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## 6 ENVIRONMENTAL ETHICS: VALUES IN AND DUTIES TO THE NATURAL WORLD

Environmental ethics stretches classical ethics to the breaking point. All ethics seeks an appropriate respect for life. But we do not need just a humanistic ethic applied to the environment as we have needed one for business, law, medicine, technology, international development, or nuclear disarmament. Respect for life does demand an ethic concerned about human welfare, an ethic like the others and now applied to the environment. But environmental ethics in a deeper sense stands on a frontier, as radically theoretical as it is applied. It alone asks whether there can be nonhuman objects of duty.

Holmes  
Rolston III

Neither theory nor practice elsewhere needs values outside of human subjects, but environmental ethics must be more biologically objective—nonanthropocentric. It challenges the separation of science and ethics, trying to reform a science that finds nature value-free and an ethics that assumes that only humans count morally. Environmental ethics seeks to escape relativism in ethics, to discover a way past culturally based ethics. However much our worldviews, ethics included, are embedded in our cultural heritages, and thereby theory-laden and value-laden, all of us know that a natural world exists apart from human cultures. Humans interact with nature. Environmental ethics is the only ethics that breaks out of culture. It

has to evaluate nature, both wild nature and the nature that mixes with culture, and to judge duty thereby. After accepting environmental ethics, you will no longer be the humanist you once were.

Environmental ethics requires risk. It explores poorly charted terrain, where one can easily get lost. One must hazard the kind of insight that first looks like foolishness. Some people approach environmental ethics with a smile—expecting chicken liberation and rights for rocks, misplaced concern for chipmunks and daisies. Elsewhere, they think, ethicists deal with sober concerns: medical ethics, business ethics, justice in public affairs, questions of life and death and of peace and war. But the questions here are no less serious: The degradation of the environment poses as great a threat to life as nuclear war, and a more probable tragedy.

### Higher Animals

Logically and psychologically, the best and easiest breakthrough past the traditional boundaries of interhuman ethics is made when confronting higher animals. Animals defend their lives; they have a good of their own and suffer pains and pleasures like ourselves. Human moral concern should at least cross over into the domain of animal experience. This boundary crossing is also dangerous because if made only psychologically and not biologically, the would-be environmental ethicist may be too disoriented to travel further. The promised environmental ethics will degenerate into a mammalian ethics. We certainly need an ethic for animals, but that is only one level of concern in a comprehensive environmental ethics.

One might expect classical ethics to have sifted well an ethics for animals. Our ancestors did not think about endangered species, ecosystems, acid rain, or the ozone layer, but they lived in closer association with wild and domestic animals than we do. Hunters track wounded deer; ranchers who let their horses starve are prosecuted. Still, until recently, the scientific, humanistic centuries since the so-called Enlightenment have not been sensitive ones for animals, owing to the Cartesian legacy. Animals were mindless, living matter; biology has been mechanistic. Even psychology, rather than defending animal experience, has been behaviorist. Philosophy has protested little, concerned instead with locating values in human experiences at the same time that it dispirited and devalued nature. Across several centuries of hard science and humanistic ethics there has been little compassion for animals.

The progress of science itself smeared the human-nonhuman boundary line. Animal anatomy, biochemistry, cognition, perception, experience, behavior, and evolutionary history are kin to our own. Animals have no immortal souls, but then persons may not either, or beings with souls may not be the only kind that count morally. Ethical progress further smeared the boundary. Sensual pleasures are a good thing; ethics should be egalitarian, nonarbitrary, nondiscriminatory. There are ample scientific grounds that animals enjoy pleasures and suffer pains; and ethically there are no grounds to value these sensations in humans and not in animals. So there has been a vigorous reassessment of human duties to sentient life. The world cheered in the fall of 1988 when humans rescued two whales from winter ice.

"Respect their right to life": A sign in Rocky Mountain National Park enjoins humans not to harass bighorn sheep. "The question is not, Can they reason, nor Can they talk? but, Can they suffer?" wrote Jeremy Bentham (1948 [1789]), insisting that animal welfare counts too. The Park Service sign and Bentham's question increase sensitivity by extending rights and hedonist goods to animals. The gain is a vital breakthrough past humans, and the first lesson in environmental ethics has been learned. But the risk is a moral extension that expands rights as far as mammals and not much further, a psychologically based ethic that counts only felt experience. We respect life in our nonhuman but near-human animal cousins, a semianthropocentric and still quite subjective ethics. Justice remains a concern for just-us subjects. There has, in fact, not been much of a theoretical breakthrough, no paradigm shift.

Lacking that, we are left with anomaly and conceptual strain. When we try to use culturally extended rights and psychologically based utilities to protect the flora or even the insentient fauna, to protect endangered species or ecosystems, we can only stammer. Indeed, we get lost trying to protect bighorns, because, in the wild, cougars are not respecting the rights or utilities of the sheep they slay, and, in culture, humans slay sheep and eat them regularly, while humans have every right not to be eaten by either humans or cougars. There are no rights in the wild, and nature is indifferent to the welfare of particular animals. A bison fell through the ice into a river in Yellowstone Park; the environmental ethic there, letting nature take its course, forbade would-be rescuers from either saving or killing the suffering animal to put it out of its misery. A drowning human would have been saved at once. Perhaps it was a mistake to save those whales.

The ethics by extension now seems too nondiscriminating; we are

unable to separate an ethics for humans from an ethics for wildlife. To treat wild animals with compassion learned in culture does not appreciate their wildness. Man; said Socrates, is the political animal; humans maximally are what they are in culture, where the natural selection pressures (impressively productive in ecosystems) are relaxed without detriment to the species *Homo sapiens*, and indeed with great benefit to its member persons. Wild animals cannot enter culture; they do not have that capacity. They cannot acquire language at sufficient levels to take part in culture; they cannot make their clothing or build fires, much less read books or receive an education. Animals can, by human adoption, receive some of the protections of culture, which happens when we domesticate them, but neither pets nor food animals enter the culture that shelters them.

Worse, such cultural protection can work to their detriment; their wildness is made over into a human artifact as food or pet animal. A cow does not have the integrity of a deer, or a poodle that of a wolf. Culture is a good thing for humans but often a bad thing for animals. Their biology and ecology—neither justice nor charity, nor rights nor welfare—provide the benchmark for an ethics.

Culture does make a relevant ethical difference, and environmental ethics has different criteria from interhuman ethics. Can they talk? and, Can they reason?—indicating cultural capacities—are relevant questions; not just, Can they suffer? *Equality* is a positive word in ethics, *discriminatory* a pejorative one. On the other hand, simplistic reduction is a failing in the philosophy of science and epistemology; to be "discriminating" is desirable in logic and value theory. Something about treating humans as equals with bighorns and cougars seems to "reduce" humans to merely animal levels of value, a "no more than" counterpart in ethics of the "nothing but" fallacy often met in science. Humans are "nothing but" naked apes. Something about treating sheep and cougars as the equals of humans seems to elevate them unnaturally and not to value them for what they are. There is something insufficiently discriminating in such judgments; they are species-blind in a bad sense, blind to the real differences between species, valuational differences that do count morally. To the contrary, a discriminating ethicist will insist on preserving the differing richness of valuational complexity, wherever found. Compassionate respect for life in its suffering is only part of the analysis.

Two tests of discrimination are pains and diet. It might be thought that pain is a bad thing, whether in nature or culture. Perhaps when

dealing with humans in culture, additional levels of value and utility must be protected by conferring rights that do not exist in the wild, but meanwhile we should at least minimize animal suffering. That is indeed a worthy imperative in culture where animals are removed from nature and bred, but it may be misguided where animals remain in ecosystems. When the bighorn sheep of Yellowstone caught pinkeye, they were blinded, injured, and starving as a result, and three hundred of them, more than half the herd, perished. Wildlife veterinarians wanted to treat the disease, as they would have in any domestic herd, and as they did with Colorado bighorns infected with an introduced lungworm, but the Yellowstone ethicists left the animals to suffer, seemingly not respecting their life.

Had those ethicists no mercy? They knew rather that, although intrinsic pain is a bad thing whether in humans or in sheep, pain in ecosystems is instrumental pain, through which the sheep are naturally selected for a more satisfactory adaptive fit. Pain in a medically skilled culture is pointless, once the alarm to health is sounded, but pain operates functionally in bighorns in their niche, even after it becomes no longer in the interests of the pained individual. To have interfered in the interests of the blinded sheep would have weakened the species. Even the question, Can they suffer? is not as simple as Bentham thought. What we ought to do depends on what is. The *is* of nature differs significantly from the *is* of culture, even when similar suffering is present in both.

At this point some ethicists will insist that at least in culture we can minimize animal pain, and that will constrain our diet. There is predation in nature; humans evolved as omnivores. But humans, the only moral animals, should refuse to participate in the meat-eating phase of their ecology, just as they refuse to play the game merely by the rules of natural selection. Humans do not look to the behavior of wild animals as an ethical guide in other matters (marriage, truth telling, promise keeping, justice, charity). Why should they justify their dietary habits by watching what animals do?

But the difference is that these other matters are affairs of culture; these are person-to-person events, not events at all in spontaneous nature. By contrast, eating is omnipresent in wild nature; humans eat because they are in nature, not because they are in culture. Eating animals is not an event between persons but a human-to-animal event; and the rules for this act come from the ecosystems in which humans evolved and have no duty to remake. Humans, then, can model their

dietary habits from their ecosystems, though they cannot and should not so model their interpersonal justice or charity. When eating, they ought to minimize animal suffering, but they have no duty to revise trophic pyramids whether in nature or culture. The boundary between animals and humans has not been rubbed out after all; only what was a boundary line has been smeared into a boundary zone. We have discovered that animals count morally, though we have not yet solved the challenge of how to count them.

Animals enjoy psychological lives, subjective experiences, the satisfaction of felt interests—intrinsic values that count morally when humans encounter them. But the pains, pleasures, interests, and welfare of individual animals are only one of the considerations in a more complex environmental ethics that cannot be reached by conferring rights on them or by a hedonist calculus, however far extended. We have to travel further into a more biologically based ethics.

### Organisms

If we are to respect all life, we have still another boundary to cross, from zoology to botany, from sentient to insentient life. In Yosemite National Park for almost a century humans entertained themselves by driving through a tunnel cut in a giant sequoia. Two decades ago the Wawona tree, weakened by the cut, blew down in a storm. People said, "Cut us another drive-through sequoia." The Yosemite environmental ethic, deepening over the years, answered, "No. You ought not to mutilate majestic sequoias for amusement. Respect their life." Indeed, some ethicists count the value of redwoods so highly that they will spike redwoods, lest they be cut. In the Rawah Wilderness in alpine Colorado, old signs read, "Please leave the flowers for others to enjoy." When the signs rotted out, new signs urged a less humanist ethic: "Let the flowers live!"

But trees and flowers cannot care, so why should we? We are not considering animals that are close kin, nor can they suffer or experience anything. Plants are not valuers with preferences that can be satisfied or frustrated. It seems odd to assert that plants need our sympathy, odd to ask that we should consider their point of view. They have no subjective life, only objective life.

Perhaps the questions are wrong, because they are coming out of the old paradigm. We are at a critical divide. That is why I earlier warned that environmental ethicists who seek only to extend a humanistic ethic to

mammalian cousins will get lost. Seeing no moral landmarks, those ethicists may turn back to more familiar terrain. Afraid of the naturalistic fallacy, they will say that people should enjoy letting flowers live or that it is silly to cut drive-through sequoias, that it is aesthetically more excellent for humans to appreciate both for what they are. But these ethically conservative reasons really do not understand what biological conservation is in the deepest sense.

It takes ethical courage to go on, to move past a hedonistic, humanistic logic to a bio-logic. Pains, pleasures, and psychological experience will no further be useful categories, but—lest some think that from here on I as a philosopher become illogical and lose all ethical sense—let us orient ourselves by extending logical, prepositional, cognitive, and normative categories into biology. Nothing matters to a tree, but much is vital to it.

An organism is a spontaneous, self-maintaining system, sustaining and reproducing itself, executing its program, making a way through the world, checking against performance by means of responsive capacities with which to measure success. It can reckon with vicissitudes, opportunities, and adversities that the world presents. Something more than physical causes, even when less than sentience, is operating within every organism. There is information superintending the causes; without it, the organism would collapse into a sand heap. This information is a modern equivalent of what Aristotle called formal and final causes; it gives the organism a telos, or end, a kind of (nonfelt) goal. Organisms have ends, although not always ends in view.

All this cargo is carried by the DNA, essentially a linguistic molecule. By a serial reading of the DNA, a polypeptide chain is synthesized, such that its sequential structure determines the bioform into which it will fold. Ever-lengthening chains are organized into genes, as ever longer sentences are organized into paragraphs and chapters. Diverse proteins, lipids, carbohydrates, enzymes—all the life structures—are written into the genetic library. The DNA is thus a logical set, not less than a biological set, and is informed as well as formed. Organisms use a sort of symbolic logic, using these molecular shapes as symbols of life. The novel resourcefulness lies in the epistemic content conserved, developed, and thrown forward to make biological resources out of the physicochemical sources. This executive steering core is cybernetic—partly a special kind of cause-and-effect system and partly something more. It is partly a historical information system discovering and evaluating ends so as to map and make a way through the world, and partly a system of

significances attached to operations, pursuits, and resources. In this sense, the genome is a set of conservation molecules.

The genetic set is really a prepositional set—to choose a provocative term—recalling that the Latin *propositum* is an assertion, a set task, a theme, a plan, a proposal, a project, as well as a cognitive statement. From this, it is also a motivational set, unlike human books, because these life motifs are set to drive the movement from genotypic potential to phenotypic expression. Given a chance, these molecules seek organic self-expression. They thus proclaim a lifeway; and with this an organism, unlike an inert rock, claims the environment as source and sink, from which to abstract energy and materials and into which to excrete them. It takes advantage of its environment. Life thus arises out of earthen sources (as do rocks), but life (unlike rocks) turns back on its sources to make resources out of them. An acorn becomes an oak; the oak stands on its own.

So far we have only description. We begin to pass to value when we recognize that the genetic set is a normative set; it distinguishes between what is and what ought to be. This does not mean that the organism is a moral system, for there are no moral agents in nature; but the organism is an axiological, evaluative system. So the oak grows, reproduces, repairs its wounds, and resists death. The physical state that the organism seeks, idealized in its programmatic form, is a valued state. Value is present in this achievement. *Vital* seems a better word here than *biological*. We are dealing not simply with another individual defending its solitary life but with an individual having situated fitness in an ecosystem. Still, we want to affirm that the living individual, taken as a point-experience in the web of interconnected life, is per se an intrinsic value.

A life is defended for what it is in itself, without necessary further contributory reference, although, given the structure of all ecosystems, such lives necessarily do have further contributory reference. The organism has something it is conserving, something for which it is standing: its life. Though organisms must fit into their niche, they have their own standards. They promote their own realization, at the same time that they track an environment. They have a technique, a know-how. Every organism has a good of its kind; it defends its own kind as a good kind. In that sense, as soon as one knows what a giant sequoia tree is, one knows the biological identity that is sought and conserved.

There seems no reason why such own-standing normative organisms



are not morally significant. A moral agent deciding his or her behavior ought to take account of the consequences for other evaluative systems. Within the community of moral agents, one has not merely to ask whether or is a normative system but also, because the norms are at personal option, to judge the norm. But within the biotic community, organisms are amoral normative systems, and there are no cases in which an organism seeks a good of its own that is morally reprehensible. The distinction between having a good of its kind and being a good kind vanishes, so far as any faulting of the organism is concerned. To this extent, everything with a good of its kind is a good kind and thereby has intrinsic value.

One might say that an organism is a bad organism if, during the course of pressing its normative expression, it upsets the ecosystem or causes widespread disease. Remember, though, that an organism cannot be a good kind without situated environmental fitness. By natural selection the kind of goods to which it is genetically programmed must mesh with its ecosystemic role. In spite of the ecosystem as a perpetual contest of goods in dialectic and exchange, it is difficult to say that any organism is a bad kind in this instrumental sense either. The misfits are extinct, or soon will be. In spontaneous nature any species that preys upon, parasitizes, competes with, or crowds another will be a bad kind from the narrow perspective of its victim or competitor.

But if we enlarge that perspective, we typically have difficulty in saying that any species is a bad kind overall in the ecosystem. An "enemy" may even be good for the "victimized" species, though harmful to individual members of it, as when predation keeps the deer herd healthy. Beyond this, the "bad kinds" typically play useful roles in population control, in symbiotic relationships, or in providing opportunities for other species. The *Chlamydia* microbe is a bad kind from the perspective of the bighorns, but when one thing dies, something else lives. After the pinkeye outbreak among the bighorns, the golden eagle population in Yellowstone flourished, preying on the bighorn carcasses. For the eagles, *Chlamydia* is a good kind instrumentally.

Some biologist-philosophers will say that even though an organism evolves to have a situated environmental fitness, not all such situations are good arrangements; some can be clumsy or bad. True, the vicissitudes of historical evolution do sometimes result in ecological webs that are suboptimal solutions, within the biologically limited possibilities and powers of interacting organisms. Still, such systems have been selected

over millennia for functional stability, and at least the burden of proof is on a human evaluator to say why any natural kind is a bad kind and ought not to call forth admiring respect. Something may be a good kind intrinsically but a bad kind instrumentally in the system; such cases will be anomalous however, with selection pressures against them. These assertions about good kinds do not say that things are perfect kinds or that there can be no better ones, only that natural kinds are good kinds until proven otherwise.

In fact, what is almost invariably meant by a bad kind is an organism that is instrumentally bad when judged from the viewpoint of human interests, often with the further complication that human interests have disrupted natural systems. *Bad* as so used is an anthropocentric word; there is nothing at all biological or ecological about it, and so it has no force in evaluating objective nature, however much humanistic force it may sometimes have.

A vital ethic respects all life, not just animal pains and pleasures, much less just human preferences. The old signs in the Rawah Wilderness—"Please leave the flowers for others to enjoy"—were application signs using an old, ethically conservative, humanistic ethic. The new ones invite a change of reference frame—a wilder ethic that is more logical because it is more biological, a radical ethic that goes down to the roots of life, that really is conservative because it understands biological conservation at depths. What the injunction "Let the flowers live!" means is this: "Daisies, marsh marigolds, geraniums, and larkspurs are evaluative systems that conserve goods of their kind and, in the absence of evidence to the contrary, are good kinds. There are trails here by which you may enjoy these flowers. Is there any reason why your human interests should not also conserve these good kinds?" A drive-through sequoia causes no suffering; it is not cruel. But it is callous and insensitive to the wonder of life.

### Species

Sensitivity to the wonder of life, however, can sometimes make an environmental ethicist seem callous. On San Clemente Island, the U.S. Fish and Wildlife Service and the Natural Resource Office of the U.S. Navy planned to shoot two thousand feral goats to save three endangered plant species (*Malacothamnus clementinus*, *Castilleja grisea*, and *Delphinium kinkiense*), of which the surviving individuals numbered only a

few dozen. After a protest some goats were trapped and relocated. But trapping all of them was impossible, and many thousands were killed. In this instance, the survival of plant species was counted more than the lives of individual mammals; a few plants counted more than many thousands of goats.

Those who wish to restore rare species of big cats to the wild have asked about killing genetically inbred, inferior cats presently held in zoos, in order to make space available for the cats needed to reconstruct and maintain a population that is genetically more likely to survive upon release. All the Siberian tigers in zoos in North America are descendants of seven animals; if these tigers were replaced by others nearer to the wild type and with more genetic variability, the species might be saved in the wild. When we move to the level of species, sometimes we decide to kill individuals for the good of their kind.

Or we might now refuse to let nature take its course. The Yellowstone ethicists let the bison drown, in spite of its suffering; they let the blinded bighorns die. But in the spring of 1984 a sow grizzly and her three cubs walked across the ice of Yellowstone Lake to Frank Island, two miles from shore. They stayed several days to feast on two elk carcasses, and the ice bridge melted. Soon afterward, they were starving on an island too small to support them. This time the Yellowstone ethicists promptly rescued the grizzlies and released them on the mainland, in order to protect an endangered species. They were not rescuing individual bears so much as saving the species.

Coloradans have declined to build the Two Forks Dam to supply urban Denver with water. Building the dam would require destroying a canyon and altering the Platte River flow, with many negative environmental consequences, including further endangering the whooping crane and endangering a butterfly, the Pawnee montane skipper. Elsewhere in the state, water development threatens several fish species, including the humpback chub, which requires the turbulent spring runoff stopped by dams. Environmental ethics doubts whether the good of humans who wish more water for development, both for industry and for bluegrass lawns, warrants endangering species of cranes, butterflies, and fish.

A species exists; a species ought to exist. An environmental ethics must make these assertions and move from biology to ethics with care. Species exist only instantiated in individuals, yet they are as real as individual plants or animals. The assertion that there are specific forms

of life historically maintained in their environments over time seems as certain as anything else we believe about the empirical world. At times biologists revise the theories and taxa with which they map these forms, but species are not so much like lines of latitude and longitude as like mountains and rivers, phenomena objectively there to be mapped. The edges of these natural kinds will sometimes be fuzzy, to some extent discretionary. One species will slide into another over evolutionary time. But it does not follow from the fact that speciation is sometimes in progress that species are merely made up and not found as evolutionary lines with identity in time as well as space.

A consideration of species is revealing and challenging because it offers a biologically based counterexample to the focus on individuals—typically sentient and usually persons—so characteristic in classical ethics. In an evolutionary ecosystem, it is not mere individuality that counts; the species is also significant because it is a dynamic life-form maintained over time. The individual represents (re-presents) a species in each new generation. It is a token of a type, and the type is more important than the token.

A species lacks moral agency, reflective self-awareness, sentience, or organic individuality. The older, conservative ethic will be tempted to say that specific-level processes cannot count morally. Duties must attach to singular lives, most evidently those with a self, or some analogue to self. In an individual organism, the organs report to a center; the good of a whole is defended. The members of a species report to no center. A species has no self. It is not a bounded singular. There is no analogue to the nervous hookups or circulatory flows that characterize the organism.

But singularity, centeredness, selfhood, and individuality are not the only processes to which duty attaches. A more radically conservative ethic knows that having a biological identity reasserted genetically over time is as true of the species as of the individual. Identity need not attach solely to the centered organism; it can persist as a discrete pattern over time. From this way of thinking, it follows that the life the individual has is something passing through the individual as much as something it intrinsically possesses. The individual is subordinate to the species, not the other way around. The genetic set, in which is coded the telos, is as evidently the property of the species as of the individual through which it passes. A consideration of species strains any ethic fixed on individual organisms, much less on sentience or persons. But the result can be biologically sounder, though it revises what was formerly thought log-

ically permissible or ethically binding. When ethics is informed by this kind of biology, it is appropriate to attach duty dynamically to the specific form of life.

The species line is the vital living system, the whole, of which individual organisms are the essential parts. The species too has its integrity, its individuality, its right to life (if we must use the rhetoric of rights); and it is more important to protect this vitality than to protect individual integrity. The right to life, biologically speaking, is an adaptive fit that is right for life, that survives over millennia. This idea generates at least a presumption that species in a niche are good right where they are, and therefore that it is right for humans to let them be, to let them evolve.

Processes of value that we earlier found in an organic individual reappear at the specific level: defending a particular form of life, pursuing a pathway through the world, resisting death (extinction), regenerating, maintaining a normative identity over time, expressing creative resilience by discovering survival skills. It is as logical to say that the individual is the species' way of propagating itself as to say that the embryo or egg is the individual's way of propagating itself. The dignity resides in the dynamic form; the individual inherits this form, exemplifies it, and passes it on. If, at the specific level, these processes are just as evident, or even more so, what prevents duties from arising at that level? The appropriate survival unit is the appropriate level of moral concern.

A shutdown of the life stream is the most destructive event possible. The wrong that humans are doing, or allowing to happen through carelessness, is stopping the historical vitality of life, the flow of natural kinds. Every extinction is an incremental decay in this stopping of life, no small thing. Every extinction is a kind of superkilling. It kills forms (species) beyond individuals. It kills essences beyond existences, the soul as well as the body. It kills collectively, not just distributively. It kills birth as well as death. Afterward nothing of that kind either lives or dies.

Ought species *x* to exist? is a distributive increment in the collective question, ought life on Earth to exist? Life on Earth cannot exist without its individuals, but a lost individual is always reproducible; a lost species is never reproducible. The answer to the species question is not always the same as the answer to the collective question, but because life on Earth is an aggregate of many species, the two are sufficiently related that the burden of proof lies with those who wish deliberately to extinguish a species and simultaneously to care for life on Earth.

One form of life has never endangered so many others. Never before

has this level of question—superkilling by a superkiller—been deliberately faced. Humans have more understanding than ever of the natural world they inhabit and of the speciating processes, more predictive power to foresee the intended and unintended results of their actions, and more power to reverse the undesirable consequences. The duties that such power and vision generate no longer attach simply to individuals or persons but are emerging duties to specific forms of life. What is ethically callous is the maelstrom of killing and insensitivity to forms of life and the sources producing them. What is required is principled responsibility to the biospheric Earth.

Human activities seem misfit in the system. Although humans are maximizing their own species interests, and in this respect behaving as does each of the other species, they do not have any adaptive fitness. They are not really fitting into the evolutionary processes of ongoing biological conservation and elaboration. Their cultures are not really dynamically stable in their ecosystems. Such behavior is therefore not right. Yet humanistic ethical systems limp when they try to prescribe right conduct here. They seem misfits in the roles most recently demanded of them.

If, in this world of uncertain moral convictions, it makes any sense to assert that one ought not to kill individuals without justification, it makes more sense to assert that one ought not to superkill the species without superjustification. Several billion years' worth of creative toil, several million species of teeming life, have been handed over to the care of this late-coming species in which mind has flowered and morals have emerged. Ought not this sole moral species do something less self-interested than count all the produce of an evolutionary ecosystem as nothing but human resources? Such an attitude hardly seems biologically informed, much less ethically adequate. It is too provincial for intelligent humanity. Life on Earth is a many-splendored thing; extinction dims its luster. An ethics of respect for life is urgent at the level of species.

### Ecosystems

A species is what it is where it is. No environmental ethics has found its way on Earth until it finds an ethic for the biotic communities in which all destinies are entwined. "A thing is right," urged Aldo Leopold (1968 [1949]), "when it tends to preserve the integrity, stability, and beauty of

the biotic community. It is wrong when it tends otherwise." Again, we have two parts to the ethic: first, that ecosystems exist, both in the wild and in support of culture; second, that ecosystems ought to exist, both for what they are in themselves and as modified by culture. Again, we must move with care from the biological assertions to the ethical assertions.

Giant forest fires raged over Yellowstone National Park in the summer of 1988, consuming nearly a million acres despite the efforts of a thousand fire fighters. By far the largest ever known in the park, the fires seemed a disaster. But the Yellowstone land ethic enjoined: "Let nature take its course; let it burn." So the fires were not fought at first, but in midsummer, national authorities overrode that policy and ordered the fires put out. Even then, weeks later, fires continued to burn, partly because they were too big to control but partly too because Yellowstone personnel did not really want the fires put out. Despite the evident destruction of trees, shrubs, and wildlife, they believe that fires are a good thing—even when the elk and bison leave the park in search of food and are shot by hunters. Fires reset succession, release nutrients, recycle materials, and renew the biotic community. (Nearby, in the Teton wilderness, a storm blew down fifteen thousand acres of trees, and some people proposed that the area be declassified from wilderness to allow commercial salvage of the timber. But a similar environmental ethic said, "No, let it rot.")

Aspen are important in the Yellowstone ecosystem. Although some aspen stands are climax and self-renewing, many are seral and give way to conifers. Aspen groves support many birds and much wildlife, especially beavers, whose activities maintain the riparian zones. Aspen are rejuvenated after fires, and the Yellowstone land ethic wants the aspen for their critical role in the biotic community. Elk browse the young aspen stems. To a degree this is a good thing, because it provides the elk with critical nitrogen, but in excess it is a bad thing. The elk have no predators, because the wolves are gone, and as a result the elk overpopulate. Excess elk also destroy the willows, and that destruction in turn destroys the beavers. So, in addition to letting fires burn, rejuvenating the aspen might require park managers to cull hundreds of elk—all for the sake of a healthy ecosystem.

The Yellowstone ethic wishes to restore wolves to the greater Yellowstone ecosystem. At the level of species, this change is desired because of what the wolf is in itself, but it is also desired because the greater Yellowstone ecosystem does not have its full integrity, stability, and

beauty without this majestic animal at the top of the trophic pyramid. Restoring the wolf as a top predator would mean suffering and death for many elk, but that would be a good thing for the aspen and willows, the beavers, and the riparian habitat and would have mixed benefits for the bighorns and mule deer (the overpopulating elk consume their food, but the sheep and deer would also be consumed by the wolves). Restoration of wolves would be done over the protests of ranchers who worry about wolves eating their cattle; many of them also believe that the wolf is a bloodthirsty killer, a bad kind. Nevertheless, the Yellowstone ethic demands wolves, as it does fires, in appropriate respect for life in its ecosystem.

Letting nature take its ecosystemic course is why the Yellowstone ethic forbade rescuing the drowning bison but required rescuing the sow grizzly and her cubs, the latter case to insure that the big predators remain. After the bison drowned, coyotes, foxes, magpies, and ravens fed on the carcass. Later, even a grizzly bear fed on it. All this is a good thing because the system cycles on. On that account, rescuing the whales trapped in the winter ice seems less of a good thing, when we note that rescuers had to drive away polar bears that attempted to eat the dying whales.

Classical, humanistic ethics finds ecosystems to be unfamiliar territory. It is difficult to get the biology right and, superimposed on the biology, to get the ethics right. Fortunately, it is often evident that human welfare depends on ecosystemic support, and in this sense all our legislation about clean air, clean water, soil conservation, national and state forest policies, pollution controls, renewable resources, and so forth is concerned about ecosystem-level processes. Furthermore, humans find much of value in preserving wild ecosystems, and our wilderness and park system is impressive.

Still, a comprehensive environmental ethics needs the best, naturalistic reasons, as well as the good, humanistic ones, for respecting ecosystems. Ecosystems generate and support life, keep selection pressures high, enrich situated fitness, and allow congruent kinds to evolve in their places with sufficient containment. The ecologist finds that ecosystems are objectively satisfactory communities in the sense that organismic needs are sufficiently met for species to survive and flourish, and the critical ethicist finds (in a subjective judgment matching the objective process) that such ecosystems are satisfactory communities to which to attach duty. Our concern must be for the fundamental unit of survival.



An ecosystem, the conservative ethicist will say, is too low a level of organization to be respected intrinsically. Ecosystems can seem little more than random, statistical processes. A forest can seem a loose collection of externally related parts, the collection of fauna and flora a jumble, hardly a community. The plants and animals within an ecosystem have needs, but their interplay can seem simply a matter of distribution and abundance, birth rates and death rates, population densities, parasitism and predation, dispersion, checks and balances, and stochastic process. Much is not organic at all (rain, groundwater, rocks, soil particles, air), and some organic material is dead and decaying debris (fallen trees, scat, humus). These things have no organized needs. There is only catch-as-catch-can scrimmage for nutrients and energy, not really enough of an integrated process to call the whole a community.

Unlike higher animals, ecosystems have no experiences; they do not and cannot care. Unlike plants, an ecosystem has no organized center, no genome. It does not defend itself against injury or death. Unlike a species, there is no ongoing telos, no biological identity reinstated over time. The organismic parts are more complex than the community whole. More troublesome still, an ecosystem can seem a jungle where the fittest survive, a place of contest and conflict, beside which the organism is a model of cooperation. In animals the heart, liver, muscles, and brain are tightly integrated, as are the leaves, cambium, and roots in plants. But the so-called ecosystem community is pushing and shoving between rivals, each aggrandizing itself, or else seems to be all indifference and haphazard juxtaposition—nothing to call forth our admiration.

Environmental ethics must break through the boundary posted by disoriented ontological conservatives, who hold that only organisms are real, actually existing as entities, whereas ecosystems are nominal—just interacting individuals. Oak trees are real, but forests are nothing but collections of trees. But any level is real if it shapes behavior on the level below it. Thus the cell is real because that pattern shapes the behavior of amino acids; the organism, because that pattern coordinates the behavior of hearts and lungs. The biotic community is real because the niche shapes the morphology of the oak trees within it. Being real at the level of community requires only an organization that shapes the behavior of its members.

The challenge is to find a dear model of community and to discover an ethics for it: better biology for better ethics. Even before the rise of

ecology, biologists began to conclude that the combative survival of the fittest distorts the truth. The more perceptive model is coaction in adapted fit. Predator and prey, parasite and host, grazer and grazed, are contending forces in dynamic process in which the well-being of each is bound up with the other—coordinated as much as heart and liver are coordinated organically. The ecosystem supplies the coordinates through which each organism moves, outside which the species cannot really be located.

The community connections are looser than the organism's internal interconnections but are not less significant. Admiring organic unity in organisms and stumbling over environmental looseness is like valuing mountains and despising valleys. The matrix that the organism requires to survive is the open, pluralistic ecological system. Internal complexity—heart, liver, muscles, brain—arises as a way of dealing with a complex, tricky environment. The skin-out processes are not just the support; they are the subtle source of the skin-in processes. In the complete picture, the outside is as vital as the inside. Had there been either simplicity or lockstep concentrated unity in the environment, no organismic unity could have evolved. Nor would it remain. There would be less elegance in life.

To look at one level for what is appropriate at another makes a mistake in categories. One should not look for a single center or program in ecosystems, much less for subjective experiences. Instead, one should look for a matrix, for interconnections between centers (individual plants and animals, dynamic lines of speciation), for creative stimulus and open-ended potential. Everything will be connected to many other things, sometimes by obligate associations but more often by partial and pliable dependencies, and, among other things, there will be no significant interactions. There will be functions in a communal sense: shunts and crisscrossing pathways, cybernetic subsystems and feedback loops. An order arises spontaneously and systematically when many self-concerned units jostle and seek to fulfill their own programs, each doing its own thing and forced into informed interaction.

An ecosystem is a productive, projective system. Organisms defend only their selves, with individuals defending their continuing survival and with species increasing the numbers of kinds. But the evolutionary ecosystem spins a bigger story, limiting each kind, locking it into the welfare of others, promoting new arrivals, increasing kinds and the integration of kinds. Species increase their kind, but ecosystems increase

kinds, superposing the latter increase onto the former. Ecosystems are selective systems, as surely as organisms are selective systems. The natural selection comes out of the system and is imposed on the individual. The individual is programmed to make more of its kind, but more is going on systemically than that; the system is making more kinds.

Communal processes—the competition between organisms, statistically probable interactions, plant and animal successions, speciation over historical time—generate an ever-richer community. Hence the evolutionary toil, elaborating and diversifying the biota, that once began with no species and results today in five million species, increasing over time the quality of lives in the upper rungs of the trophic pyramids. One-celled organisms evolved into many-celled, highly integrated organisms. Photosynthesis evolved and came to support locomotion—swimming, walking, running, flight. Stimulus-response mechanisms became complex instinctive acts. Warm-blooded animals followed cold-blooded ones. Complex nervous systems, conditioned behavior, and learning emerged. Sentience appeared—sight, hearing, smell, taste, pleasure, pain. Brains coupled with hands. Consciousness and self-consciousness arose. Culture was superposed on nature.

These developments do not take place in all ecosystems or at every level. Microbes, plants, and lower animals remain, good of their kinds and, serving continuing roles, good for other kinds. The understories remain occupied. As a result, the quantity of life and its diverse qualities continue—from protozoans to primates to people. There is a push-up, lock-up ratchet effect that conserves the upstrokes and the outreaches. The later we go in time, the more accelerated are the forms at the top of the trophic pyramids, the more elaborated are the multiple trophic pyramids of Earth. There are upward arrows over evolutionary time.

The system is a game with loaded dice, but the loading is a pro-life tendency, not mere stochastic process. Though there is no Nature in the singular, the system has a nature, a loading that pluralizes, putting natures into diverse kinds: nature<sub>1</sub>, nature<sub>2</sub>, nature<sub>3</sub> ... nature<sub>n</sub>. It does so using random elements (in both organisms and communities), but this is a secret of its fertility, producing steadily intensified interdependencies and options. An ecosystem has no head, but it heads toward species diversification, support, and richness. Though not a superorganism, it is a kind of vital field.

Instrumental value uses something as a means to an end; intrinsic value is worthwhile in itself. No warbler eats insects to become food for a

falcon; the warbler defends its own life as an end in itself and makes more warblers as it can. A life is defended intrinsically, without further contributory reference. But neither of these traditional terms is satisfactory at the level of the ecosystem. Though it has value *in* itself, the system does not have any *value for* itself. Though it is a value producer, it is not a value owner. We are no longer confronting instrumental value, as though the system were of value instrumentally as a fountain of life. Nor is the question one of intrinsic value, as though the system defended some unified form of life for itself. We have reached something for which we need a third term: systemic value. Duties arise in encounters with the system that projects and protects these member components in biotic community.

Ethical conservatives, in the humanistic sense, will say that ecosystems are of value only because they contribute to human experiences. But that mistakes the last chapter for the whole story, one fruit for the whole plant. Humans count enough to have the right to flourish in ecosystems, but not so much that they have the right to degrade or shut down ecosystems, not at least without a burden of proof that there is an overriding cultural gain. Those who have traveled partway into environmental ethics will say that ecosystems are of value because they contribute to animal experiences or to organismic life. But the really conservative, radical view sees that the stability, integrity, and beauty of biotic communities are what are most fundamentally to be conserved. In a comprehensive ethics of respect for life, we ought to set ethics at the level of ecosystems alongside classical, humanistic ethics.

### Value Theory

In practice the ultimate challenge of environmental ethics is the conservation of life on Earth. In principle the ultimate challenge is a value theory profound enough to support that ethics. In nature there is negentropic construction in dialectic with entropic teardown, a process for which we hardly yet have an adequate scientific theory, much less a valuational theory. Yet this is nature's most striking feature, one that ultimately must be valued and of value. In one sense, nature is indifferent to mountains, rivers, fauna, flora, forests, and grasslands. But in another sense, nature has bent toward making and remaking these projects, millions of kinds, for several billion years.

These performances are worth noticing, are remarkable and memora-

ble—and not just because of their tendencies to produce something else; certainly not merely because of their tendency to produce this noticing in certain recent subjects, our human selves. These events are loci of value as products of systemic nature in its formative processes. The splendors of Earth do not simply lie in their roles as human resources, supports of culture, or stimulators of experience. The most plausible account will find some programmatic evolution toward value, and not because it ignores Darwin but because it heeds his principle of natural selection and deploys it into a selection exploring new niches and elaborating kinds, even a selection upslope toward higher values, at least along some trends within some ecosystems. How do we humans come to be charged up with values, if there was and is nothing in nature charging us up so? A systematic environmental ethics does not wish to believe in the special creation of values or in their dumbfounding epigenesis. Let them evolve. Let nature carry value.

The notion that nature is a value carrier is ambiguous. Much depends on a thing's being more or less structurally congenial for the carriage. We value a thing and discover that we are under the sway of its valence, inducing our behavior. It has among its strengths (Latin: *valeo*, "be strong") this capacity to carry value. This potential cannot always be of the empty sort that a glass has for carrying water. It is often pregnant fullness. Some of the values that nature carries are up to us, our assignment. But fundamentally there are powers in nature that move to us and through us.

No value exists without an evaluator. So runs a well-entrenched dogma. Humans clearly evaluate their world; sentient animals may also. But plants cannot evaluate their environment; they have no options and make no choices. A fortiori, species and ecosystems, Earth and Nature, cannot be bona fide evaluators. One can always hang on to the assertion that value, like a tickle or remorse, must be felt to be there. Its *esse is percipi*. To be, it must be perceived. Nonsensed value is nonsense. There are no thoughts without a thinker, no percepts without a perceiver, no deeds without a doer, no targets without an aimer.

Such resolute subjectivists cannot be defeated by argument, although they can be driven toward analyticity. That theirs is a retreat to definition is difficult to expose, because they seem to cling so closely to inner experience. They are reporting, on this hand, how values always excite us. They are giving, on that hand, a stipulative definition. That is how they choose to use the word *value*.

If value arrives only with consciousness, experiences in which humans find value have to be dealt with as appearances of various sorts. The value has to be relocated in the valuing subject's creativity as a person meets a valueless world, or even a valuable one—one able to be valued but one that before the human bringing of valuableness contains only possibility and not any actual value. Value can only be extrinsic to nature, never intrinsic to it.

But the valuing subject in an otherwise valueless world is an insufficient premise for the experienced conclusions of those who respect all life. Conversion to a biological view seems truer to world experience and more logically compelling. Something from a world beyond the human mind, beyond human experience, is received into our mind, our experience, and the value of that something does not always arise with our evaluation of it. Here the order of knowing reverses, and also enhances, the order of being. This too is a perspective but is ecologically better-informed. Science has been steadily showing how the consequents (life, mind) are built on their precedents (energy, matter), however much they overleap them. Life and mind appear where they did not before exist, and with them levels of value emerge that did not before exist. But that gives no reason to say that all value is an irreducible emergent at the human (or upper-animal) level. A comprehensive environmental ethics reallocates value across the whole continuum. Value increases in the emergent climax but is continuously present in the composing precedents. The system is value-able, able to produce value. Human evaluators are among its products.

Some value depends on subjectivity, yet all value is generated within the geosystemic and ecosystemic pyramid. Systemically, value fades from subjective to objective value but also fans out from the individual to its role and matrix. Things do not have their separate natures merely in and for themselves, but they face outward and co-fit into broader natures. Value-in-itself is smeared out to become value-in-togetherness. Value seeps out into the system, and we lose our capacity to identify the individual as the sole locus of value.

Intrinsic value, the value of an individual for what it is in itself, becomes problematic in a holistic web. True, the system produces such values more and more with its evolution of individuality and freedom. Yet to decouple this value from the biotic, communal system is to make value too internal and elementary; this decoupling forgets relatedness and externality. Every intrinsic value has leading and trailing *and's*.

Such value is coupled with value from which it comes and toward which it moves. Adapted fitness makes individualistic value too system-independent. Intrinsic value is a part in a whole and is not to be fragmented by valuing it in isolation.

Everything is good in a role, in a whole, although we can speak of objective intrinsic goodness wherever a point-event—a trillium, for example—defends a good (its life) in itself. We can speak of subjective intrinsic goodness when such an event registers as a point-experience, at which point humans pronounce both their experience and what it is to be good without need to enlarge their focus. Neither the trilliums nor the human judges of it require for their respective valuings any further contributory reference.

When eaten by foragers or in death resorbed into humus, the trillium has its value destroyed, transformed into instrumentality. The system is a value transformer where form and being, process and reality, fact and value, are inseparably joined. Intrinsic and instrumental values shuttle back and forth, parts-in-wholes and wholes-in-parts, local details of value embedded in global structures, gems in their settings, and their setting-situation a corporation where value cannot stand alone. Every good is in community.

In environmental ethics one's beliefs about nature, which are based upon but exceed science, have everything to do with beliefs about duty. The way the world is informs the way it ought to be. We always shape our values in significant measure in accord with our notion of the kind of universe that we live in, and this process drives our sense of duty. Our model of reality implies a model of conduct. Differing models sometimes imply similar conduct, but often they do not. A model in which nature has no value apart from human preferences will imply different conduct from one in which nature projects fundamental values, some objective and others that further require human subjectivity superimposed on objective nature.

This evaluation is not scientific description; hence it is not ecology per se but metaecology. No amount of research can verify that, environmentally, the right is the optimum biotic community. Yet ecological description generates this valuing of nature, endorsing the systemic rightness. The transition from *is* to *good* and thence to *ought* occurs here; we leave science to enter the domain of evaluation, from which an ethics follows.

What is ethically puzzling and exciting is that an *ought* is not so much derived from an *is* as discovered simultaneously with it. As we progress

from descriptions of fauna and flora, of cycles and pyramids, of autotrophs coordinated with heterotrophs, of stability and dynamism, on to intricacy, planetary opulence and interdependence, unity and harmony with oppositions in counterpoint and synthesis, organisms evolved within and satisfactorily fitting their communities, and we arrive at length at beauty and goodness, we find that it is difficult to say where the natural facts leave off and where the natural values appear. For some people at least, the sharp *is-ought* dichotomy is gone; the values seem to be there as soon as the facts are fully in, and both values and facts seem to be alike properties of the system.

There is something overspecialized about an ethic, held by the dominant class of *Homo sapiens*, that regards the welfare of only one of several million species as an object and beneficiary of duty. If the remedy requires a paradigm change about the sorts of things to which duty can attach, so much the worse for those humanistic ethics no longer functioning in, or suited to, their changing environment. The anthropocentrism associated with them was fiction anyway. There is something Newtonian, not yet Einsteinian, besides something morally naive, about living in a reference frame in which one species takes itself as absolute and values everything else relative to its utility. If true to its specific epithet, which means wise, ought not *Homo sapiens* value this host of life as something that lays on us a claim to care for life in its own right?

Only the human species contains moral agents, but perhaps conscience on such an Earth ought not to be used to exempt every other form of life from consideration, with the resulting paradox that the sole moral species acts only in its collective self-interest toward all the rest. Is not the ultimate philosophical task the discovery of a whole great ethic that knows the human place under the sun?

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