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## Should Environmentalists Be Organicists?

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Many environmentalists have embraced some form of holism or organicism as an important, perhaps even central, principle of a new worldview, a worldview that would be more environmentally benign than modernism's mechanistic, deterministic view of nature. Sometimes, this sentiment is expressed in religious and mystical terms; at other times, it has been expressed as a broad scientific hypothesis. A common element of the religious/mystical versions and the scientific versions is a belief that we need a new guiding metaphor for understanding our place in nature. The mechanistic, atomistic models of the Cartesian-Newtonian worldview have proved inadequate to model the complex, dynamic ecological systems that create and sustain all life; it is therefore necessary to develop a new, more dynamic and holistic worldview<sup>1</sup> (Daly and Cobb, 1989; Botkin, 1990; Sagoff, 1988; Prigogine and Stengers, 1984; Norton, 1991). It is both important and urgent that we develop a unified and coherent theory of environmental management, and the choice and elaboration of a new guiding metaphor is a most important prerequisite for that practical task.

The problem, of course, is that both the idea of "holism" and the idea of "organicism" are notoriously ambiguous. If we are to take a stand on the importance of these ideas for environmentalists, we must first give some fairly specific meaning to these troublesome terms. The purpose of this paper will be to recognize the inherent ambiguity of flights from mechanism and atomism, to explore the function or functions of holism and organicism in environmental thought, and to sketch a scientifically respectable version of holism adequate to those functions.

### Organicism and early conservation thought

When John Muir read Alfred Russell Wallace's evolu-

tionary treatise, *The World of Life*, in about 1911, he annotated the margins as follows: "Every cell, every particle of matter in the world requires a Captain to steer it into place. . . . Somewhere, before evolution was, was an Intelligence that laid out the plan, and evolution is the process, not the origin, of the harmony" (as quoted in Fox, 1981). Muir here reveals that his pantheistic version of organicism – which, incidentally, was never fully expressed in his published writings – was thoroughly *idealistic* and *personalistic*. It was idealistic because the God that Muir saw in the face of nature was dynamic, changing and active. Muir concluded therefore that nature, being active and creative, cannot be explained in purely materialistic terms, accepting implicitly the hallowed principle that mere matter is inert, incapable of action unless somehow animated by spirit or soul (Norton, in preparation).

Muir accepted Darwin's theory of evolution as a correct description of natural events and he praised Darwin's powers of observation and analysis. But he thought Darwin "morbid" for emphasizing the "struggle" to survive (referring to it as an "unGodly" word). Muir, by contrast, emphasized the harmony and wholeness of nature, treating physical processes of competition and predation as mere phenomena reflecting (to the attuned mind) the underlying harmony of the whole (Fox, 1981). Muir, therefore, never had to choose between science and religion. His pantheistic version of organicism respected science as one, rather cumbersome but essential, route to an understanding of nature. Since nature was for Muir identical to God, intuitive, religious knowledge and observational, scientific knowledge were merely two paths to a unitary truth (Norton, 1991).

And, by capitalizing 'Captain,' Muir implies a form of personalism according to which nature as a whole has mental identity and intentionally guides evolutionary processes according to a prior plan.<sup>2</sup> Nature, according to Muir's strong version of organicism, can only be

understood as the expression of an intentional plan of a being with a unitary consciousness – a Captain.<sup>3</sup> Muir, in these casually written notes, therefore, stated a particularly virulent version of holism, which we can call “strong organicism.” Following Muir, we can define strong organicism as embodying two claims: (1) that nature is a “whole” entity, possessing the form of individual identity characteristic of living organisms; and, (2) that this whole entity is an intelligent being who creates according to a prior plan.<sup>4</sup>

Aldo Leopold, writing just over a decade later in 1923 (in an essay that was not published until after his death), was also drawn to organicism as an attractive and inspirational “conception of the world” (Leopold, 1923). But Leopold’s discussions of organicism were less decisive and considerably more qualified than Muir’s confident endorsement. In an incisive survey of possible approaches to environmental values, Leopold mentioned favorably the Russian philosopher Ouspensky and attributed to him the organicist view that “it is at least not impossible to regard the earth’s parts – soil, mountains, rivers, atmosphere, etc. – as organs, or parts of organs, of a coordinated whole, each part with a definite function.” Remarking that earth’s processes are so slow we can hardly notice them, Leopold went on to speculate whether this slow “metabolism, or growth” evident in natural processes implied that “there would also follow that invisible attribute – a soul or consciousness” (Leopold, 1923).

In the end, however, Leopold backed off from a strong version of organicism, both in this early, exploratory piece, and also in his later professional development as evidenced in the final version of the essay, ‘The land ethic’ (Leopold, 1949). Arguing that there is not much difference – except in language – between organicism’s conception and that of “a dead earth, with enormously slow, intricate, and interrelated functions among its parts, as given us by physics, chemistry, and geology,” Leopold concluded that “the essential thing for present purposes is that both [conceptions of the world] admit the interdependent functions of the elements.” Finally, he followed Ouspensky in saying that “anything indivisible is a living being.” Organicism, given this extremely inclusive definition of “living being,” was operationalized mainly as a methodological assumption – that environmental management, and environmental thinking more generally, must employ a systems approach to natural communities (Norton, 1990). Leopold, less brashly mystical than Muir,

defended a more minimal, methodological version of holism, one that simply emphasizes that natural systems are more than the sum of their parts. Leopold emphasized that a true understanding of any organism, including human organisms, requires a method sufficiently strong to recognize the importance of relationships of the organism to the larger, complex, ecological systems that form its environment. Leopold apparently concluded that, while there remains much that is in doubt metaphysically, he could live with any system of understanding and analysis that is able to recognize the importance of interrelationships in the creation of the multi-layered complex systems of ecology.

This early essay had begun with a survey of the sad state of ecological systems in the fragile but heavily grazed lands of the arid Southwest. We can begin to place Leopold’s almost plaintive search for a new metaphor in context by noting that he was struggling to articulate his criticisms of two central assumptions of utilitarian, scientific resource management that was dominant in governmental resource agencies at the time. (1) utilitarian management was *atomistic* in the sense that it tended to target for management particular species or resources. Accordingly, he criticized grazing practices that were carefully regulated to avoid deterioration of browse but which failed to even notice that any amount of grazing along trout streams destroyed the watercourses and the associated recreational resource (Leopold, 1923). (2) Leopold also criticized utilitarian management because it assumed the “balance of nature” idea, treating ecological systems as if they were static systems in equilibrium which, once perturbed, would return, in a reasonable recovery time, to their original productive state (Leopold, 1939).

Note that both of these managerial assumptions, which form the theoretical basis of the management system developed by Gifford Pinchot, who was the first official U.S. Forester, can legitimately be related to the guiding *mechanical* metaphor characteristic of modernist thought. That is, according to the mechanistic and deterministic assumptions of Descartes and Newton, nature can be understood as a vast machine composed of independent, uncommunicative parts. Atomism rests on the assumption of independence among the elements of which nature is composed. One can exploit elements of natural systems without regard to the impacts on other parts of the system because the system is composed of independent and uncommunicative “atoms.” The assumption of a static, normal state to

which the system will return after perturbation also rests on the mechanistic assumption of “reversibility”; the possibility of re-winding a system to a prior state is a distinguishing mark of atomistic and deterministic systems.

Leopold’s exploratory treatment of organicism as an alternative to the mechanistic conception of the world, and in opposition to reductionistic science, can be understood as a search for a metaphor with which to express his commitment to oppose atomism. Leopold’s search was guided at least by these two central principles: new models for understanding the world must be *holistic* and they must be *dynamic*, in order to correct the failures of Pinchotism.<sup>5</sup> Aside from these commitments, Leopold was much less dogmatic.

As to whether the whole of nature expresses an intentional plan, Leopold said, in response to “most of mankind” who today profess “one of the anthropomorphic religions or the scientific school of thought which is likewise anthropomorphic . . . that it is just barely possible that God himself likes to hear birds sing and flowers grow. But here again we encounter the insufficiency of words as symbols for realities.”<sup>6</sup> Leopold therefore saw organicism as a new foundational metaphor productive of useful analogies such as references to the “health” of land systems, but he stopped short of attributing literal truth to the metaphor. Instead, he noted that organicism is, “to most men of affairs,” a reason “too intangible to either accept or reject as a guide to human conduct” (Leopold, 1923).

He concludes the essay with a reference to the pragmatic conception of truth applied to cultures – the cliff dwellers and the Pueblo, for example, had each evolved a set of practices and an associated ideology that promoted their survival over many generations. They had achieved a kind of “truth” in the creative interplay with their fragile and demanding environment in the American Southwest. The practices of indigenous tribes adapted to their landscape are therefore shown to be superior to the wise use philosophy of Pinchot. Leopold decided, in other words, that management philosophy was only important insofar as it affects practice, and the best measure of practice is sustainability. While clearly favoring organicism as a personal and poetic expression of a deep truth, Leopold opted to avoid obligations to the living earth as a moral principle to support management goals and plans (because it is too speculative for “men of affairs” like Pinchot).<sup>7</sup> He preferred, instead, when arguing policy, to avoid philo-

sophical speculation; a strong sense of the importance of interrelationships, a recognition of emergent qualities of complex communities, and a sharp eye for the deterioration of natural systems under inappropriate management practices were sufficient for Leopold to constitute a “holistic” approach to management. He chose intertemporal sustainability as his moral touchstone, relegating speculation about a literally living and conscious Earth or God to nonscientific discussions in which language fails to describe nature.

Leopold’s basic strategy was to develop a broad understanding of natural systems that allows us to understand and explain how human management of natural systems causes them to deteriorate; this required a basic rethinking of the nature of those systems. At the same time, Leopold wanted to limit his political and intellectual liabilities – he knew that embracing a strong version of organicism would hardly help his case with hard-headed resource managers. His philosophical instincts led him to a version of Occam’s Razor – avoid unnecessary metaphysical claims, claims that cannot be substantiated in the standard language of science. So, Leopold used organicism metaphorically to explain why he rejected crucial features of the accepted management model and to explore how managers must change their thinking not just in detail, but also in the most basic ways they perceive and describe natural events, but he was reluctant to attribute literal truth to his organicist speculations. This strategy recommends a “minimal holism,” one which is adequate to replace the unsuccessful models of utilitarian management, but one which imposes minimal metaphysical baggage on environmentalists.

By the end of Leopold’s career, in the last versions of ‘The land ethic,’ organicism had been pushed into the background in favor of a more concrete representation of “The A-B Cleavage” among resource managers. Leopold described the B-type view – the one he favored – as regarding “the land as a biota, and its functions as something broader. How much broader is admittedly in a state of doubt and confusion” (Leopold, 1949).<sup>8</sup> Leopold’s ambivalence toward metaphysical commitments therefore lasted until the end of his career – he was always more committed to a field-based, practical understanding of what went wrong and how to improve it than he was to his philosophical explanations.

We can summarize this Part by concluding that Leopold and Muir both evoked organicist ideas of the earth and felt that this metaphor provides a better

general understanding of the human place in nature than do mechanical metaphors. But they were swimming against a very strong tide; the mechanical metaphor, dominant since Newton in physics, took control of economic thought during Muir's lifetime, despite Muir's pantheistic protests against the desecration of nature. Materialistic utilitarianism had, of course, gained a stranglehold on the Forest Service and the scientifically trained resource managers who populated the governmental departments and agencies that were charged to manage the nation's resources by the time Leopold joined Pinchot's Forest Service in 1909. But Leopold, who had a more systematic and traditional training in science than the older Muir, was uncomfortable insisting on the literal truth of organicism.

Today's critics of Pinchot's traditional environmental management agree, both with Muir and Leopold and among themselves, that we need to shift the basic metaphors we use to explain and understand natural processes and human roles in them. But they remain bothered by some of the same doubts and fears that plagued Leopold. Is denial that nature is a complex machine of interchangeable parts tantamount to embracing mysticism? Can one believe, quite literally, that there exists a huge organism called the "earth" or "biosphere" that regulates itself and intentionally maintains conditions hospitable to life? Just how much, and what type of, holism is important for environmentalists?

We can conclude this Part, then, by stating three characteristics of the new models Leopold sought for understanding natural systems:

- (1) The models must be neither atomistic nor reductionistic;
- (2) The models must be dynamic rather than static;
- (3) They must impose minimal intellectual and political baggage on the search for a new and more successful approach to managing natural systems.

### Varieties and interpretations of organicism

The central idea behind organicism can be expressed very simply. "The Earth is alive" (Thoreau, 1854; Thomas, 1990). But this poetically profound sentence is fraught with philosophical perils, embodying two cross-cutting sets of ambiguities that have left the concept virtually useless except as a vague rejection of "atomism" and "reductionism." For convenience, I will

refer to these two sets as **ambiguities of content** and **ambiguities of interpretation**. First, the assertion that the earth is alive has been given many meanings because the term "alive" is defined or understood differently by different authors; the content of organicism therefore varies according to the idea of life employed to state it. Leopold's minimalist understanding of being alive – "anything indivisible is a living thing" – contrasts with Muir's personalistic and teleological version of the organic whole of nature, for example.

But the central assertion of organicism is also ambiguous in a second way: there are multiple interpretations of the assertion. For some writers, organicism is an *ethical principle*, recommending that the good of natural communities be given moral standing that could counterbalance and override the desires of humans to use, consume, and destroy natural systems (Callicott, 1989, pp. 27–29). For others, it is a *metaphysical idea*, asserting the real existence of whole systems in opposition to metaphysical atomists (Ouspensky, 1981); for yet others, organicism is a broad *scientific hypothesis* and the basis of a new discipline, geophysiology (Lovelock, 1990); others insist that organicism need not be taken literally at all – it represents a plea for a new and more *enlightening metaphor* for the understanding of nature and the human place in it (Wallace and Norton, 1992). I will here take the liberty to introduce yet one more interpretation, which I call *methodological*; methodological organicism can be stated roughly as a plea that, as a matter of methodological practice, models of nature be constructed in analogy to living things, rather than to machines.

These interpretations are of course not exclusive: methodological organicism may be simply a more technical version of the metaphorical interpretation, for example. And metaphysical organicism is often used to justify moral organicism, as in Callicott's early discussions of the noninstrumental values of the land community (see, for example, Callicott, 1981). It will not be possible to assess the strength and defensibility of all of these types and interpretations of organicism here. Let us adopt the more modest goal of asking which of them would be adequate to support important theoretical and practical ideas of environmentalists, using Leopold's three desiderata as a rough guide.

### Minimal holism

By insisting on holism in opposition to atomism, Leopold had two related, but separable targets in mind. First, he rejected the atomistic ideal of describing the elements of nature and ignoring relations among the elements; this idea is also expressed as an insistence on ecological models of resource-producing systems. Leopold also attacked the methodology associated with atomism – reductionism – which dominated both biology and resource economics. These ideas constituted the heart of Pinchot's approach to management. Contrary to Pinchot, Leopold believed that any management model that represents any natural system must be sufficiently complex to render systems as more than the sum of their atomistic parts: "anything indivisible is a living being," as he put it.

Note, however, that this concern for interrelatedness need not lead to Muir's "Captain" and to personalism. Systems theory is based on the initially (and perhaps profoundly) paradoxical notion of irreducible parts and wholes (Koestler, 1967). How can one level of natural hierarchies (such as, for example, the hierarchy of cell, organ, organism) be both a whole – an organ that functions homeorhetically to maintain its organizational stability – and a part, contributing functionally to the larger organism? Muir's personalism represents only one possible resolution of this issue – by declaring nature as a whole to be an identifiable individual, Muir implies that all parts, as parts, are ordered from the "top" of the hierarchy, according to principles set out by the all-encompassing "Captain." Leopold's reluctance to personalize the hierarchical systems of nature represents one significant weakening of Muir's strong organicism.

Let us, then, state a minimal version of holism, attributable to Leopold and in strong contrast to Muir's virulent organicism: Minimal holism represents a commitment to the reality and importance of relations among the parts of any system, and embraces some (at least minimal) version of "emergent qualities" – the view that any "whole" has characteristics that cannot be fully explained by reference to actions of its parts. Minimal holism, so defined, need imply neither personalism nor intentional planning on the part of some particular "whole being." Minimal holism is minimal, compared to Muir's version of organicism, therefore, in two important ways: (1) the "wholes" in nature are not personalized, and (2) it does not explicitly

attribute intentional plans to the activities of "whole" systems.

There is, of course, an important overlap between Muir's and Leopold's organicism. Muir, as well as Leopold, championed the importance of interrelationships; both believed that reductionistic accounts of nature ignore its most important characteristics. This core meaning of holism, then, seems an important element in the emerging environmentalist worldview. What may remain at issue is whether this minimal holism is adequate for the reformation of environmental thought and management.

If environmentalists can base an adequate theory of environmental management on this minimal version of holism, they would greatly reduce their metaphysical vulnerabilities and, since many scientists reject the teleology and mysticism involved in strong organicism, they would broaden the base of support for their theories and the approaches to management implicit in them. Why, then, did Muir risk so much more? Why did he go beyond minimal holism to embrace strong organicism? Part of the answer lies, no doubt, in Muir's daring, romantic version of science – his blurring of the lines between science and religion that trace to his pantheism. If Nature is God, then science and religion are merely two routes to understanding the same thing (Norton, 1991). But these connections would hardly yield an argument for strong over weak organicism; indeed, pantheism and Muir's "ecstatic" science were so closely allied in his thinking that neither could stand alone; this same closeness disqualifies each as a non-circular and nonquestion-begging argument for the other.

### Dynamic systems

Muir also had another argument for strong organicism, however, one that is implicit in his brief remarks on evolution quoted above. Muir's positing of a personal Captain who guides natural objects into their place and his indignant assertion that evolution can only be the process and not the driving force in natural development suggests an argument based on an ancient puzzle about change in physical systems. Muir apparently accepted the following argument: Physical substance is necessarily inert and passive; only spiritual substance can be active and creative.<sup>9</sup> But natural systems are dynamic, active, and creative. Therefore, natural systems are

necessarily animated by a spirit. From this foundational argument, Muir could then derive his personalism and his belief in teleology: any active spiritual substance must be indivisible;<sup>10</sup> but if nature is ultimately harmonious (which Muir never questioned), there must be a single spiritual substance that acts according to a single plan.

Today, Muir's implicit argument seems somewhat quaint and romantic; his premises strike us as too controversial to support such a grand metaphysical system. But my purpose is not to evaluate Muir's metaphysics – it is rather to illuminate the dilemma facing Leopold and his more scientific followers. Muir's confident assertion that nature is a being with personal identity who acts according to a prior plan rests most basically on the ancient idea that physical substance is inert and that only spirit can be an active force. It is this assumption that, if left unquestioned, drives environmentalists past minimal holism and a simple rejection of reductionism toward a personalistic and teleological metaphysics; this assumption equally motivates Muir's confident idea of a Captain and Leopold's perplexed musings on whether "God himself likes to hear birds sing and see flowers grow" (Leopold, 1923).

This same assumption perplexes environmentalists today, for example, when they flirt with James Lovelock's Gaian theory, but at the same time worry about its possibly mystical, teleological implications. This ambivalence is of course not surprising because Lovelock himself promotes it: on the one hand, he names the biosphere "Gaia" after a Goddess (suggesting personalism) and states that Gaia creates conditions favorable to life (suggesting teleological activity); on the other hand, he argues that the creation of favorable conditions need not and should not be interpreted teleologically, and that any "actions" taken by life to perpetuate itself can be understood scientifically (Lovelock, 1990; Wallace and Norton, 1992). Can Lovelock and his followers have it both ways? Can recognition of the activity and creativity of nature be understood within the limits of physicalistic science, and without ending in idealism and mysticism? Perhaps they can (Ulanowicz, 1986), but only if Muir's keystone assumption that physical matter cannot itself be active and creative is rejected (Norton, in preparation).

Perhaps the most remarkable and far-reaching development in science recently has been the recognition, by scientists in many fields and with many different vocabularies, of the importance of "dissipative struc-

tures" (Prigogine and Stengers, 1984; Gleick, 1987; Earley, 1991). These are systems that share the characteristic of creating complexity and order out of randomness, through interchanges in the form of matter, energy, and information, with their environment. These systems, in a real sense, create and maintain themselves through time. They are homeorhetic – upon disturbance they re-equilibrate at an evolving set point – and in this sense they have agency – they "act" to maintain a complex hierarchical organization that in turn maintains their structural persistence through time.

Dissipative structures cannot be treated as simple, atomistic, physical objects with no relations to other objects in their environment, because they change their behavior in response to their surroundings and change their surroundings through their behavior. They are not inert matter; they are active, responsive, and creative. Furthermore, dissipative structures exist on every scale in nature and they have a common, hierarchical structure. Hierarchical systems are constructed on the assumption that each level functions both as a part and as a whole. Nested subsystems maintain themselves by both reacting to, and changing, their environments through the expenditure of energy. Entities at smaller scales change more rapidly than do the larger-scale systems that provide their environment, creating, at each level, sufficient stability to allow adaptation across generations at the lower level. Energy flowing both up and down in the system – upward in the form of appropriation and use; downward in the form of environmental constraints – has effects on different levels but on different scales. Scale is all-important in hierarchical representations of systems; it is assumed that systems of larger spatial scale change more slowly than their subsystems, allowing the latter to adapt to the apparent stability of larger, environing systems. Normally, the behaviors of the parts are constrained by these larger systems and these behaviors have little effect on the larger systems because the different levels of the system operate on different scales – the lower-level dissipative structures will disappear and be replaced by other individuals of their level before their individual actions significantly impact their environing systems that change on a much slower scale (Allen and Starr, 1982). Thus, while changes in the parts can affect the whole, this only occurs if there are runaway trends in which many parts change in a single direction and create cumulative changes that accelerate change in the larger system – as when many motorists burning fossil fuels

accelerate the accumulation of CO<sub>2</sub> concentrations in normally slower-changing atmospheric systems.

Hierarchical organization is apparently a common structural element of all dissipative structures because this structure allows any system both to change and to maintain stability. We can therefore employ the more comfortable and less technical term, "self-organizing structures," as equivalent to dissipative activity, and use the resulting idea as a central principle of a new and post-modern worldview. All levels of nature are unified by their similar, hierarchical structure and by their common means of maintaining and elaborating that structure through time.

These self-organizing systems need not, however, exhibit agency in the fuller sense in which one ascribes to an agent a "prior plan." Thus, when Muir implied that evolution must have a prior plan, he went beyond the principle of self-organization exhibited in dissipative structures. Nature is capable of self-organization on many levels and at least some of those levels involve no intentional and mental planning (Ulanowicz, 1986). Further, this limited concept of agency and entity-hood need not exemplify Muir's insistence that each molecule in natural events must be guided by an identifiable, intentional Captain. The crucial point here is that creativity emerges through "dialogue," communication among all the various nodes at all levels of an expanding hierarchy of "wholes" which are also "parts" on a higher level of the hierarchy (Koestler, 1967). Since the concepts of "soul" and "spirit" are normally defined as referring to indivisible mental substances, attribution of these concepts to the hierarchical arrangement of nested parts and wholes is inappropriate, based on a confusion of hierarchical levels. Information is communicated across all levels in the complex hierarchy; by contrast to Muir's strong organicism, the physical world on this model exhibits creativity on all levels, without reference to any indivisible, conscious entity.

I have argued elsewhere that Leopold's famous metaphor of "thinking like a mountain" can be operationalized by adopting the formalism of hierarchy theory (Norton, 1990). Here, I am suggesting more broadly that the development of the land ethic can be furthered if we adopt self-organizing activity as the unifying idea of an evolving ecological worldview and of a more ecologically sensitive approach to environmental management. Indeed, if one adopts the very helpful definition of Faber, Manstetten, and Proops, that ecology is the science of self-organization in nature (1992), the

substitution of self-organizing processes for the element-oriented approach of Pinchot becomes an operationalization of both Leopold's choice of holism/systematism over atomism and of dynamism over the equilibrium assumptions of classical mechanics.

The assumption of hierarchical organization in nature, and the recognition of the importance of a time dimension in physical theory, therefore provide fertile ground in which philosophers can search for a new worldview that is capable of placing humans within nature, conceptually. At the same time, it must be recognized that creativity in nature does not depend upon peculiarly human characteristics such as rationality and intentional action. This fruitful ground has, unfortunately, been little tilled by professional philosophers, because they are fixated on the question of intrinsic value in nature (Norton, 1992). But that question will fall by the wayside because the concept of objective and intrinsic value in nature is a figment of the same dualism of active subject and inert object that led Muir to interpret evolution idealistically, personalistically, and teleologically (Callicott, 1989, pp. 165–174; Norton, 1992). It is time for environmental ethicists to stop trying to vint the new wine of an ecological consciousness in the old casks of Cartesian dualistic concepts. When it is said that we need a new worldview for understanding the human role in nature, therefore, I see no reason to think such a worldview will extend dualistic concepts of objectivity and value to the "external" world. It will rather embed human observer-actors in a complex, multi-levelled process that evolves unidirectionally through time. Once such a shift in worldviews takes place, we might plausibly say that society has adopted Leopold's land ethic and that, perhaps equivalently, society has adopted a new metaphor for understanding nature and the human role in it. We will have begun to think like a mountain.

### **Conclusion: what kind of holists should environmentalists be?**

Should environmentalists be minimal holists or should they follow their "spiritual" leader, Muir, in adopting strong, teleological and spiritualistic organicism? First, note that one might consistently say "both," provided the differing interpretations are reconciled as fulfilling different functions. Environmentalists might, in discussing whether to accept a new, less mechanistic

worldview let their rhetoric soar with Muir, for example; but they might also, with Leopold, the practitioner who must forge a new management philosophy that will have broad appeal, recognize that such rhetorical flourishes raise issues that lie beyond easy resolution and content themselves with less difficult intellectual entanglements. My concern here is not with rhetoric, but with forging a vocabulary and set of principles of management that are scientifically respectable and adequate to recognize the dynamic and creative processes that maintain and shape natural systems. Given this goal, a minimal holism points a more promising direction for the future of environmental ethics and environmental policy.

Minimal holism, interpreted methodologically (as a scientific instantiation of the rhetorically effective but metaphysically overblown ideas of organicists), is an endorsement of systems theory as providing the basic concepts and principles for understanding self-organizing systems. We can express this basic commitment as a presumption that any model system that is intended to mimic natural systems must use the richer concepts of systems theory rather than the concepts of mechanism. This commitment will accomplish one central purpose of environmentalists. It provides an explanation/justification of their rejection of reductionism: reductionism is possible only in mechanical models and nature cannot be completely described as a mechanical system. Thus, while mechanical models are sometimes useful, they are not given metaphysical status, but are considered instead to be oversimplified but useful models for understanding restricted elements of the system; they could never fully capture an evolving system that has a time dimension.

Environmentalists who wish to reduce their metaphysical commitments may adopt a methodological interpretation – minimal holism is simply a decision to employ certain concepts and principles to guide the formation of models to understand natural systems. This methodological version allows environmentalists to have their cake and eat it too – they can retreat to a methodological discussion of which concepts are adequate to certain tasks of description, avoiding metaphysical entanglements and maintaining scientific respectability while providing a reasoned and clear operationalization and explanation of their rejection of reductionism as a complete language for environmental management (Carnap, 1956; Norton, 1977).

Avoiding metaphysical commitments to entities such as the “land community” or the “biosphere” can be

useful also to environmental ethicists. In a much-discussed essay, Callicott compared the land ethic to Plato’s account of the just republic, clearly implying that (at least in the extreme) obligations to the land community would override important human needs, and perhaps imply an obligation to reduce the human population by drastic means in order to protect the integrity, stability, and beauty of the land community. Expressed in this way, metaphysical organicism provides the foundation for a normative obligation to protect natural systems, thereby positing an ethical counterweight to human needs and desires in the form of an independently existing source of value located in natural systems themselves. The “intrinsic” or “inherent” good of the organism overrides the good of individuals.

The combination of organicist metaphysics with holistic ethics unfortunately yields conclusions acceptable to nobody, including Callicott, who has disavowed the apparently misanthropic consequences of his early formulation of the land ethic as ethically holistic. Today, Callicott admits his essay was deliberately provocative on this point. In the face of charges of “environmental fascism,” Callicott has offered a version of the land ethic in which obligations to other humans override obligations to members of other species and ecosystems, because the land ethic is “layered upon” our more proximate obligations to humans, rather than overthrowing those obligations (Callicott, 1989, pp. 93–94). Callicott’s original mistake, we can now see, was to interpret holism metaphysically and to follow Muir in identifying one level of nature’s hierarchy – the land community – as a real and identifiable individual. In fact, while he located that individual at a much lower level of the hierarchy than Muir’s all-encompassing Captain, Callicott in fact went beyond Muir by assigning independent moral value to ecological communities at a particular level and by taking that value to (at least in some cases) override values of any given species of individuals (including humans?), who exist on lower levels. A methodological/metaphorical version of organicism therefore avoids one unpromising, even embarrassing, outcome for environmental ethics. Similarly, this interpretation, if more fully emphasized by Lovelock, would also discourage personalistic interpretations of the Gaia Hypothesis and direct intellectual attention away from the misguided (but understandable given Lovelock’s rhetoric that identifies the biosphere with a nameable Goddess) debates about the teleological nature of Gaian theory (Wallace and Norton, 1992).

The methodological interpretation, therefore, has perceptual change, rather than a search for substantive moral norms, as its central focus and goal. The point of the adoption of a new worldview with a new organizing metaphor is not to identify new moral norms but to liberate our perception and understanding from dualistic, modernist, and mechanical assumptions. Once that process is complete, the search for a distinctively environmental ethic can begin without the dualistic hypocrisy that humans are “outside” natural systems and inherently different from inert physical objects that make up other dynamic systems in nature. The emergence of a post-modern environmental ethic depends upon the development of a new set of models for understanding the human role in natural systems.

What has changed since the days of Muir and Leopold is that we are now able to avoid the apparent dilemma between mechanism, determinism, atomism, and reductionism and, on the other hand, organicism, personalism, mysticism, and holism. Better understanding of dissipative structures as self-organizing but not teleological, and as “indivisible” without being identifiable “persons,” should begin to liberate us from the old, but clearly inadequate assumption that physical objects cannot be creative. Human creativity is not creativity *ex nihilo* but is rather a special case of, and parasitic upon, the multi-levelled and unintentional creativity of physical systems which are capable of self-organization, self-maintenance, and creative response to a dynamically changing environment.

We began by posing the question whether environmentalists and environmental managers need a “new” organizing metaphor, and whether environmentalists should be organicists. By seeking a minimal holism – one that supports the important changes in perception, value, and worldview that environmentalists advocate, but one that also minimizes its mystical implications and metaphysical commitments – we have outlined in broad terms such a metaphor. It is non-reductionistic, but it is not metaphysically or ethically holistic, and it is not organicist in the strong sense. It models natural systems with complex, hierarchical structures which maintain themselves through processes that expend energy, but it does not personalize any given level of those structures. Since natural systems are modelled as dissipative structures which include organisms, but also include ecosystems, communities, and atmospheric systems, I prefer not to call the new metaphor, “organicism.”<sup>11</sup> What the new system is called, however, is not

as important as that philosophers recognize the importance of new developments in science. If there is to be a new guiding metaphor for environmentalists, I am convinced that it will grow, organically, from the development of new conceptualizations of natural systems, not from a grafting of new ideas onto modernist assumptions. I suggest that environmentalists embrace Muir’s soaring rhetoric of pantheism as a means to find converts if they must, but that they follow the more cautious Leopold in building a less metaphysically ambitious philosophy to support their day-to-day and generation-by-generation management goals.

### Notes

<sup>1</sup> I define worldviews, and introduce a method of worldview analysis in Norton (1991).

<sup>2</sup> Muir, incidentally, is here developing an idea that was earlier expressed by Henry David Thoreau (1854), though it appears that Muir had not read Thoreau’s work when he first expressed his organicism (Fox, 1981).

<sup>3</sup> While Muir apparently considered his pantheism a re-interpretation rather than a rejection of Christianity (Callicott, 1990), there is no question that it was an heretical interpretation of Christianity, because it identified the world with God himself.

<sup>4</sup> It would be possible to debate the exact meaning of “prior plan” in this definition, because it might be argued that the plan is a timeless idea in the mind of an eternal being and that temporal priority of the plan is unnecessary. But temporal priority is not essential for our purposes – the key point of Muir’s idealism is that the plan is essential *if we are to understand the order of the whole*; laws that describe physical events, however important, are inadequate to explain the order and development we observe in nature. According to Muir’s idealism, adequate explanations of natural events are necessarily mental. To avoid issues of temporal priority, then, we can ascribe to Muir a more sophisticated version of “logical” or “explanatory” priority for the plan.

<sup>5</sup> See Callicott (1989, pp. 107–109) for a helpful discussion of Leopold’s dynamism. Callicott explains how Leopold rejected an elements ontology for a process ontology because of lessons he learned from ecology.

<sup>6</sup> Leopold used “anthropomorphic” roughly as we use “anthropocentric.”

<sup>7</sup> These passages have given rise to two opposed interpretations of Leopold’s thought as a whole. The standard interpretation, which is most eloquently expressed by J. Baird Callicott, stands in stark contrast to my more pragmatic interpretation on at least one crucial point: Callicott considers Leopold to be a confirmed modernist who accepts the modernist dichotomy of experiencing subject and inert, objectively existing, physical objects and the accompanying assumption that, to be objective, “philosophical” value must be attributable directly to real objects (Callicott, 1989, p. 165; personal communication).

While I doubt that Leopold was entirely liberated from the objec-

tivist assumptions of modernism, I differ from Callicott by giving Leopold credit for at least glimpsing past modernist assumptions by, first, recognizing that language may be inadequate to express a single, correct, and complete description of the world and, second, by emphasizing adaptability to local conditions as marked by survival as a more useful method of assessing social practices and their associated ideologies *including science itself*, than is comparison to some "objective" world of metaphysical truths (Norton, 1988; 1991). But this interpretive issue is not crucial here; even if Callicott is correct in arguing that Leopold retained a commitment to a modernist, objectivist view of science and value, we can still ask, as we are here, what would be the best direction for future elaborations of the land ethic.

<sup>8</sup> Leopold often used the term "broader" to refer to philosophical ideas.

<sup>9</sup> This premise can be traced back to the very beginnings of philosophical thought. It is implicit, for example, in Thales' assertion that "The lodestone has a soul, because it draws iron." See Hargrove (1989) and Norton (in preparation) for further discussion.

<sup>10</sup> This premise is unquestioned because, in the modern worldview formulated by Descartes (1977), indivisibility is the distinguishing and defining characteristic of spirit.

<sup>11</sup> Elsewhere, I have called the general approach to management implicit in the new approach "contextualism," because it understands environmental issues hierarchically, with each larger environment providing the "context" for its component parts; conversely, it recommends that the manipulation of subsystems be understood in context, meaning that one must also consider the cumulative impacts of individual human actions on larger systems in longer frames of time. See Norton, (1990; 1991).

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