



WHY PUT A VALUE ON BIODIVERSITY?

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In this chapter, I express a point of view in absolute terms to make it more vivid and understandable. There are exceptions to what I have written, but I will let others find them.

That it was considered necessary to have a section in this volume devoted to the value of biological diversity tells us a great deal about why biological diversity is in trouble. Two to three decades ago, the topic would not have been thought worth discussing, because few scientists and fewer laymen believed that biological diversity was—or could be—endangered in its totality. Three or four decades before that, a discussion of the value of biological diversity would probably have been scorned for a different reason. In the early part of this century, that value would have been taken for granted; the diversity of life was considered an integral part of life, and one of the nicest parts at that. Valuing diversity would, I suspect, have been thought both presumptuous and a terrible waste of time.

Now, in the last part of the twentieth century, we have meetings, papers, and entire books devoted to the subject of the value of biological diversity. It has become a kind of academic cottage industry, with dozens of us sitting at home at our word processors churning out economic, philosophical, and scientific reasons for or against keeping diversity. Why?

There are probably many explanations of why we feel compelled to place a value on diversity. One, for example, is that our ability to destroy diversity appears to place us on a plane above it, obliging us to judge and evaluate that which is in our power. A more straightforward explanation is that the dominant economic realities of our time—technological development, consumerism, the increasing size

of governmental, industrial, and agricultural enterprises, and the growth of human populations—are responsible for most of the loss of biological diversity. Our lives and futures are dominated by the economic manifestations of these often hidden processes, and survival itself is viewed as a matter of economics (we speak of tax shelters and safety nets), so it is hardly surprising that even we conservationists have begun to justify our efforts on behalf of diversity in economic terms.

It does not occur to us that nothing forces us to confront the process of destruction by using its own uncouth and self-destructive premises and terminology. It does not occur to us that by assigning value to diversity we merely legitimize the process that is wiping it out, the process that says, “The first thing that matters in any important decision is the tangible magnitude of the dollar costs and benefits.” People are afraid that if they do not express their fears and concerns in this language they will be laughed at, they will not be listened to. This may be true (although having philosophies that differ from the established ones is not necessarily inconsistent with political power). But true or not, it is certain that if we persist in this crusade to determine value where value ought to be evident, we will be left with nothing but our greed when the dust finally settles. I should make it clear that I am referring not just to the effort to put an actual price on biological diversity but also to the attempt to rephrase the price in terms of a nebulous survival value.

Two concrete examples that call into question this evaluating process come immediately to mind. The first is one that I first noticed a number of years ago: it was a paper written in the *Journal of Political Economy* by Clark (1973)—an applied mathematician at the University of British Columbia. That paper, which everyone who seeks to put a dollar value on biological diversity ought to read, is about the economics of killing blue whales. The question was whether it was economically advisable to halt the Japanese whaling of this species in order to give blue whales time to recover to the point where they could become a sustained economic resource. Clark demonstrated that in fact it was economically preferable to kill every blue whale left in the oceans as fast as possible and reinvest the profits in growth industries rather than to wait for the species to recover to the point where it could sustain an annual catch. He was not recommending this course—just pointing out a danger of relying heavily on economic justifications for conservation in that case.

Another example concerns the pharmaceutical industry. It used to be said, and to some extent still is, that the myriad plants and animals of the world’s remaining tropical moist forests may well contain a great many chemical compounds of potential benefit to human health—everything from safe contraceptives to cures for cancer. I think this is true, and for all I know, the pharmaceutical companies think it is true also, but the point is that this has become irrelevant. Pharmaceutical researchers now believe, rightly or wrongly, that they can get new drugs faster and cheaper by computer modeling of the molecular structures they find promising on theoretical grounds, followed by organic synthesis in the laboratory using a host of new technologies, including genetic engineering. There is no need, they claim, to waste time and money slogging around in the jungle. In a few short years, this so-called value of the tropical rain forest has fallen to the level of used computer printout.

In the long run, basing our conservation strategy on the economic value of diversity will only make things worse, because it keeps us from coping with the root cause of the loss of diversity. It makes us accept as givens the technological/socioeconomic premises that make biological impoverishment of the world inevitable. If I were one of the many exploiters and destroyers of biological diversity, I would like nothing better than for my opponents, the conservationists, to be bogged down over the issue of valuing. As shown by the example of the faltering search for new drugs in the tropics, economic criteria of value are shifting, fluid, and utterly opportunistic in their practical application. This is the opposite of the value system needed to conserve biological diversity over the course of decades and centuries.

Value is an intrinsic part of diversity; it does not depend on the properties of the species in question, the uses to which particular species may or may not be put, or their alleged role in the balance of global ecosystems. For biological diversity, value is. Nothing more and nothing less. No cottage industry of expert evaluators is needed to assess this kind of value.

Having said this, I should stop, but I won't, because I would like to say it in a different way.

There are two practical problems with assigning value to biological diversity. The first is a problem for economists: it is not possible to figure out the true economic value of any piece of biological diversity, let alone the value of diversity in the aggregate. We do not know enough about any gene, species, or ecosystem to be able to calculate its ecological and economic worth in the larger scheme of things. Even in relatively closed systems (or in systems that they pretend are closed), economists are poor at describing what is happening and terrible at making even short-term predictions based on available data. How then should ecologists and economists, dealing with huge, open systems, decide on the net present or future worth of any part of diversity? There is not even a way to assign numbers to many of the admittedly most important sources of value in the calculation. For example, we can figure out, more or less, the value of lost revenue in terms of lost fisherman-days when trout streams are destroyed by acid mine drainage, but what sort of value do we assign to the loss to the community when a whole generation of its children can never experience the streams in their environment as amenities or can never experience home as a place where one would like to stay, even after it becomes possible to leave.

Moreover, how do we deal with values of organisms whose very existence escapes our notice? Before we fully appreciated the vital role that mycorrhizal symbiosis plays in the lives of many plants, what kind of value would we have assigned to the tiny, threadlike fungi in the soil that make those relationships possible? Given these realities of life on this infinitely complex planet, it is no wonder that contemporary efforts to assign value to a species or ecosystem so often appear like clumsy rewrites of "The Emperor's New Clothes."

The second practical problem with assigning value to biological diversity is one for conservationists. In a chapter called "The Conservation Dilemma" in my book *The Arrogance of Humanism*, I discussed the problem of what I call nonresources (Ehrenfeld, 1981). The sad fact that few conservationists care to face is that many

species, perhaps most, do not seem to have any conventional value at all, even hidden conventional value. True, we can not be sure which particular species fall into this category, but it is hard to deny that there must be a great many of them. And unfortunately, the species whose members are the fewest in number, the rarest, the most narrowly distributed—in short, the ones most likely to become extinct—are obviously the ones least likely to be missed by the biosphere. Many of these species were never common or ecologically influential; by no stretch of the imagination can we make them out to be vital cogs in the ecological machine. If the California condor disappears forever from the California hills, it will be a tragedy: but don't expect the chaparral to die, the redwoods to wither, the San Andreas fault to open up, or even the California tourist industry to suffer—they won't.

So it is with plants (Ehrenfeld, 1986). We do not know how many species are needed to keep the planet green and healthy, but it seems very unlikely to be anywhere near the more than quarter of a million we have now. Even a mighty dominant like the American chestnut, extending over half a continent, all but disappeared without bringing the eastern deciduous forest down with it. And if we turn to the invertebrates, the source of nearly all biological diversity, what biologist is willing to find a value-conventional or ecological—for all 600,000-plus species of beetles?

I am not trying to deny the very real ecological dangers the world is facing; rather, I am pointing out that the danger of declining diversity is in great measure a separate danger, a danger in its own right. Nor am I trying to undermine conservation; in fact, I would like to see it find a sound footing outside the slick terrain of the economists and their philosophical allies.

If conservation is to succeed, the public must come to understand the inherent wrongness of the destruction of biological diversity. This notion of wrongness is a powerful argument with great breadth of appeal to all manner of personal philosophies.

Those who do not believe in God, for example, can still accept the fact that it is wrong to destroy biological diversity. The very existence of diversity is its own warrant for survival. As in law, long-established existence confers a powerful right to a continued existence. And if more human-centered values are still deemed necessary, there are plenty available—for example, the value of the wonder, excitement, and challenge of so many species arising from a few dozen elements of the periodic table.

And to countenance the destruction of diversity is equally wrong for those who believe in God, because it was God who, by whatever mechanism, caused this diversity to appear here in the first place. Diversity is God's property, and we, who bear the relationship to it of strangers and sojourners, have no right to destroy it (Berry, 1981; Lamm, 1971). There is a much-told story (Hutchinson, 1959) about the great biologist, J. B. S. Haldane, who was not exactly an apostle of religion. Haldane was asked what his years of studying biology had taught him about the Creator. His rather snide reply was that God seems to have an "inordinate fondness for beetles." Well why not? As God answered Job from the whirlwind in the section of the Bible that is perhaps most relevant to biological diversity, "Where were you

when I laid the foundations of the earth?" (Job 38:4). Assigning value to that which we do not own and whose purpose we can not understand except in the most superficial ways is the ultimate in presumptuous folly.

The great biochemist Erwin Chargaff, one of the founders of modern molecular biology, remarked not too many years ago, "I cannot help thinking of the deplorable fact that when the child has found out how its mechanical toy operates, there is no mechanical toy left" (Chargaff, 1978, p. 121). He was referring to the direction taken by modern scientific research, but the problem is a general one, and we can apply it to conservation as well. I cannot help thinking that when we finish assigning values to biological diversity, we will find that we don't have very much biological diversity left.

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