

By Holmes Rolston, III

## On Behalf of Bioexuberance

The old ethic focused on the welfare of only one species;  
a new ethic must regard the welfare of the several million  
species that constitute evolving life on Earth

The signs at a subalpine campground in the Rocky Mountain Rawah Range suggest a new kind of caring about plants. For years the trailside signs there read, "Please leave the flowers for others to enjoy." But recently, the wasted wooden signs were replaced by newly cut ones: "Let the flowers live!" Perhaps the intent was only to send a subtle psychological message, but I suspect a shifting ethic—respect for plants, replacing what was before only respect for persons.

There is similar evidence at the Indiana Dunes National Lakeshore, along Lake Michigan. The dunes were the site of the earliest studies in ecology, and their preservation required a long, bitter environmental fight. A major argument for saving the dunes was to preserve them as a playground for Chicagoans. But a recent Park Service poster depicts a clump of marram grass, sand and the lake and offers the injunction, "Let it be!" There seems now in the Park Service a caring for grass and dunes, something beyond mere maintenance of a lakeshore playground.

Such responses reflect a new ethic—one that adds a respect for plants to a respect for people. Not coincidentally, this comes at a time of enormous human-caused changes in the natural

world. Previously, humans did not have much power to spoil ecosystems and cause extinctions, or much knowledge about what they were inadvertently doing. But today humans have more understanding than ever before of the biological processes, more predictive power to foresee the intended and unintended results of their actions, and more power to reverse the undesirable consequences. We know many floristic natural histories; we find that willy-nilly we have a vital role in whether these stories continue.

We are appreciating vitality in the biological world, one that precedes and overlaps our personal or cultural presence. And with this new appreciation comes a deeper sense of responsibility.

Ethicists say that in *Homo sapiens* one species has appeared that not only exists but ought to exist. But why say this exclusively of a late-coming, highly developed form? Why not extend this duty more broadly to other species? Only the human species contains moral agents, but the paradox is that humankind, the single moral species, acts only in its collective self-interest toward all the rest. Perhaps conscience ought not be used to exempt every other form of life from consideration.

In understanding why humans

ought to let wildflowers and marram grass be, we need to see that to care about plant species is not to adopt some vague, subjective intuitions of romantic humans who fancy curious plants. To the contrary, it is to be quite nonanthropocentric and objective about botanical processes that take place independently of human preferences.

### The shift away from humanism

In the past, the reasons given for preserving rare plants have routinely been humanistic: *Please leave the plants for others to use*. People have a strong obligation not to harm other people, and a weaker, though important, duty to benefit others. Given the many ways that humans use plants—agriculturally, industrially, medically, recreationally, aesthetically, scientifically, as cultural symbols, as environmental indicators, as part of their life-support system—humans are significantly affected by their flora. Even rare plants had value to the extent that they were part of this plant world that benefits humans.

In this human-oriented view, we would not say that the needless destruction of a plant species was cruel, but we might say that it was callous. We would not be concerned about what the plants felt, but about



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what the human destroyers did not feel. We would not be valuing sensitivity in plants, but censuring insensitivity in persons. And we might go on to ask what properties in plants a person should be sensitive to.

But when we look past a concern for people, when we try to articulate an ethic to explain the deeper, naturalistic, reasons to let rare plants be, we get lost in unfamiliar territory. We find that all the familiar moral landmarks are gone. We are not addressing humans, or culture, or moral agents; we are not considering animals that are close kin, or can suffer or experience anything, or that are sentient. Plants are not "valuers," with preferences that can be satisfied or frustrated.

In moving toward a new ethic, what we find ourselves caring about are "only" plants, and plants can't "care," so why should we? It seems odd to assert that rare flowers or species have rights or moral standing, or need our sympathy; odd to ask that we should consider their point of view.

Moreover, we are not caring about individual plants, but rather about species. To an even greater degree than individuals, species don't "care."

In addition, 98 percent of the species that have ever inhabited Earth are extinct. Evidently nature doesn't care

about species, so why should we? Finally, why should we care about rare plants—what has their rarity to do with their value?

None of these elements—flora, species, ecosystems, wilderness or rarity—has figured within the coordinates of prevailing ethical systems. In fact, ethics and biology have had uncertain relations. An often-heard argument forbids moving from what *is* the case (a description of botanical facts) to what *ought to be* (an ethical prescription of duty). Philosophers accuse anyone who argues in this way of committing what they call the naturalistic fallacy.

#### **The plant way of caring**

A living plant, though lacking a brain or neural center, has a controlling program that enables it to maintain itself. The plant control program is coded in the DNA, the informational molecules. Through this program, the plant composes and recomposes itself, maintaining order against disordering tendencies and checking against its performance in the world via feedback loops. The genetic set distinguishes between what is and what ought to be—that is, it is a normative system.

Each plant develops and maintains a botanical identity, posting a boundary between itself and its environment.

An acorn becomes an oak; the oak stands on its own.

Plants do not, of course, have ends in view, they do not have goals. And a plant is not a moral system—there are no moral agents in nonhuman nature. But a plant, unlike, say, a rock, is an evaluative system, selecting resources for itself.

From one perspective, a plant's activity is just biochemistry—the whirl and buzz of proteins and other organic molecules. But from an equally valid (and equally objective) perspective, the activity is a valued state; the plant life is not merely *biological* but, given the way the plant defends itself, the life is *vital*.

Hence, to the assertion that plants don't care, the response is that plants do care—using botanical standards. They defend their lives, an intrinsic value, in the only form of caring available to them.

If we attach value to life defended (rather than to human preferences), then we must attach value to plants, because plants defend their lives as good-in-themselves. To say that there is no value involved because this activity is controlled by the genome and not by a conscious brain is something like saying that there is neither information nor life in the plant.

A plant is engaged in the biological



*A plant's activity is a valued state: A plant is engaged in the biological conservation of its identity and kind.*

conservation of its identity and kind. Conservation biologists and others ought therefore to respect plants for what they are: projects in conservation biology. This view aligns ethics with objective biology.

**The argument for species**

Although we can see why we might respect individual plants, what about species? In one view, a species is a useful fiction, like a center of gravity or a statistical average. Species might be only classes of convenience, or, like lines of latitude or contours, devices for mapping the world. Indeed, taxonomists insist on appending to the plant's Latin name the name of the "author" who, they say, "erected" the taxon.

Even Darwin wrote, "I look at the term species, as one arbitrarily given for the sake of convenience to a set of individuals closely resembling one another." Botanists are divided whether Illinois' Kankakee mallow, *Iliamna remota*, and Virginia's *Iliamna corei*, both rare, are distinct species. Perhaps all that exists objectively are the individual mallow plants; whether there are two species or one is a fuss over what labels to use.

Against this, though, is the claim that there are specific forms of life maintained in their ecosystems over time. Evolutionary lines develop into

diverse kinds of life, each with a more or less distinct integrity, a breeding population and a gene pool.

G.G. Simpson says, "An evolutionary species is a lineage (an ancestral-descendant sequence of populations) evolving separately from others and with its own unitary evolutionary role and tendencies." Niles Eldredge and Joel Cracraft insist that species are "discrete entities in time as well as space."

In this view, the idea of species does not seem arbitrary or fictitious at all, but rather, as certain as anything we believe about the empirical world, even though at times taxonomists revise the theories and taxa with which they map these forms. Species are like mountains and rivers, objectively there to be mapped. The edges of these natural groups will sometimes be fuzzy, to some extent discretionary; one species will slide into another over evolutionary time and in some cases actual speciation is now in progress. But the various criteria biologists use for defending species (descent, reproductive isolation, morphology, gene pool) provide evidence that species are really there.

What survives for a few months, years or decades is the individual plant; what survives for millennia is the kind, or species. Life is therefore something passing through the indi-

vidual as much as something the individual possesses on its own. A species is a dynamic life form preserved in historical lines and has a vitality that persists genetically over millions of years, overleaping short-lived individuals.

Further, reproduction can be looked on as the means by which a species defends itself. This does not mean that a species has a controlling center, any more than a plant has a brain; but the species, like the individual, is a survival process. Both conserve botanical identity over time.

An ethic about plants sees that the species is a bigger event than the individual. In a sense the species level is more appropriate for moral concern since the species is a more comprehensive survival unit than the organism.

When an individual rhododendron dies, another one replaces it. The deaths of individual rhododendrons are even necessary if the species is to persist: Seeds are dispersed and replacement rhododendrons grow elsewhere in the forest. As landscapes change or succession shifts, later replacements, including mutants, provide a steady turnover. Thus the species improves in fitness or adapts to a changing climate or to competitive pressures. Tracking its environment over time, the species is conserved and

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### **Bioexuberance**

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modified. As this process is extended over time, certain species are unable to adapt, there are natural extinctions, with re-speciation and a normal turnover—and the generative process continues unabated.

But with human-caused extinctions, this process stops. Such extinction shuts down the generative processes and is a kind of superkilling. It kills forms beyond individuals. It kills “essences” beyond “existences,” the “soul” as well as the “body.” It kills collectively, not just distributively. To kill a particular plant is to stop a life of a few years, while other lives of such kind continue unabated and the possibilities for the future are unaffected. To kill a particular species is to shut down a story of many millennia, and to leave no future possibilities.

A consideration of species strains any ethic focused on individuals, much less on sentience or persons. But, though it revises what was formerly thought logically permissible or ethically binding, the result can be a biologically sounder ethic. The species line is fundamental. It is more important to protect this integrity than to protect individuals. The appropriate survival unit is the appropriate level of moral concern.

“Ought species *x* to exist?” is a single element in the collective question,

“Ought life on Earth to exist?” The answer to the question about one species is not always the same as the answer to the bigger question, but since 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.

Humans ought not to play the role of murderers. The duty to species can be overridden, for example with pests or disease organisms. But a *prima facie* duty stands nevertheless.

### **The argument for evolving ecosystems**

On evolutionary time scales, species, like individuals, are ephemeral. But the speciating process is not. Persisting through vicissitudes for two-and-a-half billion years, species evolution is about as long-continuing as anything on Earth can be.

Ecosystems are biotic communities, kept in dynamic evolution over time by selection pressures toward an optimally satisfactory fit for each species. Each species defends only its own kind, but the ecosystem coordinates kinds, through a spontaneously evolving order that arises when many such species interact. That order exceeds in richness, beauty and dynamic stability the order of any of the component parts. Species reproduce their own kind; evolutionary ecosystems pro-

duce new kinds. Bioexuberance, both diversity and complexity, is conserved while it is increased.

Ecosystems are the context of speciation. Neither individual nor species stands alone; both are embedded in an ecosystem, and in that sense it is even more important to save evolutionary ecosystems than to save species. Species are what they are where they are. The comprehensive ecosystem too is a vital survival unit.

It might seem that for humans to terminate plant species now and again is quite natural—after all, plants become extinct all the time. But when human culture supplants nature, extinction is radically different. Natural extinction is the key to the future because in nature, a species dies when it has become unfit in its habitats, and other species appear in its place. Artificial extinction closes off the future because it shuts down speciation.

One can say that nature doesn't care about species, and in a way that is true. But it does not follow that there is nothing in nature promoting, conserving, elaborating species, or that we should not care about this. “Caring” is perhaps not the appropriate language to describe the natural processes by which Earth conserves life, overleaping species, starting from zero to elaborate a biota of several million species. But nature does seem to generate spe-



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cies with remarkable fertility and extravagance in Earth's several billion years of creative struggle.

We hardly yet have a complete theoretical account of this richness of life, but bioscience gives us this certainty: The evolutionary odyssey is prolific, that is, pro-life. We ought to admire the process as much as the product.

#### Valuing the rare

Rarity per se is not a valuable property. Rarity simply means few individuals of this kind exist. We do not, or should not, value plants or plant encounters just because they are rare.

That a plant is naturally rare may seem to suggest its insignificance in an ecosystem. But naturally rare species, as much as common species, signify exuberance in nature: Each is a unique expression of the potential that drives evolution. Some rare plants may be en route to natural extinction, but it does not follow that most rare plants have less biological competence than common species. On the contrary, endemics or specialized species—like the grape fern *Botrychium pumicola*, which grows only on pumice at high elevations in the Cascade Mountains—may competently occupy restricted niches.

A rare flower is a botanical achievement, a bit of brilliance, a problem resolved, a threshold crossed. An endemic species, perhaps one specialized for an unusual habitat, repre-

sents a rare discovery in nature (in addition to the adventure that humans experience in finding it). Rare species ornament the display of life. Together, the myriad species make Earth a garden.

Some rare plants live on the cutting edge of adaptability; some are relics of the past. Either way they offer promise and memory of an inventive natural history. Even more poignantly than the common, they provide both a liberal and a conservative sign, evidence of life persisting in struggling beauty, flourishing, pushing on at the edge of perishing. The rare flowers—if one is open to a wider, more philosophical perspective—offer a moment of perennial truth.

Rare species have proved their right to life through being tested by natural selection. These examples of biological right-to-life, of adaptive fitness in an ecosystem, generate at least a presumption in the humans who encounter them that these are good kinds, good right where they are, and therefore that it is right for humans to let them be, to let them evolve. That leaves plants, species and process all in place.

When humans make once-common plants artificially rare, biological vitality is lost. When humans extinguish species, they stop the story. That makes humans misfits in the system, because they bring death without survivors into Earth's prolific exuber-

ance. Life is a many-splendored thing; extinction of the rare dims its luster.

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 those of this sole moral species do something less self-interested than count all the produce of an evolutionary ecosystem as resources? Such an attitude hardly seems ethically adequate.

There is something overspecialized about an ethic that regards the welfare of only one of several million species as an object of duty. It is an ethic no longer functioning in, or suited to, the changing environment. There is something morally naive about living in a reference frame where one species takes itself as absolute and values everything else relative to its utility.

The old signs, "leave the flowers for others to enjoy," reflected a humanistic ethic. The new, naturalistic signs invite a change of reference frame. Love the flora too. Let it be. Let life flower! □

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