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Environmental Science and Environmental Ethics

by Holmes Rolston

Science and conscience have a complex, elusive relationship and this is nowhere better illustrated than in the relationship between environmental science and environmental ethics. An environmental ethic is foolish not to be informed by the best environmental science available. The success of an environmental policy depends on getting the values of the human actors coupled with a science that is descriptively accurate and operationally competent. Americans value the bald eagle as a national symbol. But we cannot save it as an endangered species unless we know what eagles eat, where they migrate, where they nest, and what pesticides and herbicides build up in the food chain and end up in their egg shells. Social values will fail unless they are connected to natural facts. Environmental science must discover and communicate to environmental ethics the parameters within which ethics must work. The way the world ought to be depends on the way it can be, and that depends on the way it is.

But we have to be cautious about thinking that science is canonical. Sometimes a socially held value drives a mistaken environmental science. The U. S. Forest Service for the first half of this century designed and conducted research projects that proved its claim that fire was a destructive agent in forests and should be suppressed (Schiff, 1962; Lee, 1991). This claim about fire in forests was largely driven by the cultural value of timber. But over the last forty years we have revalued fire in the forests. One ought to let natural fires burn; one ought to set prescribed fires. What brought about the changed ethic? Better environmental science. A skeptic may say that today we only have different social values driving a different interpretation of environmental science, and another misperception. But if so, the challenge remains; we cannot form a prescriptive environmental ethic about fire until we are descriptively informed about fire ecology. What culture ought to

do depends on what is the case in nature.

Often, however, these descriptions are already laden with values. Consider some descriptive categories used of ecosystems: the *order, stability, and diversity* in these *biotic communities*. We describe their *interdependence*, or speak of their *health or integrity*, perhaps of their *resilience or efficiency*. We describe the *adapted fit* that organisms have in their niches, the roles they play. We describe an ecosystem as *flourishing*. Strictly interpreted, these are just descriptive terms; and yet often too they are already quasi-evaluative terms—often enough that by the time the descriptions of ecosystems are in, some values are already there. They are among the givens, not the options.

Matters might have been different. If the descriptions were to result in disorder, instability, impoverished numbers of species, misfits, pathological relationships and ecosystems that do not flourish, we should have to make other judgments. And, lately, this too seems to be so in nature, though it depends on the scales and ranges at which we examine nature. Debate has increased about the extent to which the evolutionary history of ecosystems is contingent and chaotic. If speciation is only by random accident and drift, not really involving adapted fit and biological achievement, we might value the diversity of species less.

Meanwhile, we conserve natural things because they are useful, but also because we marvel at the intricacy, diversity, complexity, beauty, order, natural history, at the creativity present in nature, at life persisting in the midst of its perpetual perishing. Nature is a kind of wonderland. So we have both to take care that our ethics

is informed by the facts about nature, and, since these facts reform our value judgments, we have to take care that our science is sensitizing us to the values there. Bad science can result in bad ethics. Good science is a prerequisite for good ethics.

Vice versa, ethics can sometimes inform science. Consider two cases, both from professional scientific societies, one from ecology, one from forestry.

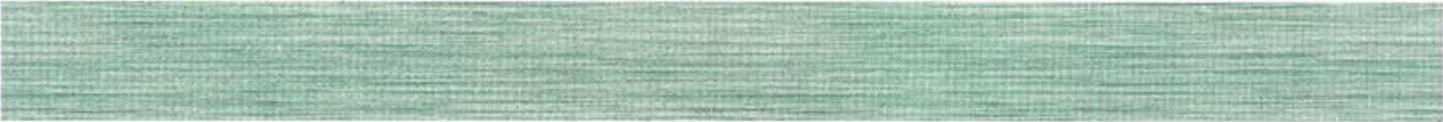
"Achieving a sustainable biosphere is the single most important task facing humankind today" (Risser, Lubchenco, and Levin, 1991). The Ecological Society of America, in a document that it called "unprecedented in its scope and objectives" set a policy "to define research priorities for ecology in the closing decade of the 20th Century," posing ecology to enter our new millennium. Those priorities are, in brief, a "sustainable biosphere" (Lubchenco et al,

1991). "There is no higher priority for research" (Risser, Lubchenco, Levin, 1991). I applaud this position; what I wish to notice here is that we have, right up front, a value-driven science.

"What one ought to do is to sustain the biosphere. . . . And this ought can involve . . . a caring for the biosphere because it has value in itself, as well as value for humans."

What one ought to do is to sustain the biosphere. This might be, vis-a-vis nature, either a prudential or a moral ought, or both. This might be, for an individual human agent, a prudential ought, since every human has a self-interested stake in the condition of the environment that one inhabits. But this must be, vis-a-vis other humans, a moral ought, since other humans, as well as oneself, are helped or hurt by the condition of the environment.

And this ought can involve—indeed the ESA statement everywhere allows for this—a caring for the biosphere because it has value in itself, as well as value for



humans. So there are multiple levels of value at stake, both natural and cultural. Still, locate these values where one may, this is mission-oriented research.

Notice that the priority set is not "sustainable development," not that set at the UNCED Earth Summit at Rio. The Ecological Society of America advocates a caring for nature that sustains the biosphere, and any sustainable human development must come within those more fundamental parameters. The report laments an emphasis on sustainable commodities, sustainable agricultural and industrial production. "Much of the current research focuses on commodity-based managed systems, with little attention paid to the sustainability of natural ecosystems whose goods and services currently lack a market value" (Lubchenco et al, 1991, p. 374).

In a second example, the Society of American Foresters has adopted a "land ethic canon."

Stewardship of the land is the cornerstone of the forestry profession. . . . Compliance with these Canons demonstrates our respect for the land and our commitment to the wise management of ecosystems. (Preamble)

A member will advocate and practice land management consistent with ecologically sound principles. (Canon I) (Craig, 1992)

Raymond S. Craig, a forester with the Oregon Department of Natural Resources and the chair of the SAF Land Ethic Task Force, explains, "The challenge lies in expanding our role beyond commodity production to embrace management in consideration of other values." Foresters now follow the imperative of Leopold "to value all components of ecosystems, without regard to their usefulness to

humans, because all components have intrinsic value. As we manage lands, those values must be considered in our decisions (Craig, 1992)."

So we see that ethics can inform both ecological science and forest science, pure and applied.

Humans have arrived on this world scene quite lately, and only more lately still have humans come to jeopardize this panorama of flourishing life. In the face of such jeopardy, humans, both biologists and ethicists, come to value life and to find its conservation imperative. That can be both because nature has value for our life conservation and also because of respect for the value of life in itself. Humans are the creatures with a conscience; we ought to value human life and wild life. Either way, some things are vital—and there we use another word that mixes biology and value. A biologist who does not respect life is just as much a contradiction in terms as is an ethicist who does not. That joins forever environmental science and environmental ethics.

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