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# Respect for Life: Counting what Singer Finds of no Account

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There is nothing to be taken into account. (Peter Singer)[1]

Peter Singer is a remarkable philosopher, who has enlarged our vision of ethics, previously much too humanist, to include animals that formerly did not count. Few ethicists, indeed few persons responsible for the care and use of animals, are not more sensitive to animal welfare now than they were before the impact of Singer and his colleagues, voicing a concern about the pains that animals suffer on behalf of humans.

Equally remarkably, however, Singer has himself proved blind to the still larger effort in environmental ethics to value life at all its ranges and levels, indeed to care for a biospheric Earth. It is almost as though what it takes Singer to win his victory about the animals – his insistence that they do suffer and that, by parity of reasoning, we humans concerned about suffering in ourselves cannot logically and ought not morally to fail to count their suffering – leaves him at a loss about insentient life, all the plants, but also most of the animals, if we remember the mollusks, crustaceans, nematodes, beetles, and the like. His victory is mostly for vertebrates, who form only 4 percent of living things by species and only a tiny fraction of a percent by numbers of individuals. Really, it is mostly for the mammals, and declines with decreasing complexity in the central nervous system.

Also, Singer has yet to count the vital processes, such as speciation, natural selection, and ecosystemic communities in which these individual organisms live. Unless we can locate his mistake, his victory could prove pyrrhic in the fight for an environmental ethic. The question whether insentient animals and plants can be loci of value is our immediate concern. Once we open that question, however, the answer opens still further questions of species, ecosystems, and ultimately the whole Earth

as the most comprehensive community of life. These latter questions we treat more briefly.

It is true, as Singer will say, that one can do much environmental: conservation, operating out of a concern for humans and higher animals, and their pleasures and pains. This is because humans and higher animals need a life support system; they live at the top of what ecologists call trophic pyramids, food chains. They can flourish only if the biotic community in which they reside is properly functioning, and that includes the plants, the fungi, the insects, the worms, and all those "lower" forms that Singer is otherwise unable to count. Singer can count them instrumentally to animal goods.

Consider such an argument moved a step further. Bryan G. Norton claims that an environmental ethic centered on human interests (an anthropocentric one) does not really differ in policy recommendations from an environmental ethic that considers directly animal interests, intrinsic values in plants, the flourishing of species and ecosystems (a biocentric or ecocentric ethic). But this is only provided that the anthropocentric ethic is sufficiently enlightened to become sensitive to the deeper values available to humans when they interact with nature, such as scenic beauty, or nature study and recreation, wilderness experiences, and so on. He calls this "the convergence hypothesis"; both the humanistic and the naturalistic ethical viewpoints converge.[2]

Singer would probably protest, as would I, that while an ethic that is anthropocentric may often coincide with one based on both animal and human welfare, they do not always so converge – not even for humans who are enlightened about deeper values to be enjoyed as humans enjoy wildlife, pet animals, and so on. If animal pleasures and pains do not count morally, not as intrinsically good and bad, then a great deal that we humans may wish to do with animals, using them for food, experiments, and so on, is permissible, which would not be permitted if they do count more directly.

But I wish to make the analogous point against Singer, now moved over further past the mammals and animals capable of similar psychological experience. Although an animal welfare ethic and an environmental ethic do often converge, they by no means always do so, and, in what follows, we will be giving numerous examples of when they do not. To put the point with some provocation, the people in the United States who join the Sierra Club do not always have the same agenda as the people who join the Humane Society.

## Counting Insentient Life – in Principle

Singer considers an ethic of respect for life and rejects it. The question is, "Once we abandon the interests of sentient creatures as our source of

value, where do we find value?"[3] In respect for life – that seems an obvious answer. But Singer finds problems. Albert Schweitzer claims that every living organism has a "will to live" and Paul Taylor claims that every living organism is "pursuing its own good in its own unique way." Singer dislikes the idea that plants have a "will" to live or that they "pursue" their good. Here is his reply:

> The problem with the defenses offered by both Schweitzer and Taylor for their ethical views is that they use language metaphorically and then argue as if what they had said was literally true. We may often talk about plants "seeking" water or light so that they can survive, and this way of thinking about plants makes it easier to accept talk of their "will to live," or of them "pursuing" their own good. But once we stop to reflect on the fact that plants are not conscious and cannot engage in any intentional behavior, it is clear that all this language is metaphorical; one might just as well say that a river is pursuing its own good and striving to reach the sea, or that the "good" of a guided missile is to blow itself up along with its target. ... Plants experience none of these [emotions of will and desire]. Moreover, in the case of plants, rivers, and guided missiles, it is possible to give a purely physical explanation of what is happening; and in the absence of consciousness, there is no good reason why we should have greater respect for the physical processes that govern the growth and decay of living things than we have for those that govern non-living things.[4]

So, Singer concludes, the capacity to suffer or experience enjoyment or happiness "is the only defensible boundary of concern for the interests of others."[5]

The set that Singer groups together is revealing: plants, rivers, and guided missiles. He can see only what they have in common, or, more accurately, what they lack in common: sentience. Therefore, for ethical counting, they are all alike. But is this so? True, plants lack conscious will and intentional pursuit; Singer is right about that, and one has to be careful with metaphors. But are there no significant differences between plants, rivers, and guided missiles? No, claims Singer, because they are all purely physical processes. In Singer's dichotomy, there seem to be only two metaphysical levels: conscious experiences and merely physical processes. He lingers in a Cartesian dualism. He is incapable of distinguishing between plants and rivers. Can we be more discriminating?

Consider plants. A plant is not an experiencing subject, but neither is it an inanimate object, like a stone. Nor is it a geomorphological process, like a river. Plants are quite alive. Plants, like all other organisms, are self-actualizing. Plants are unified entities of the botanical though not of the zoological kind: that is, they are not unitary organisms highly integrated with centered neural control, but they are modular organisms, with a

meristem that can repeatedly and indefinitely produce new vegetative modules, additional stem nodes and leaves when there is available space and resources, as well as new reproductive modules, fruits and seeds,

Plants repair injuries and move water, nutrients, and photosynthate from cell to cell; they store sugars; they make tannin and other toxins and regulate their levels in defense against grazers; they make nectars and emit pheromones to influence the behavior of pollinating insects and the responses of other plants; they emit allelopathic agents to suppress invaders; they make thorns, trap insects, and so on. They can reject genetically incompatible grafts. This description of plant activities does not require the use of "will to live" or intentional "pursuit" of desires. It is hardly metaphorical; rather, it is a literal account of what is going on.

A plant, like any other organism, sentient or not, 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. Something more than merely 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. The information is used to preserve the plant identity.

In nature there are, if we consult physics and chemistry, two kinds of things, matter and energy; but if we consult biology there is a third thing: information. In the merely physical processes, such as those affecting rivers and stones, neither matter nor energy can be created or destroyed, though, at the more fundamental levels of atomic and astronomical physics, the one can be transformed into the other. Matter throughout natural history has been energetically structurally transformed. This happens in physics and chemistry with impressive results, as with the construction of the higher elements in the stars or the composition of crystals, rocks, mountains, rivers, and canyons on Earth.

The really spectacular constructions that are manifest in biology, making possible the diversity and complexity that environmentalists wish to value, do not appear without the simultaneous genesis of information about how to compose and maintain such structures and processes. This information is recorded in the genes, and such information, unlike matter and energy, can be created and destroyed. That is what worries environmentalists about extinction, for example. This genetic information separates rivers (and guided missiles) from organisms. In it lies the secret of life, and an environmental ethics will need a discriminating account of such life, and appropriate respect for it.

Such "information," Singer might protest, is metaphorical, since plants do not consciously know what they know. But that seems prejudiced in favor of only one kind of information, refusing to recognize that informa-

tion can be genetic quite as much as it can be cognitive. The tree is doing what it is doing for its own sake. Perhaps Singer would reply that the tree does not have any "sake." Well, then the tree is doing what it is doing for its own life. He would hardly reply that the tree does not have any life, although he does not think rivers or guided missiles are alive. No, the tree has a life that it intrinsically defends as a value good in itself, and it does this on the basis of its genetic information.

Let's test Singer with another set of metaphors. Plants do not "will" or "desire"; set those metaphors aside. The plant information is carried by the DNA, which we can call a "linguistic" molecule. The DNA is a kind of "logical" set, not less than a biological set, informed as well as formed. Organisms use a sort of symbolic logic, use these base pair sequences and 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 steering core is cybernetic: partly a special kind of cause and effect system, and partly something more; partly a historical information system making a way through the world.

The genetic set is really a "propositional" set – to choose an even more provocative term – recalling how the Latin *proposition* is an assertion, a set task, a theme, a plan, a proposal, a project, as well as a cognitive statement. These molecules are set to drive the movement from genotypic potential to phenotypic expression. Given a chance, these molecules "seek" organic self-expression. Perhaps we need to be cautious about a plant "pursuing" or "willing" anything; maybe even the word "seek" is metaphorical. But we do need some words to describe what is going on and metaphors can help us get at facts of the matter. 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 and rivers), but life turns back on its sources to make resources out of them (unlike rocks and rivers).

Now let's turn to the source of value, about which Singer worries. Is nothing of any value to, or for, or in, a plant? We pass to value when we recognize that the genetic set is a "normative" set; it distinguishes between what *is* and what *ought to be*. The organism is not a moral system, for there are no moral agents in nature; but the organism is an axiological system. So the tree grows, reproduces, repairs its wounds, and resists death. The physical state that the organism defends is a valued state. 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. Such organisms may have no will or desires, but they do have their own standards. Every

organism has a *good-of-its-kind*; it defends its own kind as a *good kind.* In this sense, the genome is a set of conservation molecules. To say that the plant has a good of its own is not to be dismissed as mere metaphor. That rather seems the plain fact of the matter.

Now we can also see what is mistaken about grouping guided missiles with the plants. Singer is only half right that guided missiles are purely physical processes; they are machines, of course, but there are intentions further behind them. A guided missile has no good-of-its-kind; it is a good thing for people, who made this artifact to serve their purposes. A missile has no nature of its own; it does not exist by nature. Machines are not wild. Unlike wild rivers (which Singer also groups with the plants and missiles), a missile is a device produced by sentient organisms, namely humans, and can only be so understood, and valued. A missile is a means to human good (sometimes, a doubtful good). Missiles have no self-generating or even self-defending tendencies. Perhaps they have computers on board and various programs to lock onto their targets, or to dodge anti-missiles rockets, but all these activities are programmed into them by their designing engineers, because their purpose – the mission of the missile, so to speak – is to defend humans and what they value.[6]

If humans were to abandon their missiles, perhaps realizing that missiles do not serve human desires for security as well as hoped, then, in those left-behind missiles, there is nothing to be taken into account. Missiles have only the value that humans gave to them in the first place. But none of this is true when a human walks away from a tree. The tree has a life defended before the logger walks up, and the logger destroys it.

The values that attach to machines are entirely instrumental, derivative from the persons who have created instruments. Machines have an end only mediately as the extrasomatic products of human systems. Wound-up machines wind down, sooner or later; the process is entropic. Informed organisms wind themselves up; they keep on winding themselves up; the process is negentropic. They too break and die somatically, but not before they reproduce themselves and pass on their up-winding information to a next generation. The values that attach to organisms result from their non-derivative, genuine self-organizing as spontaneous natural systems. The standards of performance, the norms of achievement, are in the organism itself. These are objective standards in that they are not generated by human subjective preferences. A machine is only a good kind because it is a good of my kind; an organism can have a good of its kind and be a good kind intrinsically. Machines are by us and for us; organisms live on their own.

The tree is valuable (able to value) itself. If we cannot say this, then we will have to ask, as an open question, "Well, the tree has a good of its own, but is there anything of value to it?" "This tree was injured when the

elk rubbed its velvet off its antlers, and the tannin secreted there is killing the invading bacteria. But is this valuable to the tree?" Botanists say that the tree is irritable in the biological sense; it responds with the repair of injury. Such capacities can be "vital," a description with values built into it. These are observations of value in nature with just as much certainty as they are biological facts. That is what they are: facts about value relationships in nature. We are really quite certain that organisms use their resources, and one is overinstructed in philosophy who denies that such resources are of value to organisms instrumentally. But then, why is the tree not defending its own life just as much a fact of the matter as its use of nitrogen and photosynthesis to do so?

Singer will have to say that, even though plants have a good of their own and do these interesting things, plants are not able to value because they are not able to feel anything. There is no one there. Nothing matters to a plant. There is plant good, but not plant value. They do not have any interests. There is no valuer evaluating anything. Plants can do things that interest us, but the plants aren't interested in what they are doing. They don't have any options among which they are choosing. They have only their merely functional goods. This is so, Singer will reply, because nothing "matters" to a plant; a plant is without minimally sentient awareness.

But, though things do not matter *to* plants, a great deal matters *for* them. We ask, of a failing plant, what's the matter *with* that plant? If it is lacking sunshine and soil nutrients, and we arrange for these, we say, the tree is benefiting from them; and *benefit* is – everywhere else we encounter it – a value word. Biologists regularly speak of the "selective value" or "adaptive value" of genetic variations.[7] Plant activities have "survival value" such as the seeds they disperse or the thorns they make. Natural selection picks out whatever traits an organism has that are valuable to it, relative to its survival. When natural selection has been at work gathering these traits into an organism, that organism is able to value on the basis of those traits. It is a valuing organism, even if the organism is not a sentient valuer, much less a conscious evaluator. And those traits, though picked out by natural section, are innate in the organism: that is, stored in its genes. It is difficult to dissociate the idea of value from natural selection.

Any sentientist or humanist theory of value has got to argue away all such natural selection as not dealing with "real" value at all, but mere function. Those arguments are, in the end, more likely to be stipulations than real arguments. If you stipulate that valuing must be felt valuing, that there must be someone there, some subject of a life, then plants are not able to value, and that is so by your definition. But what we wish to examine is whether that definition, faced with the facts of biology, is

plausible. Perhaps the sentientist definition covers correctly but narrowly certain kinds of higher animal valuing, namely that done by sentient animals, and omits all the rest.

Singer will protest: although philosophically unsophisticated biologists have used "value" regarding plants, careful philosophers will put that kind of "value" in scare quotes. This isn't really value at all, because there are no felt experiences, no pains or pleasures at stake. This so-called value is not a value, really, not one of interest to philosophers because it is not a value with interest in itself.

Why is the organism not valuing what it is making resources of? Not consciously, but we do not want to presume that there is only conscious value or valuing. That is what we are debating, not assuming. And what we are claiming is that life is organized vitality, which may or may not have an experiential psychology. A value-er is an entity able to feel value? Yes, and more. A value-er is an entity able to defend value. On the second meaning, plants too defend their lives. In an objective gestalt some value is already present in non-sentient organisms, normative evaluative systems, prior to the emergence of further dimensions of value with sentience. We agree with Singer that there is no feeling in such an organism, but it does not follow that humans cannot or ought not to develop "a feeling for the organism."[8]

## Counting Insentient Life – in Practice

Our main concern so far has not been to address the question of how morally significant organisms are, nor what justifiable considerations may outweigh such value, only to establish in principle what sorts of things can command our moral attention. A frequent reply at this point is that, whatever the principle, plants and the lower animals have such insignificant value that this can make no difference in practice. Or, there is no way of calculating how much this value amounts to, in cases where we must trade off the interests of sentient creatures against these insentient lives. Singer complains: "Without conscious interests to guide us, we have no way of assessing the relative weights to be given to the flourishing of different forms of life."[9]

Certainly there is no calculus for such decisions; there is no calculus for how much sentient animals suffer either, such as the elk or the chickadees who must endure the winter's cold. But that does not mean nothing can be said about appropriate human behavior in the presence of insentient life. Consider some cases.

A favorite campground in the Rawah Range of the Rocky Mountains is adjacent to subalpine meadows of wildflowers, profuse displays of

daisies, lupines, columbines, delphiniums, bluebells, paintbrushes, penstemons, shooting stars, and violets. The trailside signs for years were the standard ones: "Please leave the flowers for others to enjoy." One season I returned to the campground to find that the wasted wooden signs had been replaced by newly cut ones that read, "Let the flowers live!" The traditional signs imply that the only value in flowers is that they may be enjoyed by sentient humans. The new signs moved deeper, to a respect for life. According to this ethic, what the injunction "Let the flowers live!" means is: "Daisies, marsh-marigolds, geraniums, larkspurs are living organisms that express 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 justify destroying good kinds?"

The old signs, "Leave the flowers for others to enjoy," were signs using Singer's ethic, where flowers count only for people. That ethic is, of course, reasonably effective in encouraging people to conserve wildflowers. But the new signs invite a change of reference frame, and this can mean changed behavior. Presumably, for instance, if one were in a remote area and further enjoyment of the flowers was unlikely, then no ethicist could object to my picking or even destroying them to suit whatever my whims, since, on their own, they do not count.

In the 1880s a tunnel was cut through a giant sequoia in what is now Yosemite National Park. Driving through the Wawona tree, formerly in horse and buggy and later by car, amused and impressed millions. The tree was perhaps the most photographed in the world. On holidays, there was a waiting line. The giant tree blew over in the snowstorms of 1968-9, weakened by the tunnel, although it had long stood despite it. Some have proposed that the Park Service cut more drive-through sequoias. But the rangers have refused, saying that one was enough, and that this is an indignity to a majestic sequoia. It is better to educate visitors about the enormous size and longevity of redwoods, their resistance to fire, diseases, insect pests, better to teach them to admire a durable, stalwart, marvelous tree, a sort of natural Ming classic. They will then wish to leave redwoods untouched.

Again, one could say that this is just leaving the redwood for others, to enjoy. But if it turned out that tourists really got more pleasure driving through a sequoia, then the park rangers ought to cut another one. They ought to cut several, to avoid waiting lines. In fact, however, the rangers, as well as the park visitors, who largely approve of the new policy, seem to be valuing redwoods intrinsically. It is wrong, or at least inappropriate, to mutilate a sequoia to excite tourists. The question is not pleasing people, but respecting these especially majestic and ancient trees, among the largest and oldest living things on Earth.

People use trees all the time, for timber, fuel, paper pulp, and civilization is almost unthinkable without wood. There is no argument here that people ought not to use trees; only that they can, and sometimes do, consider the appropriate uses of trees, and that one constraint on such use is what the tree is in itself. For years, I went out each winter to cut a Christmas tree, seeking, if I could find one, a wild blue spruce. I cut them not far from where the signs read, "Let the flowers live!" Not infrequently, I would discover that others, seeking the ideal tree and unable to find a small one, would chop down a large blue spruce, to cut out just the top five or six feet, and leave the dead tree felled in the forest. That seemed a waste; I refused to do it.

One day, about to cut a small spruce, I asked myself, What's the difference? It's almost worse to cut down a young tree, which has perhaps hundreds of years of life ahead of it, than to cut down an older tree, of which the life is half over. In any case, I thought, I am going to sacrifice a tree, small or large, for only about ten days of my pleasure. Wouldn't it be better to leave the tree, allowing it to flourish for a century or more, and to use an artificial tree? At least I should use a farmed tree, which would not otherwise exist. So I refused to cut it, and I have not since cut a wild tree for my Christmas festivities.

That's a personal preference, one might reply, but one cannot urge any such ethic on others. Consider then the US national Christmas tree. Each year a giant tree is cut, carried across the country, and put up and decorated on the White House lawn. The lights are turned on with a ceremony; some photographs of it appear in newspapers; people go by to see it. After ten days, the tree is trashed. All this is well and good, on Singer's ethic. But what if such a tree were identified in place, and decorated for a few days, but left alive. There could still be the pictures in newspapers, serving Christmas festivities, with also some notice of the significance of forests, and a word about how the national tree was left uncut out of respect for the tree. There could be a trail to it, and people could hike year round, and for years afterward, to see the tree that was the national Christmas tree in 1996. Children born in that year could, a decade hence, go to see the Christmas tree in the year of their birth. With this tradition, eventually, a grandfather could take a grandchild to the tree of his year of birth. Why wouldn't this be a better national tradition, even though Singer has no grounds on which to recommend it? One tree is a small item, and no one, myself included, would want to argue that the cutting of a single tree is an event of great moral significance. But tree-cutting can add up. It takes about a half a million trees each week to give two hundred million Americans the pleasure of their Sunday paper. Pleasure is all that counts on Singer's ethic; and we do need sustainable forestry so that future generations may have their Sunday

papers too. But suppose conservationists were to recommend a recycling program, perhaps financed by some additional charge for the paper, that recycled half the papers, and thus saved a quarter of a million trees a week (which would also save considerable energy and greatly reduce air pollution). Singer can't count the trees; he would only have to look to see if the recycled newspapers maintained the pleasures of the Sunday paper and also permitted humans to use the saved energy for other purposes – perhaps to take a ride out in the mountains to enjoy the scenery in the saved forests.

The forests of North America were once one of the glories of the continent, and, while much of the continent remains forested, the old-growth forests are nearly gone. Only about 10 percent remains, Some environmentalists can feel quite strongly about saving what survives, to the point, for instance, of spiking such trees lest they be cut. These "tree huggers" certainly do not wish for lumbermen to be hurt, as they may be if they cut such trees and their saw blades strike the hidden spikes and shatter. So the spikers send anonymous letters to the US Forest Service, identifying spiked groves and warning loggers to leave them uncut. Probably they want such forests so that they and their children can visit them. But such environmentalists also hold that such trees have value, including value in themselves, that justifies putting loggers at such risk. That risks some human suffering on account of trees, which cannot suffer.

We have been considering plants because they have no neurons at all and the question of their sentience is easier to set aside. But in the fuller biological picture we must also realize that Singer cannot count most of the animals. Ninety-five percent of all the creatures in the world are smaller than a chicken's egg, yet often quite perceptive – sentient in the sense of variously responding to their environment (which plants also do). Typically, we do not know whether they are subjects of a life – sentient in the sense of psychic experience and feeling pain. Singer cuts things off somewhere between shrimp and oysters.

He may be choosing his examples because shrimp have eyes and oysters do not; that tends to register a conviction that there is "someone there" behind those eyes in shrimp and no one there inside the oyster. Beings with eyes can take an interest in what is going on. Shrimp, various species, are arthropods and crustaceans (phylum *Arthropoda,* class (or subphylum) *Crustacea)* with compound eyes. Insects (class *Insecta)* are arthropods as well as shrimp, and highly perceptive, but are they subjects of a life? Oysters, *Ostrea,* without eyes, are in class *Bivalvia* (or *Pelecypoda)* among the mollusks (phylum *Mollusca).* The scallop *(Pecten)* in that class and otherwise rather similar has eyes with cornea, lens, and retina, with which it takes some interest in, or at least processes some information about, the world around it.

Still other rnollusks, such as squid and octopus (class *Cephalopoda*) have excellent eyes, which bear comparison with our own.[10] Such mollusks are quite intelligent, though we can only speculate about their consciousness. Perhaps insisting on knowledge about "conscious interests to guide us"[11] is not the way to evaluate what is at stake in the life and death of mollusks, arthropods, and other invertebrates. If that is his only criterion, what will Singer say about the 129 species of freshwater mussels (43 percent of the total number there) either already extinct or threatened with extinction in the Tennessee River Valley system, owing to human manipulation of the rivers?

Somewhere in there with the shrimps and the oysters are the crabs. Crabs have eyes. They also defend their lives in search of food. Fishermen in Atlantic coastal estuaries and bays toss beer bottles overboard, a convenient way to dispose of trash. On the bottom, small crabs, attracted by the residual beer, make their way inside the bottles and become trapped, unable to get enough foothold on the slick glass neck to work their way out. They starve slowly. Then one dead crab becomes bait for the next victim, an indefinitely resetting trap! Are those bottle traps of concern for those who respect life, after fisherman have been warned about this effect? Or is the whole thing out of sight, out of mind, with crabs too mindless to care about? Should not sensitive fisherman pack their bottle trash back to shore – whether or not crabs have much, or any, felt experience? One does not have to know whether or how much pain the crabs feel, or whether they have eyes and there is someone body there. If the discarded beer bottles were entrapping small oysters instead of crabs, ought one not to reach the same conclusion? One needs only to know that animals are dying as a result of one's action, and that a little care could prevent this. Evidence that the crabs were suffering might increase one's care, but it is not necessary for a respect for life.

Bryan Norton was walking along a beach and met an eight year old girl collecting sand dollars.[12] Some yards away, her mother and older sister were dredging sand dollars in large numbers from a colony of them not far under the surface. Upon inquiry, the girl explained that her mother used them to make things, first bleaching them in Chlorox, and then forming them into jewelry and souvenirs, and that any extras could be sold for five cents each. "You know, they're alive," Norton remarked, wishing that the sand dollars could be left in the lagoon.

Norton thought how sand dollars (phylum *Echinodermata,* class *Echinoidea)* propel themselves just under the surface of the sand by means of hundreds of tiny sucker feet, how they filter sand for minute bacteria and diatoms, using a remarkable siphon, ingeniously adapted to intake diatoms and algae, and expel waste. The functions of respiration, locomotion, and metabolism are distributed equally among the five sections of

the pentagonal organism. There is a decentralized nervous system that emanates from a major nerve circling the mouth. All these organs are encased in the calcareous skeleton, and the sand dollars have, as a result, successfully colonized the sea floor. But Norton couldn't explain this to the child, and he was puzzled about what else to say. Norton's concern is real; he needed an ethic of "respect for life," admiring the "struggle to survive" even in the sand dollars, and was unable to articulate it.[13] Sand dollars must be several ranks down under the shrimps and oysters, so Singer doesn't have anything else to say either. Sand dollars don't count, so exploit them as you please for crafts, or amusement, or whatever.

Such respect for life will seem foolish, or even wrong, to those who think that nothing matters to, or for, or with trees or wildflowers, crabs or sand dollars. If they are to save such things, they will have to find sentient persons or higher animals with interests at stake. Trees and forests have value if and only if their well-being can be related to the well-being of these privileged higher animals and people. People will wish, of course, to keep a sustainable population of sand dollars for the pleasures of future humans. That means keeping also a biotic community such as a marine ecosystem, but everything must be evaluated for the pleasures it brings to present and future generations of people.

We may know little about the conscious experiences of marine invertebrates, but at least on the land, we can consider also the experiences of the higher animals, especially the mammals. We will conserve wilderness, as well as beaches and marine ecosystems, for our vacations. But we also need to consider how wilderness is a home for the higher animals, and is to be conserved for the welfare of the bears and elk. We have to "take into account" their lives, "experiencing their own distinctive pleasures and pains." "When a proposed dam would flood a valley and kill thousands, perhaps millions, of sentient creatures, these deaths should be given great importance in any assessment of the benefits and costs of building the dam." But the trees there, and most of the animals, who are insentient in Singer's pain-suffering sense, are "to be taken into account only in so far as they adversely affect sentient creatures."[14] That seems rather narrow minded for a comprehensive ethic of respect for life.

## Counting Species, Ecosystems, and Earth

We have only begun enlarging our environmental ethic, when we move to valuing non-sentient organisms. The organism is a member of a species. Biology often focuses on organismic individuals, and we can interpret these as owners or loci of value, but biology always locates these individuals within species (populations) and ecosystems. How are we to count

species? We can count species as valuable, of course, for humanistic reasons, or, if the species in question is a sentient one, as an aggregate of the various individual members who suffer their pains and pleasures. But if our ethic permits us to find value only where there is an experiencing valuer, and if plants and the lower invertebrates cannot value their environment, *a fortiori,* we cannot find value at the level of species.

Consider some cases that confront the welfare of animals with the value of plant species. Off the coast of California and isolated from the mainland, San Clemente Island has a number of endemic plant species. In the early 1800s, Spanish sailors introduced goats so that they could have a supply of fresh meat. The goats thrived, even after humans abandoned them. Over many decades there, they have probably already eradicated several never-known species. Following renewed interest in endangered species after the passage of the US Endangered Species Act, the Fish and Wildlife Service and the US Navy, which controls the island, sought to kill thousands of these goats to save three endangered plant species: *Malacothamnus clementinus, Castilleja grisea, Delphinium kinkiense* (as well as to protect ecosystem integrity). Often the goats were in inaccessible canyons, which required their being shot by helicopter. That would kill several goats for each known surviving plant.

The Fund for Animals filed suit to prevent this killing; and, although the court ordered all goats removed, after the shooting of 600 goats, the Fund by political pressures on the Department of Navy secured a moratorium on further shooting. Happily, the Fund rescued about half the goats with novel trapping techniques. About 15,000 were live-trapped and removed. But, unhappily, neither they nor others were able to live-trap them all. Unhappily also, the transplanted goats did poorly; they mostly died within six months. Eventually, the rest of the goats were shot, in all about 14,000 of them.[15]

The court judged, rightly, that protecting endangered species justifies the killing of the goats, which are not endangered and which are replaceable, as well as exotic to the island. If the tradeoff were merely one on one, a goat versus a plant, we might well judge that the welfare of the goats would override the plants. The goats, though feral, do merit some consideration. Goats are among the most nimble and sure-footed creatures on Earth, which is why they were so hard to eradicate. But the picture is more complex. The well-being of plants at the species level outweighs the welfare of the goats at the individual level.

Singer, however, could voice no protection for the plants, as long as the goats took pleasure in eating them. In fact, had the Spanish sailors not long ago introduced this exotic goat, Singer might well urge the Fish and Wildlife Service now to do so, since in result there could be thousands of happy goats on an island which they were unable to reach on their own.

Whether the animals on the island are native or introduced is irrelevant to a sentience-based ethic, unless perhaps the introduced animals are upsetting the life support system of other, native sentient animals.

Despite the Fund's objections, the Park Service did kill hundreds of rabbits on Santa Barbara Island to protect a few plants of *Dudleya traskiae*, once thought extinct and curiously called the Santa Barbara Live-Forever. This island endemic was once common. But European red rabbits were introduced after 1900 (brought from New Zealand where they had earlier been introduced), fed on these plants, and by 1970 no *Dudleya* could be found. With the discovery in 1975 of five plants, a decision was made to eradicate the rabbits. Here it seems that protecting endangered species justifies causing suffering and death in the rabbits.

An ethic based on animal rights will come to one answer. Singer will defend the rabbits; the plants don't count, much less their species. Perhaps he even will defend the introduced rabbits that so proliferated in Australia – unless a calculus shows that sentient native marsupials suffered in ways that outweighed the rabbit pleasures. The loss of any species there will be irrelevant. But a more broadly based environmental ethic will prefer plant species, especially species in their ecosystems on Santa Barbara or the Australian landscapes, over sentient animals that are exotic misfits.

This ethic for species will need a justification in principle, and we can suggest how that might work. The species is a bigger event than the individual, regardless of whether the member individual has interests or sentience. Much of what we have said about individual organisms as non-moral normative systems can be resaid, *mutatis mutandis*, of species, The species line is the *vital* living system, the whole, of which individual organisms are the essential parts. Processes of value that we earlier located in an organic individual reappear at the specific level: defending a particular form of life, pursuing a pathway through the world, resisting death (extinction), regeneration maintaining a normative identity over time, creative resilience discovering survival skills. The species has a good-of-its-kind,[16] Situations can be better or worse for the species.

The analysis we were giving, of life defended by an organism using the vital know-how in its genes, can be extended to the species level. Indeed, going to the genetic level turns out to be at the same time going to the species level. Properly understood, the story coded at the microscopic genetic level reflects the story of an ongoing species coping at the ecosystem level, with the individual a macroscopic mid-level between. The genome (genotype) is a kind of map coding the species; the individual (phenotype) is an instance incarnating it. The genetic set is as evidently the property of the dynamic species line as of the individual through which it passes. It is as logical to say that the individual is the species's way of propagating itself as to say that the embryo or egg is the individual's way

of propagating itself. The value resides in the dynamic form; the individual inherits this, exemplifies it, and passes it on. If, then, at the specific level these processes are just as evident, or even more so, what prevents value existing at that level? The appropriate survival unit is the ongoing line of life, in which individuals play their part.

Reproduction is typically assumed to be a need of individuals, but since any particular individual can flourish somatically without reproducing at all, indeed may be put through duress and risk or spend much energy reproducing, by another logic we can interpret reproduction as the species keeping up its own kind by re-enacting itself again and again, individual after individual. It stays in place by its replacements. In this sense a female grizzly does not bear cubs to be healthy herself, any more than a woman needs children to be healthy. Rather, her cubs are *Ursus arctos* recreating itself by continuous performance. The lineage in which an individual exists is something dynamically passing through it, as much as something it has. The locus of the intrinsic value – the value that is really defended over generations – seems as much in the form of life, the species, as in the individuals, since the individuals are genetically impelled to sacrifice themselves in the interests of reproducing their kind,

We said earlier that natural selection picks out whatever traits an organism has that are valuable to it, relative to its survival. This makes for intrinsically valuable organisms. If we ask about the character of this value, it is not the somatic survival of the organismic individual; rather it is the ability to reproduce the species line, or at least those alleles in the species line which the individual possesses and can transmit. That locates value-ability innate or intrinsic within the organism, but it just as much locates the value-ability as the capacity to re-produce a next generation, and a next generation positioned to produce a next generation after that. The value-ability is an ability to continue the historical species line.

Singer insists that all this defense and reproduction of species lines of flora and fauna is of no value except as a few higher animals who can suffer pains and pleasures are affected. Animals can suffer, but in species "there is no such feeling. In this respect... species are more like rocks than they are like sentient beings." Extinctions are "to be taken into account only in so far as they adversely affect sentient creatures."[17] But species are not very much like rocks at all; Singer's sentience-based ethic leaves him quite indiscriminating about vital differences. Things matter for species, like they do for trees. Things matter for sentient species, above and beyond the welfare of individuals.

The golden trout, state fish of California, evolved in three California creeks, the South Fork of the Kern River, Golden Trout Creek, and the Little Kern River, and is restricted to three drainages. It is an attractive,

"flashy" fish, and anglers highly prize catching it, although it is now threatened and the catch is quite limited. The brown trout was introduced into California in the late 1800s and is widespread throughout the state. It encroached on the golden trout, coming to outnumber it a hundred to one in the golden's own range,

Over the centuries, the golden may well prove a better adapted fit in this kind of habitat, if one considers the infrequent extremes of climate found in California, very cold winters, hot summers, droughts, fluctuations in water level, and so on. But this species was selected for competence in such a challenging physical environment, not for competition biologically against other more aggressive fish. Especially in the golden's reduced numbers, due to overfishing by early Californians, it could not outcompete the introduced newcomer in the short run.

The California Department of Fish and Game decided to eliminate the brown trout in golden trout habitat and for eighteen years (1966-84) waged a campaign to accomplish this.[18] Three downstream barriers were built and upstream golden trout were rescued while brown trout were poisoned by the tens of thousands. After the poison was neutralized, the golden trout were returned to the streams. About $300,000 was spent on this effort. The justification of this was partly aesthetic, partly quality fishing, partly respect for a state fish. It was also in considerable respect for an endangered species, historically evolved to fit a particular ecosystem, even though the introduced species was outcompeting it in its native ecosystem. The argument was that the one species belonged there as an adapted fit; the other was there by human help, repeatedly introducing the browns, and by human excess, overfishing the goldens. Human pleasures in recreational fishing did not outweigh the loss of the evolutionary achievement in the golden trout.

There would have been many more brown trout than golden had the introduced browns remained. If we simply aggregated individual fish lives with their sentient pains and pleasures, oblivious to differences of species, the larger population would be preferred. But the Californians did not count individual lives; they counted species, because respect for species makes a difference. Assuming that fish suffer when killed, they even judged that the killing of brown trout in order that golden trout may live is justified on a differential basis of a hundred to one, because they were counting evolutionary achievement and ecological competence, an event of brilliance in fish speciation in a unique habitat, not just the number of fish that might live in these waters with human interruption and disturbance.

Once again, Singer's ethic can make no judgments of this kind. He would have to inquire, perhaps, whether the delight of anglers catching some of these restored golden trout might outweigh the suffering of all the

poisoned brown trout. If he is counting only the lives of fish individuals, perhaps the California Department of Fish and Game should rather have modified the stream habitat (perhaps by check dams regulating the stream flow to make it less fluctuating) to hasten the extinction of the golden and to allow even more numbers of the introduced browns. On the sentience criterion alone, he is incapable of distinguishing between a monoculture of brown trout and the remarkable biodiversity of fish species in the US West. He cannot count species directly at all.

Species are what they are where they are, in ecosystems. An enlarging environmental ethic will need a principle for valuing ecosystems. "A thing is right," concluded Aldo Leopold, "when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."[19] Leopold wanted a "land ethic," one that embraced concern for individual plants, animals, and persons but also and fundamentally loved and respected biotic communities. But Singer cannot be so fundamental. "A thing is right," he will have to say, "when it tends to maximize the pleasures and minimize the pains of sentient animals, including humans, in the biotic community."

Or for that matter, the animals involved could be happy in zoos, if their life support was as well assured there as in ecosystems, and if they had rich enough zoo environments not to be frustrated. Also, if and where we can, we might remove the predators in the wild biotic communities, allowing for more herbivores, since the predators cause pain and suffering, and the herbivores do not. This will maximize the pleasures and minimize the pains there, though of course we will have to manage so that the herbivores do not overpopulate and suffer in result.

For most animals, Singer will reply, a biotic community, ordinarily an ecosystem, is the necessary habitat for their well-being, but an ecosystem itself has no feelings, and so cannot count in itself. "There is nothing that corresponds to what it feels like to be an ecosystem."[20] Concern for ecosystems is secondary, instrumental to a respect for human and other sentient life. The basic problem for Singer, again, is that ecosystems have no subjectivity, no felt experiences. They do not and cannot care, unlike the higher animals within them that can and do care. Ecosystems have no "interests" about which they or we can care.

But that is to make a category mistake, trying to apply criteria of value that are appropriate to sentient animals to ecosystems, where the criteria of value need to be something else. We should locate what is of value in ecosystems differently, which will involve their capacity to generate and support species – all the biodiversity environmentalists wish to conserve. These environmentalists are satisfying their preferences in such conservation, to be sure; but what they desire to preserve are the selective and life-supporting forces in ecosystems that once generated and still

maintain the lives of individual plants and animals, what Leopold calls "the land," or the "biotic community."

Evolutionary ecosystems over geological time have increased the numbers of species on Earth from zero to five million or more. Extinction and respeciation have differentiated myriad natural kinds. Organisms defend only their own selves or kinds, but the system has spun a bigger story. Organisms defend their continuing survival; ecosystems promote new arrivals. Species increase their kinds, but ecosystems have increased kinds, and increased the integration of kinds. The system is a kind of field with characteristics as vital for life as any property contained within particular organisms.

The claim that value enters the world only in the conscious experiences of the subjective lives of higher organisms has too much subjective bias. It values a late product of the system, psychological life, and subordinates everything else to this. At this scale of vision, if we ask what is principally to be valued, the value of life arising as a creative process on Earth seems a better description and a more comprehensive category. One can always hang on to the claim that value, like a tickle or remorse, must be felt to be there. Its *esse* is *percipi.* Non-sensed value is nonsense. There is subjective experience; there is objective vitality; but it is only beings with "insides" to them that have value. "Someone" must be there to count. We nowhere wish to deny that such experiences and their experiences are of value, but we deny that this is the whole account of value in a more holistic, systemic, ecological, global account. There can be value wherever there is positive creativity; and, while such creativity can be present in subjects with their interests and preferences, it can also be present objectively in living organisms with their lives defended. It is also present in species that defend an identity over time, in biological systems that are self-organizing and that project storied achievements.

"Where do we locate value, if not in sentience?" asks Singer. Consider a final level at which environmental ethics must provide an answer. We find ourselves located on a valuable planet. Earth is really the relevant unit to be valued, the fundamental survival unit. That, Singer swiftly replies, is going to extremes, and makes my point. Earth is not "Gaia," as though it were some conscious being.[21] Earth is, after all, just earth. The belief that dirt could have intrinsic value is really the *reductio ad absurdum* of any environmental philosophy that tries to maintain that insentient things can have value. Dirt is instrumentally valuable, but not, Singer will say, the sort of thing that has value by itself. Put like that, we agree. An isolated clod defends no intrinsic value and it is difficult to say that it has much value in itself.

But that is not the end of the matter, because a clod of dirt is integrated into an ecosystem; earth is a part, Earth the whole. Dirt is product and

process in a planetary systemic nature. We should try to get the global picture, and switch from a lump of dirt to the Earth system in which it has been created. On an everyday scale, earth, dirt, seems to be passive, inert, an unsuitable object of moral concern. But on a global scale? The values inherent in earth depend on the scale, on the circumstances; and we on Earth live in some rather special circumstances.

Earth is, Singer could insist, a big rockpile like the moon, only one on which the rocks are watered and illuminated in such way that they support life, including some sentient life. Earth is no doubt precious as a means of life support, but it is not precious in itself. There is no one there in a planet. There is not even the objective vitality of an organism, or the genetic transmission of a species line. Earth is not even an ecosystem, strictly speaking; it is a loose collection of myriads of ecosystems. So we must be talking loosely, perhaps poetically, or romantically of valuing Earth. Earth is a mere thing, a big thing, a special thing for those who happen to live on it, but still a thing, and not appropriate as an object of intrinsic or systemic valuation. It is really the sentient life that we value and not the Earth, except as instrumental to life. We do not have duties to rocks, air, ocean, dirt, or Earth; we have duties to people, or sentient things. We must not confuse duties to the home with duties to the inhabitants.

The trouble, though, is that this is not a systemic view of what is going on on the valuable Earth we now experience, before we experienced it. We need an account of the generation of value and valuers, not just some value that now is located in the psychology of the experiencers. Finding that value will generate an Earth ethics, with a global sense of obligation to this whole inhabited planet. The evolution of rocks into dirt and dirt into fauna and flora is one of the great surprises of natural history, one of the rarest events in the astronomical universe. Earth is all dirt; we humans too come from the humus; and we find revealed what dirt can do when it is self-organizing under suitable conditions.

In this bigger picture, it is not just plants that are self-organizing, but plants and all living things, sentient ones included, are products of a more comprehensive process of self-organizing, or spontaneously organizing, that characterizes the planet. This generativity is the most fundamental meaning of the term "nature," "to give birth." This self-organizing has been called "autopoiesis," and there are excellent scientific analyses of this spontaneous generation of complex, living order.[22] The planet as a self-organizing biosphere is the most valuable entity of all, because it is the entity able to produce all the Earthbound values.

At this scale of vision, if we ask what is principally to be valued, the value of life arising as a creative process on Earth seems a better description and a more comprehensive category than the pains and pleasures of a

fractional percentage of its inhabitants. Nothing matters to Earth, perhaps, but this creativity on Earth is the fact of the matter – the process and its products, speciation and species – and is greatly to be valued. Such an Earth is not just valuable because we humans and some other sentient animals value it. Rather, we are able to value it, and they are able to value their lives on it, because Earth is valuable, able to produce value. The production of value over the millennia of natural history is what we should most respect, not just the satisfaction of some preferences in sentient lives. Earth is the source of value, and therefore value-able, able to produce value itself. That is much more adequate as an environmental ethic than just to count everything else as a resource for a privileged few conscious valuers.

In that sense, a valuable Earth is not the *reductio ad absurdum* of valuing dirt. What is more nearly absurd is to claim that "trees, ecosystems, and species are more like rocks than they are like sentient beings"[23] and then to form a myopic environmental ethics insisting that "there is nothing to be taken into account" in all this display of vitality in insentient life.

## Notes

1 Peter Singer, Animal *Liberation,* 2nd edn (New York: New York Review Books, 1990), p. 8.
2 Bryan G. Norton, *Toward Unity among Environmentalists* (New York: Oxford University Press, 1991).
3 Peter Singer, *Practical Ethics,* 2nd edn (Cambridge: Cambridge University Press, 1993), p. 277.
4 Ibid., p. 279.
5 Singer, *Animal Liberation,* p. 9.
6 There is a discussion about "artificial life," as, for instance, in the journal *Artificial Life* (MIT Press). Some even claim that it already exists, in certain computer viruses, though most deny this. Were humans to create life, they would need an ethic respecting it.
7 For example, Francisco J. Ayala, *Population and Evolutionary Genetics: a Primer* (Menlo Park, CA: Benjamin/Cuinmmgs Publishing Co., 1982), p. 88; Robert H. Tamarin, *Principles of Genetics,* 5th edn (Dubuque, IA: William C. Brown Publishers, 1996), p. 558.
8 Evelyn Fox Keller, *A Feeling for the Organism: the Life and Work of Barbara McClintock* (New York: W. W. Freeman, 1983).
9 Ibid., p. 277.
10 M. F. Land, "Optics and vision in invertebrates," in Hansjochem Autrum (ed.), *Handbook of Sensory Physiology,* volume III/6B (Berlin: Springer-Verlag, 1981), pp. 471-592.

11 Singer, *Practical Ethics,* p. 277.
12 Bryan G. Norton, "Sand dollar psychology," *The Washington Post Magazine* (June 1,1986), pp. 10-14.
13 Ibid., pp. 11,13.
14 Singer, *Practical Ethics,* pp. 275-7.
15 Details from Jan Larsen and Clark Winchell, Natural Resources Managers, Naval Air Station, North Island, San Diego, California. See also *Federal Register,* 47 (February 3, 1982), p. 5033.
16 This claim is pressed by Lawrence Johnson as the "interests" of a species *(A Morally Deep World,* Cambridge: Cambridge University Press, 1991), and Singer rejects species "interests" *(Practical Ethics,* pp. 282-3). "Interests" may well be a term that has too many psychological associations to extend well to species. But "good" is not.
17 Singer, *Practical Ethics,* pp. 283-4, 275-6.
18 Details from Edwin P. Pister, California Department of Fish and Game, Bishop, California.
19 Aldo Leopold, *A Sand County Almanac* (New York: Oxford University Press, 1949, 1967), pp. 224-5; cf. Singer, *Practical Ethics,* p. 280.
20 Singer, *Practical Ethics,* p. 283.
21 Ibid., p. 283.
22 Humberto R. Maturana and Francisco J. Varela, *Autopoiesis and Cognition: the Realisation of the Living* (Dordrecht/Boston: D. Reidel Publishing Co., 1980); John Tyler Bonner, *The Evolution of Complexity by Means of Natural Selection* (Princeton, NJ: Princeton University Press, 1988); Stuart A. Kauffman, *The Origins of Order: Self-organization and Selection in Evolution* (New York: Oxford University Press, 1993).
23 Singer, *Practical Ethics,* pp. 283-4.