal and as the foundation for much thinking about the proper relationship between humans and the rest of nature. This view is by no means universally accepted by anthropologists, however. Indeed, it is my impression that most anthropologists see in all cultures evidence of a tension between nature and culture, which is then mediated or dealt with in various ways that to a considerable extent define the culture and lend it its distinctive characteristics. On this ground, then, I put forward the following premises as the basis for a new paradigm for the relationship between nature and culture:

1. Though ourselves the products of nature, and in this sense natural, we do differ in certain fundamental ways from the rest of nature, notably with respect to our level of self-awareness. Thus we may be citizens of the world, but we are not “plain citizens,” and any attempt to overlook this is simply wallpapering over a major feature in the structure of the world, and is bound to have unfortunate consequences. People have never regarded themselves as “plain citizens” of the world; instead they have always—at least since the development of language—distinguished between nature and culture and have felt a measure of tension between themselves and the rest of nature. Moreover, though it may vary in intensity, this tension is irreducible. It cannot be avoided simply by living in a simpler or more primitive way, “closer to nature.” It is part and parcel of being human; it comes with our genes.
2. Although this tension cannot be resolved in purely literal terms, it can at least be dealt with in a psychologically effective way through performance and ritual. This, then, is one of the functions of ritual, and humans have used ritual techniques from time immemorial to mediate their relationship with nature.
3. The process of ecological restoration provides an ideal basis for the development of a modern system of rituals for negotiating our relationship with the rest of nature.

This, then, is the outline of a new environmental paradigm based on a sense of the crucial role of ritual in any satisfactory relationship between ourselves and the rest of nature, and on the observation that the act of restoration provides an excellent foundation for the development of a new ritual tradition. I should stress that what I have in mind is not simply the addition of performative techniques such as music, poetry, and so on, to the process of restoration, but a conception of restoration itself as both an effective process and an expressive act. The idea is not merely to *decorate* restoration, but to develop it to enhance its expressive power.

This conception is at the heart of Earthkeeping, a new program being developed by the University of Wisconsin-Madison Arboretum and the Society for Ecological Restoration to provide opportunities for people to participate in restoration efforts at selected sites as a way of learning about a healthy relationship with nature. In my view this is a step toward the emergence of restoration as a major cultural event, comparable with other social rituals such as elections, sporting events, festivals, and holidays—and toward Aldo Leopold's "civilized society" living not in harmony, but at least in an ongoing dialogue with the natural landscape.

CONTEXT, DEFINITIONS, AND CLARIFICATIONS

The ideas presented in this essay are the result of some fifteen years of reflections and discussions concerning the development of a collection of restored ecological communities at the University of Wisconsin-Madison Arboretum. This project was undertaken in 1934, under the leadership of a handful of ecologists and conservationists that included Aldo Leopold, Ted Sperry, John Curtis, and Henry Greene. It was a pioneering project from the first, and today the resulting collection of restored prairies and forests is considered the oldest and most extensive such collection in the world. It is widely regarded as a model for the idea of ecological restoration in its strictest sense, and has served as an inspiration—and in some cases even as a source of seed—for numerous projects at other locations.

Today the Arboretum has begun to serve as a symbol of ecological restoration, and in my view it will one day rank with places such as Walden Pond or Yosemite National Park as a landmark in the development of the modern environmental sensibility. For purposes of this essay, what is important about the Arboretum is its demonstration of the methods and objectives of ecological restoration. A good example is the John T. Curtis Prairie, a restored tall-grass prairie that was the first major restoration

project at the Arboretum and which now occupies 64 acres in the center of the 1,280-acre teaching and research facility.

Survey records from the 1830s indicate that this site was covered by a mixture of tall-grass prairie at the time of European settlement, but when the Arboretum was dedicated in 1934 the original vegetation had been nearly eliminated and the site had been under cultivation for about three-quarters of a century. Restoration at that time meant attempting to return the historic grassland vegetation to a site occupied mainly by exotic grasses and weeds. Work began on a large scale in 1936 under the supervision of Dr. Theodore Sperry and has continued at varying levels of intensity ever since. Curtis Prairie and the slightly younger and smaller Henry Greene Prairie about one-half mile away are currently regarded as the oldest restored prairies, and quite possibly are the oldest restored ecosystems anywhere. They have been the subject of many scientific studies over the years, and some parts of these prairies, especially of Greene Prairie, are considered among the highest-quality replicas of a natural prairie ever achieved.

The effort that led to the restoration of these prairies, though novel in certain respects, was not altogether unprecedented. It drew in part from related activities in areas as diverse as forestry, landscape design, and wildlife management. What set it apart from earlier efforts, however, was the commitment not just to manage the land, or even to rehabilitate it in a general sense, but to re-create, deliberately, a faithful replica of a historic ecosystem.

This activity, with this explicit purpose, is what is meant here by the term "ecological restoration." It is important to keep in mind that this can be carried on at several levels. The work at the Arboretum was relatively dramatic because it involved an attempt to replace virtually an entire ecosystem wholesale on a site from which it had been almost completely removed. This makes for a clear illustration of the principle behind ecological restoration, which is simply the active attempt to compensate for human influence on an ecological system in order to return the system to its historic condition. This continual effort to sustain the system against the pressure of our own influence makes restoration such a powerful tool for exploring and defining our relationship with the system, and for achieving what might be called an ecological definition of who we are—that is, a definition written in terms of our impact on other species and ecosystems.

The degrees of influence involved in this process may vary enormously, from very great, as with the University of Wisconsin-Madison Arboretum, to subtle. When the influence is subtle many prefer the term "management" to "restoration." But there is no clear distinction between restoration and management in these senses: they are simply parts of a continuum. In my view it is important to reject the false distinction between them and to refer to activities across the entire continuum as restoration because this explicitly acknowledges the role of the human in the process and opens it to the subjective benefits explored in this essay. To do otherwise is to avoid the responsibility of biotic citizenship or perhaps to reserve this responsibility and the satisfactions and benefits associated with it to a professional elite, an approach to conservation that I believe will inevitably fail in a democratic society.

NOTES

1. Interestingly, Leopold used this phrase in a speech at the dedication of the University of Wisconsin-Madison Arboretum in which he outlined the then-novel plan for a large-scale ecological restoration project on the property. Two versions of this speech survive in written form. The longer, which contains this phrase, was printed in a booklet commemorating the fiftieth anniversary of the Arboretum in 1984. The other, shorter version first appeared in *Parks and Recreation* magazine and is included in a recently published anthology of Leopold's writings; see S. L. Flader, and J. B. Callicott, eds., *The River of the Mother of God and Other Essays by Aldo Leopold* (Madison: University of Wisconsin Press, 1991), 209-11. The versions are quite different, and the latter refers to "harmonious relationship" instead of "mutually beneficial relationship."

2. The phrase is from the Wilderness Act of 1964, one of the early achievements of the modern environmental movement, and arguably one of its most characteristic, at least as far as the natural landscape is concerned.

3. Henry D. Thoreau, *The Journal of Henry D. Thoreau*, 2 vols., Bradford Torrey and Francis H. Allen, eds. (New York: Dover, 1962), 1:53 (entry for June 16, 1840).

4. See S. Packard, "Just a Few Oddball Species: Restoration and the Rediscovery of the Tallgrass Savanna," *Restoration & Management Notes* 6, no. 1 (1988): 13-22. For another example from the West Coast, see Rich Reiner and Tom Griggs, "Nature Conservancy Undertakes Riparian Restoration Projects in California," *Restoration & Management Notes* 7, no. 1 (1989): 3-8. These early projects have demonstrated the value of restoration by volunteers to the natural-area conservation efforts of an organization such as The Nature Conservancy. Though novel when first undertaken within the past half-dozen years, these projects are now regarded as models, and such work is expected to play a central role in a new plan for the Conservancy that some insiders have called "revolutionary."

5. Loren Eiseley, *The Invisible Pyramid* (New York: Charles Scribner's Sons, 1970). The references are to passages from chapter 7, "The Last Magician."

6. The phrase is from the opening paragraph of the chapter on "Solitude" in *Walden*.

7. William R. Jordan III, Michael E. Gilpin, and John D. Aber, eds., *Restoration Ecology: A Synthetic Approach to Ecological Research* (Cambridge: Cambridge University Press, 1987), especially the introductory chapter.

8. Mircea Eliade, *The Myth of the Eternal Return* (Princeton: Princeton University Press, 1954).

9. The use of this term is borrowed from Paul Shepard, *The Tender Carnivore and the Sacred Game* (New York: Charles Scribner's Sons, 1973).

10. See J. T. Curtis and M. L. Partch, "Effect of Fire on the Competition between Blue Grass and Certain Prairie Plants," *American Midland Naturalist* 39, no. 2 (1948): 437-43.

11. Frederick Turner, "A Field Guide to the Synthetic Landscape: Toward a New Environmental Ethic," *Harper's Magazine* 276 (April 1988): 49-55.

12. Bill McKibben, *The End of Nature* (New York: Random House, 1989), 211.

13. Steve Packard, "No End to Nature," *Restoration & Management Notes* 8, no. 2 (1990): 72.

14. W. R. Jordan III, "A New Paradigm," *Restoration & Management Notes* 9, no. 2 (1991): 64-65. See also my editorials in other issues of *Restoration & Management Notes*, including 5, no. 1; 7, no. 1; 7, no. 2; and 10, no. 2.

15. An interesting example occurs in the report on the management of the national parks prepared by a commission headed by Starker Leopold in 1963. While prescribing what is essentially a program of ongoing restoration for the parks, even describing them in theatrical terms as vignettes of the presettlement landscape maintained to create an illusion of original wilderness, the report insists that the work of restoration itself be kept out of sight—backstage, as it were. This is a classic expression of the conception, characteristic of modern environmentalism and distinguishing it from conservation movements earlier in this century, of nature as a collection of objects in the landscape—in fact, literally an "environment." Though the Leopold report sees restoration as a performance in a sense, its interest at least so far as the public is concerned is exclusively in the product of restoration: the "finished" ecosystem as an object in the landscape (that is, more an art like painting or sculpture, with their emphasis on the creation of concrete artifacts, than like the performing arts, with their ecology-like emphasis on process and relationship). This, however, deprives the public of the experience of restoration—either as audience or as participant, and excludes the people from the very process that defines our relationship with nature. The result is an illusion of nature as pristine and apart. Our relationship with it then becomes the responsibility of a corps of experts working behind the scenes. The elitism implicit in this formulation, though obviously unintended, would in my view prove fatal to conservation in a democratic society.