

Pages 381-414 in Stephen R. Kellert and Edward O. Wilson, eds., *The Biophilia Hypothesis: A Theoretical and Empirical Inquiry* (Washington: Island Press, 1993). By permission.

CHAPTER 13

*Biophilia, Selfish Genes,  
Shared Values*

*Holmes Rolston III*

TWO CENTRAL FEATURES of Edward O. Wilson's work are selfish genes and biophilia (1975a, 1984a). Perhaps more than any other living biologist, he has sought an ethics that is, both subjectively and objectively, based on biology. We moral agents, human *subjects* who act, must have morality based in our genes. And those who are the focus of concern, the *objects* or beneficiaries of our moral behavior, are not simply other humans but plants and animals. This ethics is based in a love for all forms of life: biophilia. So the chief exponent of selfish genes reaches toward a more comprehensive ethics, one even including ants.

Hence the puzzle: can we get biophilia from selfish genes? If so, well and good. If not, must we choose one or the other? Here I will propose a theory that describes what is going on and prescribes what ought to be. We can start with selfish genes but will have to expand progressively outward until we end with the whole Earth. By a series of ever more extensive hookups we

will weave the selfish genes into global natural history. Philosophically this is a study in integration and identity in natural history.

Among sociobiologists, Wilson is notable for his ardent environmentalism. In *Biophilia*, with the subtitle *The Human Bond with Other Species*, he urges "an advance in moral reasoning... to create a deeper and more enduring conservation ethic." And he insists: "The only way to make a conservation ethic work is to ground it in ultimately selfish reasoning—but the premises must be of a new and more potent kind." Wilson worries about only "a surface ethics" and continues: "It is time to invent moral reasoning of a new and more powerful kind... a deep conservation ethic [based on] biophilia. . . .The more the mind is fathomed in its own right, as an organ of survival, the greater will be the reverence for life for purely rational reasons" (1984a:126, 138-140).

In sum: "To the degree that we come to understand other organisms, we will place a greater value on them, and on ourselves" (1984a:2). Wilson struggles both to keep and to break out of a selfish conservation ethic. He hopes to place great value on other organisms and we find that promising. We will return to the vocabulary of value. We want to get values in the right places—whether by placing them there, by finding them in place, or by sharing them. We hope to put selves in their places, as well, and thereby to put into place an environmental ethics.

#### Selfish Genes

In Wilson's classic *Sociobiology*, we are introduced to "The Morality of the Gene" on the first page (1975a: 3). The genes, he says, hold culture on a leash: "Human behavior—like the deepest capacities for emotional response which drive and guide it—is the circuitous technique by which human genetic material has been and will be kept intact. Morality has no other demonstrable ultimate function" (1978:167). He continues: "Human emotional responses and the more general ethical practices based on them have been programmed to a substantial degree by natural selection over thousands of generations. . . . The deep structure of altruistic behavior . . . is rigid and universal" (1978:6, 162-163).

"Morality, or more strictly, our belief in morality," says Wilson, "is

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merely an adaptation put in place to further our reproductive ends. ... In an important sense, ethics... is an illusion fobbed off on us by our genes to get us to cooperate" (Ruse and Wilson 1985). "Human beings function better if they are deceived by their genes into thinking that there is a disinterested objective morality binding upon them, which all should obey. We help others because it is 'right' to help them and because we know that they are inwardly compelled to reciprocate in equal measure. What Darwinian evolutionary theory shows is that this sense of 'right' and the corresponding sense of 'wrong,' feelings we take to be above individual desire and in some fashion outside biology, are in fact brought about by ultimately biological processes" (Ruse and Wilson 1986:179). Bluntly put, ethics results in genetic fertility; that is its deepest explanation.

Can biophilia be such "an illusion fobbed off on us by our genes to get us to cooperate" for our reproductive advantage? If all human behavior is a "technique by which human genetic material has been and will be kept intact," if "morality has no other demonstrable ultimate function," then we must "ground it in ultimately selfish reasoning" and all morality will be "the morality of the gene." This requires asking whether genes can be moral or immoral. Are there selfish genes that keep biophilia on a leash?

We do not ask about the morality of the liver or endoplasmic reticulum, for organs and organelles cannot be moral agents. But genes do code for life (for livers, cells, and organismic behavior as a whole) and perhaps there can indeed be a morality of genes. Genes govern the process; they are not simply products, and maybe there is some selfishness in the executive program. It is logically essential to the ordinary concept of selfishness that some entity (a "self") act in its own interests in an arena where peer entities (other "selves") have interests that can be acted for or against. We must be able to identify one self among other selves where the result of behavior benefits one and costs others. For a selfish gene, the contrasting class would be other genes located within or without a particular individual organism. Gene A benefits; gene B loses. Otherwise the possibility of selfish behavior lapses.

It is essential to any censurable selfishness that the agent acting selfishly has an option. Ought implies can; ought not implies can do otherwise. Since genes have no such behavioral options, we may not be dealing with censurable selfishness, but rather with a compulsive selfishness governed by

the genes as they determine (but do not choose) behavior. Already we see that we must be circumspect about selfishness in genes.

Questions arise whether one gene can act against the interests of other genes that coinhabit the same organism. Or against the interests of genes inside other organisms. We must locate genes in their communities, their ecosystems. Biological phenomena take place at multiple interconnected levels—from the microscopic genetic through the organismic to the ecosystemic, bioregional, and planetary. Bigger networks are superposed on smaller, and these on lesser networks still; we descend *from* global scales to those in nanometer ranges. When we locate a gene in such a fishnet offishnets of fishnets, it is difficult to think what it would mean for a single gene to operate "selfishly" in any biological sense (much less in any moral sense). Identity becomes a complex, multilevel phenomenon.

Part of the problem is that the benefits and costs accrue at a level different from that at which the gene immediately acts. There is a genetic level of *coding* and an organismic level of *coping*. Structure and metabolism both are genetically controlled; the genotypic level is doubly cross-wired to the phenotypic level. One gene may affect numerous phenotypic traits (pleiotropy); a single morphological or behavioral trait may depend on the contribution of many genes (polygeny). Many genes are epistatic (affect one another's effects).

In the functioning organism, proteins of thousands of different kinds, made on different genes and delivered to their vital sites, must all thereafter coact with the rest of the somatic materials and metabolic processes with which the organism manages to cope. Regulatory genes switch on and off the structure-producing and enzyme-producing genes. So a "selfish" regulatory gene can only be expressed in the phenotype if it switches on and off appropriately some structural or other gene—presumably too a "selfish" gene but one that can, in turn, be selfish only subject to the operation of a regulatory gene.

Though Wilson believes in selfish genes, he also knows that "real selection, however, is not directed at genes but at individual organisms, containing on the order often thousands of genes or more" (19753:70). No gene is fit by itself; it has fitness only in the company it keeps. If a gene has a "self to be selfish about, this too is only in the company it keeps. Hence these al-

legedly selfish genes are already set in the context of sharing, even before we pass outside the boundaries of the individual organism. One cannot be very selfish if one's fate is blended and interlocked with that of a hundred thousand others. Especially with behavior, which involves complex neural, cognitive, and muscular activities, the whole organism is involved, interacting with its environment.

A generic reductionist approach sees the organism as nothing but an aggregation of genes and their outputs, each gene being individually "selfish," a kind of bottom-up approach. But the truer picture is a top-down approach: the organism is a whole, a synthesis, and codes its ways of coping in the genes, which are analytic units of that synthesis, each gene a cybernetic bit of the program that is the specific form of life. A gene exists in the microworld of coding, though its output functions sooner or later in the ecological macroworld of coping. We are having trouble seeing how any one gene is in any position to act selfishly—as though this could mean in its "own" interests separately from the interests of other genes or separately from the interests of the organism in which it is embedded.

### Selfish Selves

We next turn to the organism facing its outer environment. Although many genes and their products coordinate into one integrated organism within the skin, facing outward life is lived as a singular individual. The organism is on its own. At this point natural selection does operate to select the better-adapted fits, those coded for the best coping. Now "selfish" behavior becomes more plausible. Behavior is a characteristic of the organism, not of this or that gene.

Again we must ask whether there is an identifiable entity (a "self") that can act in its own interests in an arena where peer entities (other "selves") have interests that can be acted for or against. In the case of a selfish organism, the contrasting class will be other organisms, either of the same or other species. The network of its coordinated parts comes to integrated unity in the organism as a whole. That is the "self." Such organisms frequently behave so as to benefit themselves at cost to others. One chicken grabs a grain of corn in the barnyard, and others do not get it. So it certainly

seems that an organismic self can act against the interests of other organismic selves. Neither plants nor animals have intentions about this matter in the reflective sense required of moral agents. Except possibly for certain higher animals, it is not possible for them to do otherwise. So it is still not clear that selfishness is an appropriate label to apply to genetically based behavior and performance, where there are no options. But at least we can see how one organism can gain while other organisms lose. And so, perhaps, we have a biological analog to, a precursor of, selfishness.

We need to reflect on "selves," vital to the question of identity in natural history. Life requires reproduction, and that requires genes. Life also requires an inside and an outside, an organism that has separated itself from its environment. The definition of life—as we know it on Earth in any case—really includes this definition of self from nonself. There must be some kind of a cell, some defining envelope. After that, a cell, an organism, can take in nutrients from the environment and sequester them for its own uses. Our biology has to be arranged so as to keep us apart, though we must immediately add that our biology has to relate us to others with whom we are interdependent. The conservation of self-identity by a semipermeable organism is the larger truth within which we must interpret this alleged selfishness. The individual must live in an environment with which it must be in constant exchange. Self-identity means self-defense, self-stability, self-integrity.

"Self" is often a psychological concept, an ego, so we must be clear here that "self" is a biological concept. Plants and paramecia have no subjective life, though they defend objective selves. In all the advanced species of natural history, those with immune systems, the self is a singularity. In some forms of life, selves are clones of each other. Sometimes selves are histocompatible. But this is not true past the earlier levels of evolutionary history. After that, nature began to make idiographic selves. Indeed, the degree of idiosyncrasy in nature is quite remarkable. There is historical particularity in Earth's natural history, right down to the biomolecular level.

In organisms without moral capacity, we make a category mistake if we let "selfish" have a moral meaning. But in nature, there are selves—biological organismic identities to be preserved. Such a self-impulse cannot in it-

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self be a disvalue. Quite to the contrary, this self-impulse is just the life impulse, the principal carrier of biological value. An organismic self is not a bad thing, nor is the defense of it. The system evolves organisms that attend to their immediate somatic needs (food, shelter, metabolism) and reproduce themselves in the very next generation. In the birth-death-birth-death system a series of replacements is required. The organism must do this; it has no options; it is "proper" for the organism to do this (Latin: *proprium*, one's own proper characteristic). Somatic defense and genetic transmission are the only conservation activities possible to most organisms; they are necessary for all, and they must be efficient about it.

If there is some disvalue, this must lie in an overextension or aberration of the self-impulse. When a subordinate monkey relinquishes a feeding site to a dominant, the dominant may be said to have "selfishly" taken over. Or males may "selfishly" dominate females or defend territories. But if we strike out the negative moral overtones and replace them with positive self-preservation, what is going on? The monkey with the superior genes gets fed and bred; the monkey with the inferior genes does not, or at least not first. What is so disvaluable about that? Should it rather be the other way round—that the inferior genes get nourished and propagated and the superior ones do not?

Some sociobiologists can be quite emphatic about this organismic selfishness, which, they think, we humans are born into. Richard Dawkins reaches this conclusion: "We are survival machines—robot vehicles blindly programmed to preserve the selfish molecules known as genes. Let us try to *teach* generosity and altruism, because we are born selfish" (1976:ix, 3). George Williams complains: "The process and products of evolution are morally unacceptable. . .and justify an . . . extreme condemnation of nature. . . . Brought before the tribunal of ethics, the cosmos stands condemned. The conscience of man must revolt against the gross immorality of nature. . . . Natural selection . . .can honestly be described as a process for maximizing short-sighted selfishness." Behavior such as that of the dominant monkey, says Williams, is "not only selfish in some theoretical sense but patently pernicious. Only the morally and intellectually dishonest could label it otherwise." Williams urges: "An unremitting effort is required to expand the circle of sympathy for others. This effort is

in opposition to much of human nature" (1988:383-385,392,437). Not only must humans get an ethic from outside biology, they must defeat their biology with it

Many thinkers have concluded that humans are born selfish, and some influential ones find little possibility of altruism in the deeper sense, short of some kind of redemption of the nature we inherit biologically. These views have sometimes claimed to be scientific, as in Freud's psychoanalysis or Skinner's behaviorism; but even before the rise of science they were just as intensely advocated by Luther, Calvin, Aquinas, Augustine, Saint Paul, Jesus, and Gautama Buddha. The novel discovery here locates the nature of our bondage to selfishness in genetic determinants.

Some sociobiologists think that this discovery frees us from such bondage. But Wilson, as cited earlier, does not seem to think we can escape that leash. Rather we will have to find moral altruism if and only if some kind of altruism can be found within the constraints of the selfish genes. We get a clue how this may be so when we notice that the higher organisms, which "behave" and "act," often cooperate with one another. They mate in pairs and rear their offspring, they hunt in packs, they nest in colonies, they give alarm calls, they lead each other to food and share it. How are we to explain this behavior?

### Inclusive Selfish Genes

To answer we must go down to the genetic level and consider kinship from the "selfish" gene's-eye view. When geneticists become sociobiologists, though they continue to suppose there are selfish genes, they insist that when we ask about "my genes" we have to enlarge the scope of "my" and go up to the family level by the same logic that goes down to the genetic level. From the gene's-eye view, since a gene is an information bit, a gene is present in all cells where there are copies of it. A particular gene is copresent in myriads of cells within any one individual but likewise may be copresent in relatives—copies within kin in a different skin. Facing out, we find that we are sometimes facing in, finding ourselves in others. Expanding the concept of the self to include this "inclusive fitness" (Hamilton 1964), the survival and reproduction of a relative are partly equivalent in evolutionary

effect to one's own survival and reproduction. Animals, including humans, are evolved not only to reproduce the genetic materials in their own bodies by creating and assisting their descendants, but also to assist copies of their genes that reside in collateral relatives. Assistance to a relative will be favored if the benefit to the relative, proportioned to the degree of relationship, exceeds the cost to the donor.

Consider a baboon on sentry duty. He is not getting anything to eat while others are eating. But seen in terms of inclusive fitness, the distribution of benefits is the reverse of what it first seems. The sentry duty reduces what Wilson calls personal fitness (better: individual fitness). But it does not reduce inclusive fitness. The dominant male's genetic self, arising from his genetic type, is copresent in those he guards. He has one-half of a self in offspring, one-eighth of a self in first cousins, and so on. If we add these up, and adjust for risks and probabilities, the "selfish" benefits distributed elsewhere exceed the losses to the whole self within himself. So he is really defending his enlarged reproductive self when he risks his individual organismic self.

Here we are reaching an odd sort of selfishness, too, just as conceptually odd as we found selfishness to be at the genetic level. An individual's fitness is shared with kin—more and less with mother, father, sisters, brothers, children, cousins, uncles, aunts, nieces, nephews—all those blood relations in whom there are partial copies of "my genes," of whose genes "my genes" are partial copies. "Inclusive" mellows "fitness" from the skin outward. It does not matter whether the descendants (gene copies) are mine immediately, as a result of my individual fitness, or in my family, my inclusive fitness. If I fail to reproduce, it is just as well to have copies transmitted over there in my cousins.

Now we have clouded the seeming clarity of having located an idiographic "self" that can be selfish. It is not just the organismic, somatic self (the one protected so zealously by the immune system) that counts; it is the reproductive (genetic) self. In relatives, a self acts to preserve shared genes even if the self is not the one to perpetuate them. You can insist, if you wish, that these are still selfish genes, partial copies of oneself over there in daughter or nephew, uncle or cousin. But this is a strange kind of selfishness smeared out into a network of family relationships. Really, there is no rea-

son to prefer a reductionist explanation of such behavior, "nothing but selfishness," especially when labeling it pejoratively with a term borrowed from more complex human moral failure.

We are dealing with vital competence in an animal that has no duty. It is more plausible to interpret such behavior as self-defense, self-actualizing proper to every animal life, a defense not only of somatic self but of familial and specific forms of life. The "self" is not so much isolated and singularly preserved as it is fragmented and redistributed, mingled with other "selves," likewise shuffled. We are really dealing with in-common genes, in which any one family member participates, such as the dominant male baboon or a juvenile he protects. We are dealing with a heritage. We find a much expanded "selfishness" that becomes indistinguishable from family—one that shares most genes with conspecifics, a self stretched into community.

Humans have evolved with this animal heritage, and therefore we can interpret much human cooperation with the same theory applied to primates—for example, "altruistic" acts when a family member risks danger to protect his kindred. But this is no "killjoy" explanation of human ethics reduced to animal selfishness. Rather if human ethics originated here, this is really a quite promising origin of ethics in values already shared in pre-moral animal behavior. Inclusive fitness, where "my" becomes "our," is a welcome precursor to ethics, although we must be dear about what additionally emerges with its elevation into altruistic moral concern.

### Sexuality and Self

This "our" of shared genes is a widening circle. Consider sexuality. Few phenomena are more pervasive throughout natural history than sexuality; few have proved more challenging to interpret from the point of view of selfish genes. The idiographic self cannot survive alone but has to mate. Sexuality requires male animals to couple defense of blood family to the nonkindred genetic lines of female mates. But this includes not only mates of a particular male but also those nonkindred female "others" who mate his kin, because "his" fractional genetic selves also couple with outside lines. The female mammal does have to tolerate another—the fetus in her

womb, only half her own. So a particular self's inclusive fitness (genes in his or her kin) become entwined with much "alien" fitness in the bloodlines of mates. The individual somatic self is smeared out into the family and entwined with the community. The self is checked by sexuality.

Outbreeding individuals mate with others who have different genes. The human individual, falling in love, urged to reproduce, cannot love self alone but loves self in family, a family initiated by union with a genetically unrelated other. Typically husband and wife do not have recently shared genes. Nor can brother marry sister, nor cousin close cousin, without inbreeding depression. When the genes go through just that phase of the life cycle where the fully selfish gene might wish to construct a faithful copy of itself, or at least to protect partial copies of itself in relatives, there is chopping up and reshuffling, as though to bar genetic fidelity as the only rule in the game. The system insists on variation. It is hard to be selfish if one is a genome and must be split in half at every reproduction.

Sexually reproducing organisms cannot make identicals; offspring must be *others* (Latin: *alteri*) and in this sense sexual reproduction is by necessity "altruistic." Organisms can only make similars, similars with differences, and such variations over evolutionary time are as critical as the similarities. It is not possible, of course, for an organism to make other-very-differents; it can only breed after its kind. Only in asexual reproduction can an organism make identicals, clones, but asexuals are disadvantaged over evolutionary time. There is not enough variation and no way to crossbreed discoveries. Pure replicators, making only identicals, do well enough in the short term or in little-changing environments; but in the long haul and in complex environments, they go extinct (Maynard Smith 1978).

Thus an organism arrives in the world as a beneficiary of past variations, and it inhabits a natural system in which it can cope only if it can make variant copies of itself. Insofar as they are copies, the organismic history is inherited; insofar as they are variants, history is generated anew. The organism is itself a product of history, but its "self" cannot continue long somatically: it dies. And it cannot replicate itself except as it also generates otherness, copies with variance. Sexuality is a key to this variance. It breaks up at the same time that it creates unique biological identity. The self can-

not continue except by dividing to unite with an alien self; its selfishness is limited by a required sharing. Selves over time inhabit a breeding community. Each new generation of idiographic selves is born of complementarity.

Yet these other selves are not all that other. Humans are "all of one blood" in the species sense. The man and the woman, like any mating pair, must have enough in common to interbreed; they share far more in their biochemistries than they differ in their idiosyncrasies. Within the human population there are many alleles at many loci, and one human can only carry a few of these. In this sense two individual humans may differ by hundreds of genes. At the same time, genetic studies show a remarkable uniformity from one human population to the other. Only 15 percent of the variation within human blood types exists between groups, whereas 85 percent of the variation is shared across groups (Lewontin 1972). For most genes, differences between populations are of frequency only; the genes themselves tend to be the same in population after population from the equator to the arctic circle. Where there are differences in alleles, it is difficult to link such differences with any survival benefit. Despite intensive study, there are less than half a dozen such genes known. Genes for dark skin provide protection in sunny climates. The sickle-cell gene gives resistance to malaria in malarious regions. But there are hundreds of other human blood group polymorphisms that do not make any known difference to reproduction rates.

Some geneticists believe that most of these differences are due to genetic drift and are neutral to selection. It is difficult to think that such genes could defend themselves "selfishly," since selection does not act on them. Other differences (as with dark skin) may formerly have made more difference than they do now; they may be relict genes. Whatever the explanation for the differences, humans around the globe have enough in common genetically to interbreed. If we are thinking about the genes that make ribosomes, Golgi apparatus, erythrocytes, acetylcholine molecules, or stem cells for B and T lymphocytes, whatever distinctive mix there is of these alleles in the husband's body, they are more similar to than different from the genes that do those things in the wife's body. Most of my genes are nonrival with most genes in most other humans.

From this perspective the fifty-fifty male /female split was a misperception; there is no more than a fraction of a percent difference between us; we have 99.444 (!) percent of our genes in common with everybody else, sort them uniquely though we do. Those genes of hers that seemed alien a moment ago are mostly my genes after all—or, the other way round, my genes are hers. After all, my wife too has hemoglobin in her veins and an opposable thumb on her hands, as do all "alien" humans around the globe. There are only four blood types as far as transfusion is concerned. Where most genes are involved it is difficult to think of alien genes in any other human. All 5 billion humans have copies of genes mostly like the copies I share with them. The differences between us, if we must compete about these, all turn on a trifling fractional percent and a different turn of the genetic kaleidoscope. It is really only the relatively idiosyncratic genes about which we are quarreling.

The other side of the picture is that each idiographic self is really a cluster of bits and pieces borrowed from, inherited from, all over everywhere, copies of which are still present with us side by side in relatives. We are composites. For it is not so much that our genes are heterogeneous, as is our combinatorial package. Most of my genes are not unique to myself at all, nor even to my family; to the contrary, they are common to conspecifics. These in-common genes, insofar as they affect behavior as well as determine structure, will be pushing me to cooperate with any and all fellow species members, and they with me. Or perhaps they will be neutral to behavior that differentiates between members of my species, since they are copresent in all.

We do not want a pejorative picture of a world laden with selfishness from the genes on up if the selfishness is really theory-laden and in the eye of the beholder. We might be viewing wild nature through a human prism—fooling ourselves that this is objective hard science when it is really just a subjective way of framing the problem. In this case the theory is not revealing anything about values in nature; it is just confusing us. Selfishness is indeed real—we experience it in culture—but we do not want to speak as though animals and genes were ethical agents in conditions of only superficial similarity. That kind of science has become almost animistic, mistakenly ascribing personal characteristics to natural things that are

incapable of such characteristics. The immorality is not there in nature; it is in our theoretical habiliment. Theories are like suits of clothes: they do have to fit the data more or less, but a great deal depends on how you want to dress things up.

### Satisfactory Fitness

No genes, no organism; but also no ecology, no organism. Genes and self are quite surrounded by their environs. All three levels are vital: genes, organisms, natural history. If we are going to see the whole picture, we must next place the self in an ecosystem where it has a satisfactory fitness. The skin is a surface of exchange with the environment, and what is outside is as vital to life as what is inside. The world offers resources and accepts our wastes, recycling them. Interdependence and dependence are as true as selfish genes and organism. The environment is something that is outside and, we might say, over against us, but also it is our life support, not something that we are against or that is against us. Self-actualizing is essentially the protection of individual biological identity in a world where life is maintained by the orderly control of what passes through membranes. An educated geneticist must be an ecologist.

From the perspective of selfish genes, "foreign" means any molecule not coded for by the organism's DNA. Everything in the environment is foreign. But from the perspective of ecology, the organism inhabits a niche; the environment is its domicile, its "home" (the root of ecology, Greek *oikos*). An organism without a habitat is soon extinct. Life, skin in, has to protect a self. Life, skin out, has to fit the organismic identity into an ecosystemic integrity. Selves survive a little while; but all the while, really, the ecosystem in which this self lives is the fundamental unit of development and survival. An organism is a member of a species; its self-identity is smeared out into family and kind; that was the previous point. The present point is that an organic self, a member of a species, is what it is where it is. There are no organisms, period; there are only organisms-in-ecosystems.

Although conflict is part of the picture, the organism is selected for a situated environmental fitness beyond an inclusive fitness. For several decades biology has emphasized the survival of those with better-adapted fit into

their ecological communities. A bear organism fits its forest community—as surely as its organs fit together to organize a bear, as surely as the genes program and defend that organization. There are differences: the heart and lungs are close-coupled in a way that bear and forest are not. An ecosystem is often weakly coupled. Still: no forest, no bear. Unity is admirable in the organism, but the requisite matrix of its generation is the open, plural ecology.

Most of the relations between organisms are networks of interdependence and tolerance. This includes eating each other and being eaten. It also includes, if there are to be idiographic selves with identity, standoff relations. Organisms must defend territories and offspring. There can sometimes arise adversary relations. But the bigger truth is ecological: every organism is connected to and dependent on many others. Joining this holistic biological picture with a philosophical perspective, we must find a place for both idiographic self-defense and community dependency in tandem.

To some, ecosystems are little more than stochastic processes. A seashore, a tundra, is a loose collection of externally related parts. Much of the environment is not organic at all (rain, groundwater, rocks, nonbiotic soil particles, air). Some is dead and decaying debris (fallen trees, scat, humus). These things have no organized needs; the collection of them is a jumble, hardly a community. Each self-defends its own life and there is only fortuitous interplay between organisms. An ecosystem is a matter of the distribution and abundance of organisms, how they get dispersed here and not there, birthrates and deathrates, population densities, moisture regimes, parasitism and predation, checks and balances. There is really not enough centered process to call community. There is only catch-as-catch-can scrimmage for nutrients and energy.

Even if we think of animals and plants as selfish, we still may respect them because each defends an organized biological identity. An ecosystem is the necessary habitat for this self-defense, but an ecosystem itself has no genome, no brain, no self-identification. It does not defend itself against injury or death. It is not irritable. An oak-hickory forest has no self to defend. So it can begin to seem as if concern for ecosystems is secondary after all, instrumental to the defense of organismic selves.

But to say that and nothing more is to misunderstand ecosystems. The organism is selected for a situated environmental fitness. There is a crucial element of struggle, but it is equally important to see this element contained in community. Ecological science emphasizes how there is a biological sense in which deer and cougar cooperate, defend their selves though they may; and the integrity, beauty, and stability of each is bound up with their coactions. Predator and prey, parasite and host, grazer and grazed, require a coevolution where both flourish, since the health of the predator, parasite, grazer is locked into the continuing existence, even the welfare, of the prey, host, or grazed.

The community connections, though requiring adaptive fit, are looser than the organismic coactions. But this does not mean they are less significant. Internal complexity, a self, arises to deal with a complex, tricky environment, the world as foil of self. The skin-out processes are not just the support, they are the subtle source of the skin-in processes. Everything will be connected to many other things, sometimes by obligate associations, more often by partial and pliable dependencies; and, among other components, there will be no significant interactions. There will be shunts and crisscrossing pathways, cybernetic subsystems, and feedback loops, functions in a communal sense. The system is a kind of field with characteristics as vital for life as any property contained within particular organisms. The individual and species (the genetic line) and its environment are not in fortuitous contrast or accidental aggregation; the ecosystem is the depth source of individual and species alike.

In the current debate among biologists about the levels at which selection takes place—individual organisms, populations, species, genes—the recent tendency to move selective pressures down to the genetic level forgets that a gene is always emplaced in an organism that is emplaced in an ecosystem. The molecular configurations of DNA are what they are because they record the story of a particular form of life in the macroscopic, historical ecosystem. What is generated arises from molecular mutations, but what survives is selected for adaptive fit in an ecosystem. We cannot make sense of molecular life without understanding ecosystemic life. The one level is as vital as the other.

Sometimes it is even held that organisms—or their biochemical mole-

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cules: proteins and genes—are real whereas ecosystems are just collections of interacting individuals, epiphenomenal aggregations. This too is a confusion. Any level is real if there is significant downward causation. Thus the atom is real because that pattern shapes the behavior of electrons; the cell is real because that pattern shapes the behavior of amino acids; the organism is real because that pattern coordinates the behavior of hearts and lungs; the community is real because the niche shapes the morphology and behavior of the foxes within it. Genes are the coding for coping in ecosystems; this makes them what they are where they are, and it makes ecosystems as real, as ultimate, as any genetic self.

"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" (1968:224-225). Leopold urged a "land ethic" that embraces concern for individual plants, animals, and persons but fundamentally loves and respects biotic communities. An environmental ethics needs biophilia for what Leopold called the land. Selves there are; but selfishness is difficult to maintain when the self gets spread through kin and kind, mated with other selves, and, now, extended into the landscape one inhabits, an interconnected web of life. There is some exaggeration in the deep ecologist's "the world is my body." But for those intoxicated by selfish genes, it is a sobering thought.

### Reciprocal Altruism

At the next level of the evolution of cooperation, we complicate the picture with reciprocal altruism (Trivers 1971). Serving their self-interest, animals may help each other out, now oblivious to close kinship. There are certain things it is difficult or inconvenient for a baboon to do for itself (backscratching) which others can conveniently do for it; and it can reciprocate for them (scratch their backs). So it is to the mutual advantage of social primates to backscratch for each other. At this level, genetic relationships make no difference; a foreign backscratcher will do as well as a brother. So one baboon may be inclined to scratch the back of another, subject only to the likelihood that the second will reciprocate later when the first gets an itch.

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In a cooperative society, animals can lower their risks. A vervet monkey will give an alarm call. Any other monkey, related or not, can interpret the call and benefit from it, while the caller puts himself at some risk by identifying his location to the predator. But on a later occasion, if the caller himself is unaware of a nearby predator and is alerted by the call of some more distant monkey, perhaps one quite outside his own family line, his life is saved. When unaware of a nearby predator, a monkey is at high risk of losing everything; when calling to alert others to a predator that he has spied at a distance, a monkey is at comparatively low risk. Because of this asymmetrical risk factor—a little cost versus a lot of benefit—both parties can, overall, lower their risks by helping each other out. Each gains individual somatic fitness and is more likely to live to reproduce than if neither gives alarm calls. Reciprocal altruism raises somatic and genetic fitness without any need to introduce genetic or inclusive fitness: kin selection.

When reciprocal altruism is working well, there are no losers on long-term average, although there are short-term losers on occasion. The baboon scratching another's back is not getting anything to eat while he is backscratching; the alarm-calling monkey is momentarily at some risk, gaining nothing by this particular call. But generally each gains back more than was lost, although benefits and losses may, on statistically rare occasions, be maldistributed. "Selfishness" makes some sense when one wins and another loses, but it is difficult to think what selfishness means in a win/win situation when one "self" has a self-interest that coincides with that of another. Mutual backscratches may each be acting in their self-interest, but there is nothing selfish about helping each other out to the mutual advantage of both.

Where there is memory and a capacity to discriminate between individuals, remembering who reciprocates and who does not, reciprocal altruism can evolve where kinship is marginal and in doubt, so that the benefited other may (or may not) be both kin and reciprocator. A strategy dubbed "tit-for-tat"—cooperating initially, never thereafter refusing to reciprocate if the other does, refusing to cooperate when and so long as the other refuses to cooperate, and restoring cooperation at once if the other ventures it—can get established in a population, remain established, and resist invasion by various other strategies, particularly by noncooperation (Ax-

elrod and Hamilton 1981). (Caution: these are mathematical game models, run on computers, which are neither biological nor ethical. Whether they map anything going on in the real world of genetics and ecosystems, much less that of personality and morality, needs more discussion.)

All this is said to be enlarged "selfishness." But in the same way that "inclusive" fitness is not a very selfish kind of fitness, or that a satisfactory fitness in an ecosystem webs the self into an ecosystem, reciprocal altruism is not as "selfish" as alleged. The "self" is getting coupled up to other selves willy-nilly. One way to approach this issue is resolutely to hang onto the central paradigm of "selfishness" and see all these others as being exploited by the original self. But it is just as plausible to see the self as being distributed out into the communal system, and we reinterpret what is happening by transposing to a communitarian paradigm.

The social system is entwining the self, as backscratcher or alarm caller, inseparably with the destinies of others—somewhat analogously to the way in which, earlier, the system embedded the fate of any one gene with the collective fates of myriads of others copresent in the genome of the integrated organism. This organism was in turn embedded in a family, its genes smeared out over kindred, and all these genes were interlocked sexually with mates. The organism got placed in a species line, in a breeding population, and further placed in a biological community on a landscape. Now, in social systems, the self is again being expanded, past those who are kindred, to all those of like kind with whom one interacts. Again, this is no problematic, ugly, ungodly, evil, or embarrassing precursor of ethics.

Adding in these genetically unrelated but socially related reciprocators with whom the individual interacts makes the picture all the more communitarian, since the genes of all these reciprocators are benefited with this coupling to "my" selfish genes. Just as it was earlier difficult to think of a "selfish" gene, owing to its inescapable organismic interlocking, it now becomes problematic to think of a selfish self. Willy-nilly there is reciprocity; there is community. If one insists on the word, the individual acts "selfishly" in his or her own interests, but "selfish" has been first stretched to cover benefits to father, mother, niece, nephew, cousin, children, aunts, uncles, and so on, and then stretched to cover benefits made to reciprocating

nonkindred others. The "my" that once seemed located from the skin in has been so much the further reallocated into a broadly scoped "our."

The evolutionary adventure is becoming less and less private and individualistic, more and more social and communal. The picture we are getting is one of benefits dispersed as much as benefits hoarded. Reciprocal altruism, though present even in animals, is not extensive there, however. Animal relationships are usually not sufficiently complex, enduring, or remembered to permit its elaboration (Wilson 1975a:120). Most organisms, living in rather local environments and narrow niches, are incapable of much reciprocity. Animals do not have much capacity to act or interact outside their own immediate sector of residence.

But humans can vastly expand the circle of reciprocal altruism, and this is the basis of all cultural cooperation. In all cultures, ancient and classical, people did not help just their blood relations; they helped other members of their tribe. Persons today cooperate at work, in politics, at school, in business, and so on with other persons with whom they have no known kinship except that they are all members of *Homo sapiens*. In modern nations, with trade by truck, mail, and telephone, they may never even see or know the names of these people. The small circles of reciprocal altruism in the animal world become national and international networks of cooperation. In this kind of behavior, judgments of kinship are irrelevant. This embedding of individual in society involves transmitting neural information superposed on genetic cybernetic systems. It involves language, artifacts, markets, computers, oil tankers, and jet planes.

The human person, already an integrated whole by concerted action of the genes from the skin in, already having found gene copies in kindred outside of the self, is all the more embedded in a community. Out-group cooperation can be just as beneficial as in-group cooperation. Brothers and cousins are nearby and can often help, but they are not likely to possess goods to which I do not myself also have some access. Foreigners have access to goods and skills I may need—and this is in fact what has happened in the modern world. The local self eats breakfast (coffee, orange juice, bananas) with resources drawn from 10,000 miles away and brought to oneself through the reciprocal cooperation of 10,000 persons (all those who

had anything to do with getting breakfast here). Then one drives to work in a car made in Japan.

All this is a way of coping in the world, and such a propensity to cooperate must be coded in our genes. We could think of this as just glorified backscratching—with the additional complication, beyond what is instinctive from our animal heritage, that now we have to make judgments of the likelihood of reciprocation over greater distances and time spans. Those who can figure out these trade-offs and probabilities will live longer and reproduce more; their genotypes will be selected for.

Like animal cooperators, mutual human backscratchers may each be acting in their self-interest. But there is nothing selfish about helping each other out to the mutual advantage of both—not unless all self-interested actions are condemned as selfish. No ethical system, nor any religion, has ever condemned cooperation in which both partners gain. One of the two Great Commandments urges us to love others as we do ourselves. This injunction presumes self-love as an unquestioned principle of human behavior and urges us to combine this with loving others. If we can do this with overall loss to none, so much the better. We need not always love others instead of ourselves to fulfill this commandment.

The tit-for-tat strategy, though initiated at the nonmoral level, is not an immoral strategy if a moral agent were to continue it. It is an operational version of the Golden Rule, doing to others as you would have them do to you, while refusing to be taken advantage of. The strategy it displaces (dubbed "always defend") really means always defend your own self immediately, the only strategy possible to lower life-forms. There is nothing improper about this strategy at that level and indeed there is something impressive when in higher animals it evolves into: If possible, always cooperate in defending your values, but refuse to be a pushover for noncooperators, because this destabilizes the cooperative system. As before, values thereby become entwined in community—now the moral community superposed on what was before a biotic community.

This process suggests how reciprocal altruism may have evolved into ethical altruism in humans. It shows the enlarging of self-interests in cultural systems. This is an evolutionary development that makes interhuman

ethics possible. But plants and animals are not reciprocators, and we still need to know whether environmental ethics is possible. Let us return to the self that has been progressively enlarged into family, kind, ecosystem. Where and how do we place value now?

### Shared Values

Can we describe the natural system more accurately and less pejoratively? Let us choose a positive axiological paradigm, rather than a negative ethical one, trying out a different interpretive gestalt. We can rewrite "selfishness" as "the conservation of intrinsic value." This too will be an interpretive scheme, a more plausible one we think, but if not it illustrates at least how the sociobiological account is itself interpretive. It will also help us find an environmental ethic, because we will get values in the right places, and human duties will follow accordingly.

Every organism must be self-projecting, pushing itself forward. But by the revised account, this process is not nasty; that is the beauty of life. Self-development, self-defense, is the essence of biology, the law of the wilderness, though there is also all that we have said about such a self being extended into family, kin and kind, niche and landscape. And there is still more to be said when culture emerges. An organism is the autonomous seat of its own life program, as rocks and rivers cannot be. The coping organism is coded at its information center. The genome is set to drive the movement from genotypic potential to phenotypic expression. Given a chance, these molecules seek organic self-expression.

They thus proclaim a life way. And with this an organism, unlike an inert rock, claims the environment as resource and sink from which to abstract energy and materials and into which to excrete them. Life thus arises out of earthen sources (as do rocks), but life turns back on its sources to make resources out of them (unlike rocks). Rocks do not give rise to other rocks; rivers do not reproduce themselves. But oaks make other oaks. An acorn becomes an oak; the oak rises from the ground and stands on its own.

So far we have only a description of the logic of life. 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 genome is a set of conservation

molecules. The organism is an axiological, evaluative system. So the oak grows, reproduces, repairs its wounds, 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* now seems a better word for it than *biological*. 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 reference. The organism has something it is conserving, something for which it is standing: its life. Organisms have their own standards, fit into their niche though they must. They promote their own realization while at the same time 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*.

Bacteria, mice, and chimpanzees have projects of their own; each is a life-form to be defended for what it is intrinsically. To label this "selfish genes" is to misunderstand the biology and the metaphysics of what is going on. Every organism must project itself in the world. Instead of thinking of a ground squirrel, much less a single gene within a ground squirrel, as acting "selfishly," we will substitute the equally descriptive but nonpejorative acting "for its own sake" and even substitute the positive "to protect its intrinsic value." These are "axiological genes."

A gene is really an information fragment—and information does not have to be lost to be shared. It is really difficult to interpret selfishly the transmission of information. When that information overleaps death it would seem as appropriate to say that it has been "shared" (distributed) as that it has been "selfishly" reproduced (hoarded). Since a parental organism "donates" (distributes) information to offspring via genes, "altruism" is as easy an inference as is selfishness—if one insists on moral labels. Genes are no more capable of "sharing" than of being "selfish"—it must at once be said—where "sharing" and "selfish" have their deliberated, moral meanings. Since genes are not moral agents, they cannot be selfish and, equally, they cannot be altruistic. But they can transmit information. And if we are going to stretch a word employed in the moral world and make it serve in this amoral realm, then "share" is as descriptive as "selfish" and without the

pejorative overtones. Genes do generate; they reproduce or communicate what they possess; they share (distribute in portions) their information, literally, although preconsciously and premorally. That places each gene where it belongs: on a commons in which it participates. What is selfish about dispersing vital information, sharing a value?

Natural history is not an evil scene driven by maliciously selfish genes. It is a wonderland of adaptive fit, a community of intrinsic values woven instrumentally into a systemic web. There is the conservation of intrinsic value, but this is not permitted to be an isolated thing: it is webbed into the family, the population, the species line, the ecosystemic community, the landscape, as an individual is given a place to live and a role to play in the valuable system. Intrinsic value is smeared out into instrumental and systemic value, no less than was the self smeared out into the whole. Values enjoyed have to be values shared.

We want a nonhumanistic, nonanthropocentric account, one unbiased by our morals. This is really a much better paradigm because there is no good reason to think that genes are selfish; there are no moral agents in wild nature even at the organismic level, much less the genetic one. But there is good reason to think that there are objective, nonanthropocentric values in nature and that these are defended and distributed by wild creatures in their pursuits of life in the midst of their entwined destinies. The axiological paradigm is the objective and natural one; the ethical ("selfish") paradigm is subjective and humanistic. We want to try to pass judgment on the value of nature for what it is in itself—with criteria appropriate to nature, that is, not with anthropocentric criteria. Let nature be what it is; do not fault it morally. Value it biologically; do not disvalue it ethically.

Suppose we cast the event, say, of a dominant monkey's feeding first in terms of values defended. What is of value here (the superior genome) gets transmitted, maintained through feeding and breeding, while what is of relative disvalue gets selected against. There is no moral agency at issue; what is at stake is value that is self-actualized. To ask these monkeys to behave as altruistic humans is to misunderstand the events and misvalue them accordingly. Read out the immorality, and the picture looks different. Take off the dark glasses and put on clear ones. It is a category mistake to describe (and censure) what goes on in wild nature with terms borrowed from culture and projected onto nature. There is nothing here particularly disvalu-

able that moral agents, when they come, will want to deplore and rectify in the animals—although nothing follows from this about how they should behave in culture. The alleged selfishness is really the conservation of value intrinsic to the organism in the only manner possible and appropriate to it. All such contests at feeding and reproduction are endured for "selfish" advantage by males or females only in a problematic sense, since the somatic individual soon dies anyway. A better way of interpreting events is to say that the contest is to share genes. It is self-defense in one sense. But if males and females spend time, energy, and effort to reproduce, this is self-sacrificing in another sense. By those who resolve to see everything through selfish lenses, this will (rather confusingly) be called selfishness again, seen from the nonmoral genetic level. But we get a much dearer picture of what is going on if we interpret this as values being transmitted over generations.

Although the organism is engaged in a short-range reproduction of its kind, the systemic processes are neither short-range nor do they selfishly maximize only one kind. The evolutionary system is 3.5 billion years old; it has steadily produced new arrivals, replacements, and elaborations of kinds, going from zero to 5 or (or 10) million species, through 5 (or 10) billion turnover species in a kaleidoscopic panorama. Every organism, in the subroutines of this system, actualizes its own values and transmits them to the next generation (with variations). Apart from humans, to whom we next turn, that is all any organism has the capacity to do, a capacity of critical value. The result is quite a dramatic story—not just a long, long chain of "patently pernicious" short-sighted selfishness. The value account seems quite descriptively plausible, not at all "morally and intellectually dishonest."

Philosophers sometimes note that on close examination a seemingly bold hypothesis dies the death of a thousand qualifications. What happens to the seemingly bold hypothesis of selfish genes is that they live the life of ten thousand interconnections.

### Biophilia on the Home Planet

Incremental quantitative changes can add up to a qualitative change. We start with night, add light bit by bit, and pass into day; the night is gone. We

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have started with selfish genes, added "other" values interconnection by interconnection, and passed over to valuing others. Humans can see these ten thousand interconnections and love this system of life in which they too are entwined. Humans, alone on the planet, can realize that they are kindred with all. Darwin taught us so, a century ago, from an evolutionary perspective; today, microbiologists confirm it. For structural genes, "the average human protein is more than 99 percent identical in amino acid sequence to its chimpanzee homolog" (King and Wilson 1975:112). Differences between the species lie largely in regulatory genes (Sibley and Ahlquist 1984).

Edward Wilson recognizes this as well: "We are literally kin to other organisms. . . . About 99 percent of our genes are identical to the corresponding set in chimpanzees, so that the remaining 1 percent accounts for all the differences between us. . . . Furthermore, the greater distances by which we stand apart from the gorilla, the orangutan, and the remaining species of living apes and monkeys (and beyond them other kinds of animals) are only a matter of degree, measured in small steps as a gradually enlarging magnitude of base-pair differences in DNA" (1984a:130). "At the biochemical level," he says elsewhere, "we are today closer relatives of the chimpanzees than the chimpanzees are of gorillas" (Ruse and Wilson 1986:176). Aren't these small steps gradually enlarging the self by degrees until the self is identified with more and more others?

Suppose we translate such genetic similarity into the vocabulary of selfish, kin-selecting genes. If a human (Jane Goodall) were to devote her life to saving chimpanzees, this would really be 99 percent selfish and only 1 percent altruistic, at least for structural genes. Likewise with the Siberian tigers to whom George Schaller is perhaps 95 percent related. And so on down the evolutionary lineage. We get a circle of alleged selfishness expanded several orders of magnitude past siblings and cousins, aunts and uncles. This is just as curious a big-scale selfishness as the narrow, constrained variety with which we started.

From the viewpoint of the gene that makes a cytochrome-c molecule, found in organisms ranging from yeasts to people, it is going to be difficult to locate much of a rival. Cytochrome-c molecules do evolve through various nucleotide substitutions, but they are comparatively stable molecules.

The primary structure is identical in humans and chimpanzees, which diverged about 10 million years ago; there is only one replacement between humans and monkeys, whose most recent common ancestor lived 40 to 50 million years ago (Dickerson 1971). The same is true from the viewpoint of genes that make adenosine triphosphate (ATP), biotin, riboflavin, heme, thiamine, pyridoxine, vitamins K and B<sub>12</sub>, or those involved in fatty acid oxidation, glycolysis, and the citric acid cycle, or those that make actin and myosin. The genetic code is essentially the same for all living organisms. The twenty amino acids are common to all.

Sometimes life lines, once independent, have fused into a single identity. Two of the most important processes energizing life on Earth use endosymbionts. One, involving mitochondria, powers animals; the other, with chloroplasts, powers plants; and, of course, plant power is the basis of animal power, including human power. In the full drama of natural history, identity is a multileveled, dynamic phenomenon. Biological identity is not so idiographic after all: it mingles with biological solidarity and is shared with the fauna and flora of the ecosystemic whole.

Such a vastly expanded kinship suggests that the better way to view this ever more extended inclusive self is to regard it as individuals residing within a community of shared values. Though an individual self, I, in my effort to survive, am not really pushing the line of a solitary individual at all: I live in a community on a front of shared family heritage, shared human heritage, shared primate, mammalian heritage, indeed shared biological heritage. Perhaps I still have some "inclusive fitness," carried genetically, fractionally, and which I particularly have to defend in my local niche. But from a gene's-eye view, if we take the 99 percent seriously then it seldom matters whether the genes are inside me, inside my cousin, or inside a chimpanzee. Indeed, it may not matter whether they are inside me or inside an oyster or an ant.

When we move from the microscopic level to the range of ordinary experience, selves have entwined destinies with the landscapes they inhabit. Maybe you do not feel all that related to chimpanzees and insist on being discriminating about your relationships. Maintain your distance from the other creatures as you wish, insist that the self is over against the world. But you cannot take the self out of the world. We continue to inhabit this home

planet, a relationship you cannot escape. A bumper sticker says, "Earth: love it or leave it." Since leaving is difficult, loving Earth is the only real option.

Perhaps we are genetically adapted to loving it. Natural selection could certainly select for loving that with which one has an entwined destiny: that could convey survival advantage. Biologists suppose that selection operates at the level of the individual; they prefer the lowest level possible. Most humans have inhabited local neighborhoods; they hardly knew they inhabited a planet. But they did know they dwelt on landscapes; they belonged to "countries," as they put it, and it seems quite plausible to think that humans could, over time, be selected to love their world.

This will be a flexible characteristic, however, since humans inhabit many different kinds of landscapes and often rebuild them to their liking. Animals have to take their landscapes ready to hand, as it were; they adapt their selves to them. Human selves can, in culture, rebuild their landscapes, more or less, adapting them to their preferences. This rebuilding too will convey survival advantage. Maybe there is some selection of those who love culture and conquer nature. Still, in the end, every culture remains set in an ecosystem. The human genetic destiny, if there is such a thing, can be expected to keep the self happy in its home place. People need to be natives, residents, as well as citizen-selves. Ethics is not so much ultimately selfish as self-involving. And when the full scope of these self-involvements is known, the planet is the self's ultimate survival unit. Inclusive fitness ends up being planetary fitness.

The opposite of selfishness is altruism, and we have been enlarging selfishness so that it becomes more altruistic, embracing an expanding circle of relationships. Have we not reached the point at which the circle comes to include genuine others—an altruism with universal intent? If so, the environmental ethicist is the ultimate altruist. We do reach a point where the quantitative expanding of self has reached a qualitative regard of a self for others with whom one is interconnected but whom one loves for what they are in themselves, not just for what they are for us. We cannot get off the Earth, out of the system, but we can get our identity enlarged to the whole. And then we see as what philosophers call ideal observers: those who see overall and not just from their narrow niche.

To try to see all ethics as nothing but extrapolated selfish genes might stunt humanity because it fails to realize the genuine human transcendence—an overview caring for others. Rather than using mind and morals as survival tool for defending the human form of life, mind forms an intelligible view of the whole and defends ideals of life in all their forms. Humans have oversight; they are worldviewers—today more than ever before. From this, morality follows as a corollary because of what humans can know and do—today more than before because of our increased knowledge and power. Humans can get "let in on" more value than any other kind of life. They can share the values of others and in this way become consummate altruists.

Animals have the capacity to see only from their niche; they have mere immanence. Humans can have a transcending view from no niche. It is not just our capacity *to say I*, to actualize an ego-self, but our capacity to *see others*, to oversee a world, that distinguishes humans. Skeptics and relativists may say that humans just see from another niche, and it is certainly true that when humans appraise soil or timber as resources, they see from within their niche. But humans also see other niches and the ecosystems that sustain niches; they study warblers or see Earth from space. No other species has such supersight, such spectacular oversight. What humans can do that nothing else can is recognize these intrinsic values for what they are, where they are, instrumentally woven into the ecosystemic Earth. Such value, which *is* present, *ought* to be preserved.

You can, if you insist, hang onto the old anthropocentric paradigm that we maintain such oversight lest we stunt humanity. But you are really failing to see the paradigm switch to a biocentric conviction arising from a love of life beyond self-love. The self has gotten deeper and deeper into its ecology; the shallow self is no more. This view is both radical, in that it goes to the roots, and conservative in that it conserves all life, not just human life extended. And it makes biophilia superbly possible. You can say, if you like, that what humans really want is the optimal (ideal) configuration of their world; indeed this is so. But this is to abandon the genetic leash; the criterion is no longer the maximum production of "my" offspring at all, nor even "our" human offspring.

But this, you may protest, is only theory. Who knows whether such an

ethic can be lived? We need examples that verify this theory. Consider personal experience. When I donate money to promote an environmental cause to which I am committed—the fund for whales—I need not even know that I have genes. Or if I do, the genes be damned, so long as the whales are saved. I do want to convert other persons to my conservationist ideology, but their genetic relationship to me is immaterial. I enjoy knowing that the whales are safe in their marine ecosystems. Label that a "selfish" motivation if you must, but my enjoyment does nothing to increase my fertility. John Muir and David Brower, if anything, will have fewer offspring in the next generation on account of their time, energy, and effort spent in protecting Hetch Hetchy and Glen Canyon.

I do not expect whales, warblers, or grizzlies, much less forests and canyons, to reciprocate with mutual backscratching; the animals can do nothing to assist me (or any other humans) somatically or genetically. Insist that what I am really doing is identifying my "self" with the ecosystemic whole, or preserving my life support system, or whatever; this does not aggrandize the self or its genetic line so much as it stretches the "self" out into the community it inhabits, until the self has come to focus on not-self, on other selves that are good of their kind. Why not face up to the epistemic crisis? These are no longer selfish questions. They are questions whether each of the myriad "other" life-forms can be good-of-its-kind, good-in-its-kind-of-place, and about their all being in a good kind of place—and these add up to the question of well-placed goodness. Ethics is about optimizing these values.

Can you continue to insist that I do not really have a concern for the whales, warblers, or pristine forests, that I am only protecting my recreational opportunities? Or that I am only self-deceived and parading my beneficence so that other humans will laud me and assist my offspring, since I am an environmentalist hero? Surely it is better to say that the "self" has been elevated into genuine morality, where it can detect values outside itself, and come to embrace these values in freedom and love because it is right to do so. This is not naturalized ethics in the reductionist sense; it is naturalized ethics in the comprehensive sense.

If you are still unconvinced, let us close with an *ad hominem* argument addressed to Edward Wilson himself, who so superbly demonstrates what

kind of love of life is possible in humans. We shall make him part of the evidence for our theory. Wilson claims: "Our societies are based on the mammalian plan: the individual strives for personal reproductive success foremost and that of his immediate kin secondarily; further grudging cooperation represents a compromise struck in order to enjoy the benefits of group membership" (1978:199). Can we make that claim self-referential?

Hardly. Because in the same breath he urges, as an interhuman ethics, the three primary principles. First: One ought to protect "the cardinal value of the survival of the human genes in the form of a common pool over generations." Second: One ought to "favor diversity in the gene pool as a cardinal value," for "of all the evils of the twentieth century, the loss of genetic diversity ranks as the most serious in the long run." Wilson fears a tragic loss of "the variety of human genes out of which endless new combinations can be drawn for the attainment of genius and further genetic evolution" (1978:196-199; 1980:61-62). Third: One ought to regard "universal human rights. .. as a third primary value" (1978:198). Sociobiology, Wilson concludes, is going to lead us to "a genetically accurate and hence completely fair code of ethics" (1975a:575). We hear hope in the man and commend him for it. But what we hear does not sound like grudging cooperation at all; it sounds, rather, like someone ardently defending the common sources that generate human life in all its diversity, producing a culture in which each person is worthy of respect as a matter of right. Meanwhile, it is hard to find this logic in the biology of the theory—which says that if it is genetic (maximizing one's own offspring, no matter what), then it cannot be completely fair (equity for all). One cannot be selfish about self and fair and at the same time give each his due by right, much less be altruistic toward any.

In environmental ethics, Wilson urges forming a human bond with other species, loving not only human diversity but biodiversity throughout the fauna and flora. He wants to stretch the self into a nobility of character that comes from a "generosity beyond expedience" (1984a:131) that he has himself embraced but cannot quite reach on the basis of his theory. He concludes that there ought to be a respect for life in which we value other forms of life as we do our own, a sort of Golden Rule in environmental ethics. The self-interest that an environmental ethic serves cannot be of the back-

scratching kind; the ants that Wilson wishes to protect are unlikely reciprocators. Wilson confesses that, "in the end, the problem of wilderness preservation is a moral issue, for us and for our descendants," and he commends "species diversity as an ethical goal" (1984b). Here we are not dealing with a genetic determinism fobbing off illusions about why we are behaving so. We are dealing with an ethical "idea," an "ideal," a conviction detecting objective natural values present outside the self, outside culture, values that ought to be preserved.

Wilson asks: "What event likely to happen during the next few years will our descendants most regret?" His answer: "The one process now going on that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats. This is the folly our descendants are least likely to forgive us" (1984a:121). If our descendants will judge it an all but unforgivable sin to destroy thousands of other species, this catastrophe ought not to happen. Nor is it just our descendants' regret that we fear; it is life lost from this wonderland Earth.

No doubt these descendants will suffer losses in those species that do not survive. Their human quality of life may be at stake, but maximum reproductive success—the largest human population possible on Earth—is no criterion of this environmental ethic. Indeed, it is antithetical to it. Our human reproductive instincts must and ought to be replaced by biophilia and concern for environmental integrity. "To rear as many healthy children as possible was the long road to security," Wilson observes, "yet with the population of the world brimming over, it is now the way to environmental disaster" (1975b:50).

For those humans who can move outside their own pragmatic utilities and learn to appreciate the "mysterious and little-known organisms" with which we coinhabit this planet, "splendor awaits in minute proportions" (1984a:139). This, if you insist, is an enrichment of human welfare, but it has nothing to do with his or our fertility or selfish genes. None of this inquiry about what humans ought to do in environmental ethics can be undertaken without being released from an ethics that is nothing but selection for maximum production of human offspring. The one thing selfish genes do not do is promote diversity not their own. Rejoicing in the splen-

dor of his planet, Wilson is finding it difficult to get biophilia out of selfish genes. That is because a single gene is really, so to speak, only a fragment of biophilia, a bit of life information. A gene is nothing much in and of itself; there is no self there to be selfish about. But these genes collectively, in their wholes, share and spin together the vital drama of life.

There is no need for a person with such an admirable love of life to retreat into a killjoy explanation of his love. Why not rise to a joyous explanation? The home planet is prolific with life, exuberantly projected up from the primeval ooze and mud, an emergent vitality expressed in 10 million species. The planet loves life and so do we. This is the evolutionary epic, and we are this love of life become conscious of itself. We do not want to depress life into nothing but selfishness, borrowing inappropriately a depressing category from human moral failure. We want to respect the life that has so marvelously expressed itself over evolutionary history, and reaching that respect will itself be an elevating moral achievement.

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