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Kenosis and Nature

HOLMES ROLSTON, III

Every commonplace detail of nature, every stone and tree, includes an immense richness and variety of lesser detail: in every fragment of it a thousand million lesser fragments cohere and interact.

Loves Endeavour, Love's Expense, p. 84

Unless a grain of wheat falls into the earth and dies, it remains alone; but if it dies, it bears much fruit.

John 12:24

1. Selfish Genes, Selfish Organisms, and Survival of the Fittest

If one compares the general worldview of biology with that of theology, it first seems that there is only stark contrast. To move from Darwinian nature to Christian theology, one will have to change the sign of natural history, from selfish genes to suffering love. Theologians also hold that, in regeneration, humans with their sinful natures must be reformed to lives that are more altruistic, also requiring a change of sign. But the problem lies deeper; all of biological nature can seem to run counter to what Jesus teaches: that one ought to lay down one's life for others. In nature, there is no altruism, much less kenosis.

Life, coded by the genes, is always encapsulated in particular organisms. In biology we find, at once and pervasively, the organism as a bounded somatic "self" — something quite unknown in physics, chemistry, astronomy, meteorology, or geology. The general Darwinian interpretive framework moves from the coding genes to the coping organisms and sees organisms so constituted genetically that self-interested (typically labeled "selfish") behavior is inevitable. Organisms behave so as to benefit themselves at cost to others. A bird grabs a seed, and others foraging nearby do not get it. A bird eats a worm, and benefits; the worm loses. Genotypes program selfish phenotypes. With genotypes, Richard Dawkins's most fundamental biological truth is "the gene's law of universal ruthless selfishness."¹ With phenotypes, George Williams claims, "Natural selection . . . can honestly be described as a process for maximizing short-sighted selfishness."² So runs the current dogma.

But claims that genes and organisms are "selfish" may depend not so much on empirical evidence as on the choice of a general interpretive framework within which to view the phenomena. Such biologists could be committing Whitehead's "fallacy of misplaced concreteness," where, selecting out some particular feature of a situation, one forgets the degree of abstraction involved from the real world, and mistakenly portrays the whole by over-enlarging a factor of only limited relevance. The "self" question, much discussed in biology, is, philosophically speaking, an "identity" question, which proves also to be an "integration" question. The question is of "belonging": What is the gene's and the self's suitable role and place?

2. Self-Defense and Self-Actualizing

In less pejorative language, one can more simply say that an organism is "self-actualizing." An organism pursues its integrated, encapsulated identity; it defends its life, conserves its own vitality as an intrinsic value. This involves "self-defense," without which life is not possible. An or-

1. Richard Dawkins, *The Selfish Gene*, new edition (New York: Oxford University Press, 1989), p. 3.

2. George C. Williams, "Huxley's Evolution and Ethics in Sociobiological Perspective," *Zygon* 23 (1988): 383-407, citation on p. 385.

ganism must make claims on its environment, for food, mates, territory. Heterotrophs must use, instrumentally, other organisms, for example as prey. Heterotrophs and autotrophs alike must resist being made use of by other organisms, where this is detrimental to their interests, for example again, as prey. An organism is "self-constituting," "self-realizing," "self-developing," "self-conserving," "self-generating"; an organism acts "for its own sake" — all these things can be said in a descriptive language that, though still Darwinian, stops short of framing organisms with the ultra-Darwinian "selfish" overtones. Self-maintenance and self-propagation are not evils; both are necessary and good. Without them no other values can be achieved or preserved.

An organism can only conserve what identity, or vitality, or value, it has, and not some other that it does not have. Any particular organism has a "good-of-its-kind," that is, a species identity. But it does not have all of the good-of-its-kind, since other alleles, which it does not have and which are not expressed in its structure and behavior, are not present. They are elsewhere in the population. So the organism expresses as much of the good-of-its-kind as it possesses, both that conserved from its inherited past and that ventured in novel recombinations and mutants. This genetically based knowledge will be tested in the trials of life. Others, conspecifics, do likewise. Some reproduce better than others. In the contests of life, natural selection operates to optimize the good-of-that-kind in the niche in which that species resides, sacrificing the less fit, increasing the more fit. The outcome is species-actualizing, a species whose members are later more fit on their adaptive landscapes than they were before.

3. Self-Identity, Species Identity, Inclusive and Shared Fitness

An organism has a somatic self-identity, but the organism is itself an expression of a genetic identity. Such genetic identity is, in the particular combinatorial genome that the organism possesses, unique to itself (excepting twins and clones). But this genetic identity is also, more and less, scattered about. By contemporary biological theory, the organismic individual competently defends its "self" (still so-called), wherever and to the extent that this "like-self" is manifested, which will be most among nearby family, also in tribe, population, fanning out in the whole gene

pool. The organismic self can hold what values it holds intrinsically only as such values are inclusively distributed in kin outside self somatically, though like self genetically, what biologists call "inclusive fitness."³ When an organism is faced with defending similarities against differences, in competition with others of its species, with different alleles, each organism has been selected to defend its kin and therefore its similarities in offspring and relatives. That way, if its alleles have a survival advantage, the fittest (best-adapted) will survive.

Already, genetic identity is getting mixed up. We hardly know whether to say that some helping behavior, directed at a relative, who partially contains a copy of ones "self" (and who also partially contains "non-self" genes) is a "self-sacrificing" or a "self-interested" act. It depends on where one posts the boundaries of "self." Richard Alexander sums this up: "We are evidently evolved not only to aid the genetic materials in our own bodies, by creating and assisting descendants, but also to assist, by nepotism, copies of our genes that reside in collateral (non-descendant) relatives."⁴ 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.

What gets defended and selected is not just the genes of any particular individual but some set of genes-in-relatives, wherever they are in the kinship group. From this perspective, the behaviors selected are not so atomistic and individualistic as first seems the case; they are diffused in the kin, in the nearby kind. Many of a particular self's genes are co-present in relatives, copies within kin in a different skin; indeed all of a particular self's genes are somewhere carried also by others, in rather similar and somewhat variant combinations, save for those rare mutants it might possess. The organism, in addition to its own self-actualizing, assists in the self-actualizing of its kin.

Any such "inclusive" self clouds the seeming clarity of having located a "self" that can be identified, much less one that can be "selfish." It is not just the organismic (somatic) self that counts; it is the reproductive (genetic) self. All that an organism can really transmit to future generations

3. William D. Hamilton, "The Genetical Evolution of Social Behavior. I and II," *Journal of Theoretical Biology* 7 (1964): 1-52. Uses of "inclusive" in biological theory, when compared and contrasted with uses in theological circles, are quite revealing.

4. Richard D. Alexander, *The Biology of Moral Systems* (New York: Aldine de Gruyter, 1987), p. 3.

are genetic elements of itself, slivers of a self. The life that the organismic individual has is something passing through the individual as much as something it intrinsically possesses. All such selves have their identity in kinship with others, not on their own. Identity does not attach solely to the centered or modular organism; it can persist as a discrete pattern over time. The individual is subordinate to the species, or at least that portion of the species line for which it has alleles — not the other way around. Any one genetic set is as evidently the property of the larger species gene pool as of the individual through which this part of it passes.

The organism can only conserve what form of life, what value it embodies, and none other. But the biological system, in which the individual self-actualizing and self-reproducing organism plays its role, is more selective. Individuals are evaluated for their increased fitness, for what geneticists call their "adaptive value."⁵ Individuals that have more of such capacities survive; but when they survive they pass along genes that have survival value in the species line, enabling it to continue by re-forming on its evolving adaptive landscape. What is conserved is what any individual "knows" that is better than its less well-"informed" competitors, the losers. Such vital information gets distributed, portioned out, increasing in frequency in the next generation, more and more actualized. Now we begin to see more than mere self-defense. We see organisms whose function is given over to the success of their lineages. To put the point provocatively, organisms are "devoted to" their lineages.

Genes are a flow phenomenon. The genes are caught up in an impulse to thrust through what they know vitally to the next generation, and the next, and the next. Genes live in a lineage, dynamically evolving over time. Ultra-Darwinians, swept along by strong undertow from their theory, will insist on a gestalt in which the gene is said to be protecting itself "selfishly" in the next generation. David Barash puts it this way: "The ultimate benefit is clear enough: genes help themselves by being nice to themselves, even if they are enclosed in different bodies."⁶ The trouble with that kind of claim, besides the bald anthropomorphism, is that the

5. Robert H. Tamarin, *Principles of Genetics*, 5th edition (Dubuque, Iowa: William C. Brown, 1996), p. 558; Francisco J. Ayala, *Population and Evolutionary Genetics* (Menlo Park, Calif.: Benjamin-Cummings, 1982), p. 88.

6. David Barash, *The Whisperings Within* (New York: Harper and Row, 1979), p. 153.

"self" essential to the claim has no firm identity, being now scattered about, divided around in dozens of bodies.

When one clarifies that identity in terms of a cybernetic flow of information — familial, populational, species — the phenomenon under discussion is more appropriately viewed in another gestalt. A single gene is tested for what it can "contribute" to the whole organism. The organism, in turn, an expression of its genome, is tested for its adapted fit in an ecosystem. But that is not so much for the somatic survival of that organism as for the organisms power to sustain the ongoing population and species line, what it can "contribute" to the species line. Fitness is the ability to "contribute" more to the welfare of later-coming others of one's kind, more relative to ones "competitors." The organism contributes all that it has to contribute, its own proper form of life, what it has achieved that is of value. The organism gets lost as an individual, we might say, and gains a role in the lineage that transcends it. The system facilitates congruence between generations.

When the individual self has become implicated into an "inclusive" fitness, we can introduce, rather provocatively, the word "shared" to help interpret this genetic "allocating" and "proliferating." "Share" has the Old English and Germanic root *sker*, to cut into parts, surviving in "shears," "plowshare," and "shares" of stock. As used here, to "share" is to distribute in parts the self's genetic information, thereby conserving it. Genes generate ongoing species lines, instantiated in individual lives. To accomplish this, genes reproduce or communicate what survival value they possess. They share [= distribute in portions] their information, literally, although preconsciously and premorally.

The central feature of genes is that they can be copied and expressed, again and again. They replicate. Their power to send information through to the next generation is what counts. The genetic information gets allocated and reallocated, portioned out, and located in various places. Whatever the process, rather obviously genetic information has been widely distributed, communicated, networked, recycled, and shared throughout natural history. In cumulative result, there is the genesis of diversity and complexity in natural history. There is the transgenerational distributing and contributing of genetic values. Put one way, the organism is "sacrificed" to its species line; put still another way, the organism is "empowered" for such contribution.

Here we must take some care. When used in ethics and theology,

"share" has a positive moral tone, and our point in using it biologically, additionally to describing what is going on, is to neutralize, to un-bias, the negative moral tones left by "selfish." "Share" is difficult to interpret selfishly. When genetic information is passed on to a next generation, when that information overleaps death, it would seem as appropriate to say that it has been "shared" (distributed) as that it has been "selfishly" kept. *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. If one is going to stretch a word sometimes employed in the moral world and make it serve in this amoral, though axiological, realm, then "share" is as descriptive as "selfish" and without the pejorative overtones. Sometimes one has to lean into the wind to stand up straight. "Dividers" and "multipliers" too find it hard to be selfish. The survival of the fittest turns out to be the survival of the sharers.

We do need to choose our words carefully — "distribute," "disperse," "allocate," "proliferate," "divide," "multiply," "transmit," "recycle," or "share" in "portions." We want a nonhumanistic, nonanthropocentric account, one unbiased by our morals either for worse or better. The distributive account is a much more descriptive 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, adaptive values, in nature, on which survival and flourishing depend, and that these are defended and distributed by wild creatures in their pursuit of life. Only humans are moral agents, but myriads of living things defend and reproduce their lives.

The genetic information is divided out in the population, various alleles here and there, various recombinatory and mutant trials, and the good of the species vitally depends on such distributed and shared genetic information. Though the individual organism does not act for the good of the species, which it is incapable of doing, it is good for the species that the individual organism acts as it does. The losers, used in the genetic search, get sacrificed, relatively, for the good of the species, but that does not mean they have no share in the generative process. Though their alleles are less frequent in the next generation, the species line in which such organisms also have their identity continues for the better. Losers in

one sense can be winners in another — rather like those who lose an argument win, if, in the discipline or tradition with which they identify, better arguments prevail. Most ball teams are losers; but the champions require the testing that the losers provide, and the sport that the losers love is a better sport in result. In the genetic development being discussed here, the winners win if— and only if— they can contribute survival value to oncoming generations.

Evolutionary genesis depends on such individuals, both winners and losers, to comprise the variation over which natural selection can act. The individual organism, self-actualizing as it is, is a player in a bigger drama that is going on "over its head," so to speak, or that is "bigger than itself." The uniqueness of any particular genetic makeup is a one-off event — temporary, instantiated in an organism, tested for its fitness; and thereby it has a role in a recombinatorial process by which the species survives, making possible the myriads of other lives that ensue in that species lineage.

This places this organismic self-actualizing in a more inclusive context, but, some will insist, it does not yet allow for self-emptying. An organism can only defend its own proper life (recalling the Latin: *proprius*, ones own), and in that sense it cannot be kenotic. Oak trees and warblers cannot be altruistic, behaving so as to benefit others at cost to self, for, if they do, they go extinct. Meanwhile, the picture coming into focus does portray individual lives discharged into, flowing into, "emptied into" these larger populational and species lines. Maybe some precursor of kenosis is beginning to evolve. Fitness means dying to self for newness of life in a generation to come. Our inquiry continues.

4. Interdependence and Symbiosis

The life of every organism, plant or animal, is situated within an ecology, a life support system. Nothing lives alone. Any "self is embedded in an environment. Only those organisms survive that find a fitness in a biotic community. The organism can only conserve what value it has, and none other. But the biological system, in which the individual self-actualizing and self-reproducing organism plays its role, is more comprehensive, more inclusive. The individual is immersed in a field of forces transcending its individuality.

A grass plant survives with other plants, more and less kin, as well as

other species, embedded in the same soil, capturing nutrients released by fungal and microbial decomposers, as well as by the ungulates who eat the grass. Plants depend on the carbon dioxide released by animals, who depend on the oxygen released by plants. An animal must eat the grass, or eat what has eaten the grass, and so trophic pyramids build up. Energy and materials cycle and recycle through the system. Hypercycles develop, loop-linking several species; the rate of replication of each species is an increasing function of the concentration of the replicator immediately preceding it in the cycle. *Chlamydomonas* (a single-celled green alga) is eaten by *Daphnia* (a waterflea), and the stickleback, a fish, feeds on the *Daphnia*; the stickleback excretes nitrate, which fertilizes the *Chlamydomonas*.⁷ Meanwhile too, each species defends its kind with defenses against being eaten.

In this system, the only capacity that the individual organism has is to be "self-interested," to defend its self and its kind; but the truth is that the system requires the organism to operate within the interdependencies, resources, and constraints of its situation. So we need to place any organismic self-actualizing in an even more inclusive context than that of species lines. Insisting on seeing everything from the perspective of either individual genes or organisms or even individuals in species lines could be a metaphysical atomism that fails to appreciate how these self-units are structured into ecological communities, parts within larger wholes. These networks constitute their identity quite as much as does anything internal to their genetic or organismic "selves," or their species lines. The truth could be more social, or ecological, than ultra-Darwinists envisage. Life must be encapsulated in selves, and such selves reproduce and spread in an environment in which they both play a part and have an integrated fit. They must have a part, a "share" of the resources in their environment, and they themselves will, sooner or later, enter that resource chain and become parts claimed, or shared, by others.

The genes within an organism are dependent on the genes in many other species with which it significantly interacts. One can think of this as value capture and contest, which it is; but it is also value dependency. Any particular organism, with its genes, must live "together with" those on

7. John Maynard Smith and Eörs Szathmáry, *The Origins of Life: From the Birth of Life to the Origin of Language* (New York: Oxford University Press, 1999), pp. 49-50; Manfred Eigen and Peter Schuster, *The Hypercycle: A Principle of Natural Self-Organization* (Berlin: Springer-Verlag, 1979).

whom it is dependent, more and less. In turn, others will be dependent on it. That genes "co-act," or, rather more provocatively, "co-operate" (operate together), evidently true from the skin in, does not cease to be part of the truth from the skin out, although the character of the co-operation shifts from the organismic to the ecosystemic. Each species is a node in a network, and genes elsewhere in that network are quite vital to it, "alien" or "other" genes in the somatic sense, but genes with which it is quite "at home" in the ecological sense.

Animals occupy niches in a trophic pyramid; they eat and will be eaten. Animals have no genes for photosynthesis; such genes, in plants, are quite vital to them. Ungulates cannot digest cellulose without the bacteria in their rumen. Carnivores eat herbivores. The raptors eat the warblers that eat the insects that eat the leaves. That makes raptors dependent on the successes of all the genes with survival value in warblers, insects, and the plants they eat. Higher animals may lose enzymes, rather than gain them, because they depend on the lost enzymes remaining in species on which they feed. Natural selection shapes animal behavior according to such dependencies, which may involve several trophic levels.

Life preys on life; all advanced life requires food pyramids, eating and being eaten. If the higher forms had to synthesize all the life materials from abiotic materials (also degrading their own wastes), they could never have advanced very far. The upper levels are freed for more advanced synthesis because they depend on syntheses (and decompositions) carried out by lesser organisms below. Heterotrophs must be built on autotrophs, and no autotrophs are sentient or cerebral. From a systemic point of view, we see the conversion of a resource from one life stream to another — the anastomosing of life threads that characterizes an ecosystem. Plants become insects, which become chicks, which become foxes, which die to fertilize plants.

Sometimes genes jump around. Two life lines, once independent, can fuse into a single identity. Now that scientists can couple molecular genetic analysis with traditional fossil paleontology, the tree of life is turning out to have surprisingly complex roots, because there are not just splits and branches, but gene exchanges by organisms that reconnect and interconnect the splits and branches.⁸ Genetic information has been widely

8. Nicholas Wade, "Tree of Life Turns Out to Have Surprisingly Complex Roots," *New York Times*, April 14, 1998, pp. B11, B14.

distributed, redistributed, multiplied, divided, or "shared," not only within but across species lines.

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. Mitochondria, which anciently had a free-living identity, have been incorporated into the organisms they now empower. Similarly with chloroplasts. Multicellular organisms may have formed by one-celled organisms joining up, as well as by their differentiation.

Fitness is not something a gene, or even an organism, has as such. Adaptation, the central word in Darwinian theory, is an *ecological word*, not a *genetic* one. One does not know the fitness when one knows the output of a gene, not even when one knows how this output integrates hierarchically in the whole organism. We know fitness only when we know how this output operates in the environmental niche the organism inhabits. Although the mutants bubble up "from below," the shape that the microscopic molecules take is controlled "from above," as the molecular information stored is what has been discovered about how to make a way through the macroscopic, terrestrial-range world. Identity is identity in an environment.

Sometimes it is hard to say which level is prior and which is subordinate; perhaps it is better to say that there are vital processes at multiple levels. Biological identity is multi-leveled. *Ecosystem* is as ultimate a truth as is *gene*. Biological phenomena take place at multiple interconnected levels, from the microscopic genetic through the organismic to the ecosystemic and bioregional levels. Bigger networks are superposed on smaller networks, and these on lesser networks still; there is descent from continental and global scales to those in nanometer ranges. Genes have what identity they have only as they play a part in this larger biotic community in which they code a role.

That the myriad creatures are in contest and competition cannot be denied; nor can it be denied that they are bonded together in interdependencies. Genes are cross-wired not only within individuals, within families, within populations, within species; they are cross-wired within ecosystems. Any particular self, with its integrated genes from the skin-in, distributed genes round about, and its web-worked connections from the skin-out, is a kind of holon, a genuine whole but one in which also its environment, its niche, is fully reflected. True, the co-actors are not so much

co-operators as are they enmeshed in a series of checks and balances, controls and feedback loops; but equally true, just this system is the vital context of all life. Seen in this more comprehensive scheme of things, plants function for the survival of myriads of others. We could even say, provocatively for our "kenosis" inquiry, that they are "emptied into," given over to, "devoted" to, or "sacrificed" for these others in their community.

5. Sexuality and Reproduction

Interpreting sexuality is philosophically revealing. In sexual reproduction, which nature requires for survival in most fauna and flora, the offspring will be half-different even in the first generation — half-different at least from the perspective of the diploid-haploid-diploid recombination of genes that takes place at meiosis. Sexually reproducing organisms cannot make identicals; offspring must be *others* (*alteri*) and in this sense sexual reproduction is by necessity "altruistic" in an others-unlike-self sense. It is hard to be selfish, if one is a genome and must be split in half at every reproduction. "Sex," says Michael Ghiselin, is "synonymous with 'mixis' — literally 'mingling'."⁹

Further, the system encourages outbreeding. If an animal must mate, then mating with siblings would more nearly preserve the particular set of genes that an organism has. Given the necessity to breed sexually, it might be thought advantageous to breed with near kin. That way the organism can transmit its own genes somatically coupled with its genes also in relatives. This sometimes happens, but the system discourages close inbreeding. Breed an organism must with its own kind, breed it often does within its tribe, perhaps even its larger family, but breed it should not with immediate relatives. There are selective pressures toward outbreeding, where an animal mates with kind, not kin.

Inbreeding costs, known also as inbreeding depression, include reduced viability and fecundity of offspring and susceptibility to disease and genetic deformities, so that close inbreeding is selected against rather strongly and is virtually absent in natural populations of animals. These detrimental effects have also resulted in suppressed self-pollination in

9. Michael T. Ghiselin, *The Economy of Nature and the Evolution of Sex* (Berkeley: University of California Press, 1974), pp. 52-53.

plants. The system discourages kin selection in sexual pairing; it forces outbreeding, against the "selfish" tendencies of the genes.¹⁰ It requires spreading genes around, mixing them up.

To reproduce themselves selfishly one's genes have to join with an alien set. That interlocks any "selfish" set of genes with those of another line; it must outbreed at a fifty-fifty split to protect its genes within. From the genes-eye view this is a curious system, in which the chances of transmission are fifty-fifty by required coupling with nonkindred lines. If one still wants to think of it that way, the system limits, or mixes, the permitted "selfishness" with other-directedness. Competitors are forced to be co-operators, the selfish to share. An organism must mate to breed. Sexuality means, for our inquiry, that an organism must contribute to, flow into, discharge its genes into a broader populational pool.

The whole thrust of sexual reproduction is toward bonding the individual into a community exceeding itself. Sexuality dilutes or divides out any "selfishness." The system is, so to speak, "self"-limiting. What one in fact confronts is survival by way of incorporation into, and cooperation with, others. Genes do not stay within individuals, they are spread around families; and, beyond that, they cannot stay within families either. In mating, outbreeding, they must be mingled with those of others in the population, and those of populations can (as mobility and opportunity permit) be shared throughout the species.

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, one can interpret reproduction as the species keeping up its own kind by reenacting itself again and again. In the species line, individuals are devoted to this task, their absolutely essential function. The female mammal's liver is of benefit to her somatically; the female's mammary glands benefit the next generation at cost to her. The female's reproductive system is not maintained for her identity but to preserve her species identity. This preserves her genes, if you like, but these genes of hers flow in reproduction into the populational and species pools. The gene flow at one level is the species flow at another scale.

In this sense a tigress does not bear cubs to be healthy herself, any

10. With enough unrelatedness, in populations evolved more or less differently in more or less distant environments, there can also be outbreeding depression.

more than a woman needs children to be healthy. Rather, her cubs are *Panthera tigris* recreating itself. She plays a part, or has a role, or a "share" in the ongoing line. Her behavior may be "self-propagating" or even "self-interested" from the point of view of genetic or species identity, although the vocabulary of "self" or "interest" applied to a species line seems awkward. In any case, what she does is not "self-interested" from the point of view of somatic identity.

Richard Alexander says, "In a sense somatic effort is personally or phenotypically selfish, while reproductive effort is self-sacrificing or phenotypically altruistic but genetically selfish."¹¹ Well, perhaps, but it is also difficult to figure out what "genetically selfish" means, because the "self" is "inclusive" of others, kin, mated to, and instantiated in and representative of a species line. Meanwhile, genetic survival often requires somatic sacrifice.

Both reproductive morphology and behavior are defending the line of life bigger than the somatic individual. The lineage in which an individual exists dynamically is something dynamically passing through it, as much as something it has. The locus of 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. Value is something dynamic to the specific form of life. The value resides in the dynamic form; the individual inherits this, exemplifies it, defends it, and passes it on.

So now at various levels — inclusive fitness, sexuality, ecosystem interdependencies — the picture coming more and more into focus has a great deal of one kind of thing being sacrificed for the good of another. The lives of individuals are discharged into, flow into, "emptied into" these larger currents of life. Maybe there is kenosis in nature after all.

6. Life, Death, and Regeneration

With living things, questions of level mingle with questions of identity, which mingle with questions of persisting and perishing. Whole organisms are ephemeral. The genes have more of an eye on the species (so to

11. Alexander, *The Biology of Moral Systems*, p. 41.

speak) than on the individual. The solitary organism, living in the present, is born to lose; all that can be transmitted from past to future is its kind. Though selection operates on individuals, since it is always an individual that copes, selection is for the kind of coping that succeeds in copying, that is re-producing, producing again the kind, distributing the information coded in the gene more widely. Survival is through making *others* (altruism, even if similar others), who share the same valuable information. Survival is of the better transmitter of whatever is of genetic value in self into others, descendants. Survival of the fittest turns out to be survival of the senders.

Individual organisms must die. Species do not have to die; most, of course, do die. Ninety-eight percent of all species that have ever existed have gone extinct, so there are high probabilities; but there is no law of nature or inevitability about species extinction. But here a puzzling aspect of the matter strikes us. By virtue of the innovative genes, in their reproducing, the death of the organism feeds into the nondeath of the species. Only by replacements can the species track the changing environment; only by replacements can the descendants evolve into something novel. Genera and species sometimes do die, that is, go extinct without issue; but they are often transformed into something else, new genera and species; and, on average, there have been more arrivals than extinctions — resulting in the increase of both diversity and complexity over evolutionary history.

Life demands the unrelenting conservation of biological identity above all else, an identity that is threatened every moment, every hour, every generation. Life came forth from the formless void, and each life must constantly struggle lest it relapse into that chaos. Life must be perpetually redeemed in the midst of its perishing.¹² In the Psalmists metaphors, life is lived in green pastures and in the valley of the shadow of death, nourished by eating at a table prepared in the midst of its enemies. The organism ever stands in close proximity to failure, a failure (death) that will sooner or later overtake every individual life. These individual failures are kept from being final only by regeneration from life to life. Every species

12. This idea, even the phrase, goes back through Whitehead to Locke and eventually Heraclitus, where it is not necessarily restricted to living organisms. See Alfred North Whitehead, *Process and Reality*, corrected edition (New York: Free Press, [1927-28], 1978), pp. 29, 60, 146-47, and others.

has to reproduce itself from generation to generation; it absolutely must regenerate or else go extinct.

The conservation of life is through the reproduction of life.

7. Cruciform Nature

In the Hebrew beginning, the "wind" ("Spirit") of God "animates" ("inspires") the waters and the earth; God commands the earth to "bring forth" or "bear" the swarms of creatures, each reproducing after its kind, multiplying and filling the earth (Genesis 1). In the Greek, "nature" has, as root idea, "giving birth." If we must use metaphors, after Darwin, the Earth is as much like a womb in these gestating powers as it is, after Newton, a clockwork machine, or, after Einstein, energy and matter bubbling up out of a spacetime matrix. This "giving birth" requires "labor," and the birthing metaphor, making possible this continued reproduction, seems inseparable from elements of struggle. Biological nature is always giving birth, regenerating, always in travail. Something is always dying, and something is always living on. "The whole creation has been groaning in travail together until now" (Romans 8:22). Perhaps we can begin to recognize in creative nature dimensions both of redemptive and of vicarious suffering, one whereby ongoing success is achieved by sacrifice.

That is what was right about Darwin's "struggle to survive," and, though biologists now prefer to speak of an organism's finding an "adapted fit," they remain fully aware of this dimension of striving. An instinctive biological drive to survive is present at every biostructural level. Each individual organism must, throughout its life, maintain and regenerate its somatic structures. But death comes, and life is maintained only in the effort demanded to pass life from one generation to the next. When we deal with nature in physics and astronomy, we meet a causal puzzle, one of creation *ex nihilo*. Biology adds creation *ex nisus*, creation *per laborem*. To cause, there is added care. To movement, there is added concern. To energy, there is added effort. Something is at stake, requiring defense. There is success, and failure. There is death, but, with labor and regeneration, life ongoing. There is a kind of death that bears much fruit, like a seed fallen into the earth; and here (in the verse used as epigraph) John can use a botanical analogy to the passion of Jesus.

The flora and lower faunal forms participate in this struggle, though

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only in later, higher forms, does the capacity for suffering evolve. Now there must also be endurance — in the more sentient creatures, passionate endurance. We meet an existential puzzle, one of creation *per passionem*. The goings on become going concerns. Life on earth is not a paradise of hedonistic ease, but a theater where life is earned by toil and sweat. We do not really have available to us any coherent alternative models by which, in a hurtless, painless world, there might have come to pass anything like these dramas in botanical and zoological nature and that have happened, events that in their central thrusts we greatly treasure. There are sorts of creation that cannot occur without death, without one life seeded into another, and these include the highest created goods. Death can be meaningfully integrated into the biological processes as a necessary counterpart to the advancing of life.

There is a creative upflow of life transmitted across a long continuing turnover of kinds, across a natural history that includes a struggle resulting in more diverse and more complex forms of life. This whole evolutionary upslope is a calling in which renewed life comes by blasting the old. Life is gathered up in the midst of its throes, a blessed tragedy, lived in grace through a besetting storm. In nature there is first simply formation, and afterward information. Only still later does nature become cruciform. But the story on Earth does develop so.

Things perish with a passing over in which the sacrificed individual also flows in the river of life. Each of the struggling creatures is delivered over to preserve a line. In the flesh and blood creatures, each is a blood sacrifice perishing that others may live. We have a kind of "slaughter of the innocents," a nonmoral, naturalistic harbinger of the slaughter of the innocents at the birth of the Christ, all perhaps vignettes hinting of the innocent lamb slain from the foundation of the world. In their lives, beautiful, tragic, and perpetually incomplete, they speak for God; they prophesy as they participate in the divine pathos. All have "borne our griefs and carried our sorrows." They share the labor of the divinity.

The abundant life that Jesus exemplifies and offers to his disciples is that of a sacrificial suffering through to something higher. The Spirit of God is the genius that makes alive, that redeems life from its evils. The cruciform creation is, in the end, deiform, godly, just because of this element of struggle, not in spite of it. There is a great divine "yes" hidden behind and within every "no" of crushing nature. God, who is the lure toward rationality and sentience in the upcurrents of the biological

pyramid, is also the compassionate lure in, with, and under all purchasing of life at the cost of sacrifice. Long before humans arrived, the way of nature was already a *via dolorosa*. In that sense, the aura of the cross is cast backward across the whole global story, and it forever outlines the future.

In the biblical model, to be chosen by God is not to be protected from suffering. It is a call to suffer and to be delivered as one passes through it. The election is for *struggling* with and for God, seen in the very etymology of the name Israel, "a limping people." The divine son takes up and is broken on a cross, "a man of sorrows and acquainted with grief." Redemptive suffering is a model that makes sense of nature and history. So far from making the world absurd, suffering is a key to the whole, not intrinsically, not as an end in itself, but as a transformative principle, transvalued into its opposite. The capacity to suffer through to joy is a supreme emergent and an essence of Christianity.

The enigmatic symbol of this is the cross, a symbol Christians adopt for God, and for an extrahistorical miracle in the atonement of Christ, but one which, more than they have known, is a parable of all natural and cultural history. The cross here is not nature's only sign, but it is a pivotal one. It would also be a mistake to say that life is nothing but a cross, for life is gift and good news too. Still, all its joys have been bought with a price.

"I believe in Christ in every man who dies to contribute to a life beyond his life," confessed Loren Eiseley.¹³ That theme of dying to contribute to a life beyond one's own is, however, willingly or unwillingly, everywhere in the plot. It does not emerge with humans, though the capacity to be deliberate and responsible about such dying and contributing may emerge with humans. All the creatures are forever being sacrificed to contribute to lives beyond their own.

Every organism is plunged into a struggle in which goodness is given only as it is fought for. Every life is chastened and christened, straitened and baptized in struggle. Everywhere there is vicarious suffering. The global Earth is a land of promise, and yet one that has to be died for. The story is a passion play long before it reaches the Christ. Since the beginning, the myriad creatures have been giving up their lives as a ransom for many. In that sense, Jesus is not the exception to the natural order, but a chief exemplification of it.

13. Loren Eiseley, "Our Path Leads Upward," *Reader's Digest*, March 1962, pp. 43-46, citation on p. 46.

If so, kenosis, so far from being in stark contrast with selfish genes, might be integral to the plot. This is only a precursor to the level of kenosis exemplified in the Christ. But, contrary to what first appeared when we began this analysis, theologians do not have to change the sign of natural history as given to them by biologists.

8. Choosing Kenosis: Objection and Opportunity

There is a sense in which there can no more be self-emptying in nature than there can be selfishness. Both are equally category mistakes, projecting human possibilities onto a nature incapable of either. Nature, including botanical and zoological nature, just *is*. Period. There is neither good nor bad about such an amoral nature. But there are other senses in which organismic selves both can be and regularly are limited in nature, checked by and poured out ("emptied") into processes transcending such selves, discharging themselves into the resulting genesis of biodiversity on Earth. When we humans get into the picture, that amoral but valuable genesis has to be evaluated, both the products and the process.

One objection to this search for precursors of kenosis in natural history is that there is little or nothing voluntary in these animal and plant behaviors, which is also why there is nothing moral there.¹⁴ We can take

14. After a careful survey, Helmet Kummer concludes, "It seems at present that morality has no specific functional equivalents among our animal relatives" ("Analogues of Morality Among Nonhuman Primates," in Gunther Stent, ed., *Morality as a Biological Phenomenon* [Berkeley: University of California Press, 1980], p. 45). Contesting this, some recent studies find significant choices made in some animals, especially primates. Some of these may be called premoral or even moral.

Frans de Waal finds precursors of morality, but concludes: "Even if animals other than ourselves act in ways tantamount to moral behavior, their behavior does not necessarily rest on deliberations of the kind we engage in. It is hard to believe that animals weigh their own interests against the rights of others, that they develop a vision of the greater good of society, or that they feel lifelong guilt about something they should not have done. Members of some species may reach tacit consensus about what kind of behavior to tolerate or inhibit in their midst, but without language the principles behind such decisions cannot be conceptualized, let alone debated" (*Good Natured: The Origins of Right and Wrong in Humans and Other Animals* [Cambridge, Mass.: Harvard University Press, 1996], p. 209).

After her years of experience, Jane Goodall writes: "I cannot conceive of chimpanzees

into account how what are, from one perspective, self-fulfilling activities, are from another perspective, activities in which a self is limited with respect to others. But no action can be kenotic unless it is freely chosen. Trees do nothing voluntary, therefore nothing kenotic. The creatures can only acquiesce in this order of evolutionary generation in which they are embedded; they cannot do otherwise. So there is nothing to commend them for, and this is a radical difference with a voluntary self-limiting on behalf of others, as found in the life of Jesus or the lives of the saints.

True, but! Anyone who thinks much about freedom soon finds complex contexts in which freedom blends with determinism, with destiny. Even those actors that might seem to be most free can equally sense an inescapable calling to roles in which they must acquiesce. "Thy will, not mine, be done." "Here I stand, I cannot do otherwise." Humans inherit a world, and roles and opportunities in that world, as givens within which they must operate. Freedom is never freedom from an environment; seldom is there much freedom to choose another environment. Freedom is within an environment. Persons, like other creatures, find themselves with their particulars in time and space, a setting within which they must work. Any blending of option, openness, indeterminacy, or contingency, with inevitability, determinism, controls, or givenness is elusive and permits no simple resolution.

There is autonomy in the creatures, in botanical and zoological senses. Plants are on their own in the world, defending their own forms of life, and reproducing this generation after generation. There are external controls, but these defenses are innate in their genes (as they are also in ours). Animals do what they spontaneously desire, and they are so made as instinctively to desire reproduction and distributing their form of life as widely as is in their power. All organisms, in reproduction, also spontaneously generate variations, novelties vital to their searching for better adapted modes of life.

No organism voluntarily chooses its form of life; no organism has the power to consider self-limitation on behalf of others as one of its options.

developing emotions, one for the other, comparable in any way to the tenderness, the protectiveness, tolerance, and spiritual exhilaration that are the hallmarks of human love in its truest and deepest sense. Chimpanzees usually show a lack of consideration for each others feelings which in some ways may represent the deepest part of the gulf between them and us" (*In the Shadow of Man* [Boston: Houghton Mifflin, 1971], p. 194).

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That level of choice only appears with humans. Even they do not choose to be *Homo sapiens*, though as members of the species *Homo sapiens*, they have optional lifestyles unprecedented in the fauna and flora. Neither do humans choose this life-and-death-birth-and-rebirth order of being in which they too are caught up; they can only acquiesce in it. Neither do humans choose whether life must persist midst its perpetual perishing. This Earth-world is given to humans willy-nilly, as much as to all the other species.

But humans do have novel powers for rebuilding their Earth and for choosing their forms of life upon it. Humans may choose to rise to such challenges and succeed; they may also fail. In terms of our theological interests, humans in their cultures can rise deliberately to choose moral good, or they can fall back into moral evil. This amplifies the spontaneous evils of nature and deeply compounds the story. Humans have a superiority of opportunity, capacities unattainable in animal life. Even in human life such capacities are forever unattained, only brokenly attained. There is a genesis of spirit, recomposed from nature, in which humans can and ought to break out of their animal natures. Those experiences come creatively, with struggle, with an arduous passage through a twilight zone of spirit in exodus from nature. This requires the second birth superposed on the first, transcending natural possibilities. This may indeed require divine inspiration and redemption, transcending merely human possibilities. In this sense theological experience requires experiences beyond the previous attainment and power of biology, and here the possibility of kenotic self-limitation in humans reaches levels without precedent in prehuman nature.

Self-actualizing is a good thing for humans as well as animals. Organisms do well what they have the capacities to do; and this vital, productive capacity results in the Earthen genesis, with its swarms of creatures. The amoral fauna and flora are checked in their possessive impulses by the limitations of their ecosystems, and this provides a satisfactory place, a niche, for each specific form of life. Each species is limited to its appropriate sector, where it has an adapted fit. The creatures are caught up in these creative processes in which the individual is sacrificed to species lines, embedded in ecosystems, dynamic in evolutionary history.

The human species is embedded in this system, flesh and blood that must cope in an Earth-world. But the human species is unique, with powers of dominion unparalleled in any animal, and tempted by the fearful

power of hand and mind to possess the whole. The human species has no natural niche, no limits by natural selection, which is relaxed progressively as the human species rises to culture as its niche, superposed on nature. Our possessive power is tempted to concupiscence. This power can only be checked by duty or by tragedy, and not by duty alone but by duty empowered by a vision of the whole. We move out of biology into ethics, and further, out of ethics into spirituality. Now we reach the possibility of kenosis in the classical Christian sense, where a self-interested individual limits self on behalf of others.

Indeed, we can now envision the possibility of kenosis in a still richer sense, where self-interested humans impose limits on human welfare on behalf of the other species. Beyond any human capacity to actualize a self, shared with myriads of other creatures, humans are distinguished by their capacity to see others, to oversee a world. Environmental ethics calls for seeing nonhumans, for seeing the biosphere, ecosystem communities, fauna, flora, the Earth. Environmental ethics advances beyond humanistic ethics, beyond the usual Christian ethics in that it considers others besides humans. We can put this provocatively by saying that Christian kenosis is called to rise to sufficient moral vision to count real "others" (nonhumans) — trees, species, ecosystems.

An exciting difference between humans and nonhumans is that, while animals and plants can defend only their own lives, with their offspring and kind, humans can defend life with vision of greater scope. They can sacrifice themselves for the good of humans yet unborn, or on the other side of the globe, the entire human community. Humans can also care for the biotic communities with which they share this planet; they can care for their biosphere. Here we recognize a difference crucial for understanding the human possibilities in the world. Humans can be genuine altruists; this begins when they recognize the claims of other humans, whether or not such claims are compatible with their own self-interest. The evolution of altruism and the possibility of kenosis is complete only when humans can recognize the claims of nonhumans. In that sense environmental ethics is the most altruistic form of ethics. It really loves others. This ultimate altruism is, or ought to be, the human genius.

The secular world looks for the management of nature, for reducing all nature to human resource, and plans a technology and an industry to accomplish that in the next century and millennium. But in that aspiration, humans only escalate their inherited desires for self-actualizing,

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tempted now into self-aggrandizement on scales never before possible. Humans are no longer checked by the long-standing ecological and evolutionary forces in which they have so long resided. The Christian opportunity today is to limit such human aggrandizement on behalf of the five million other species who also reside on Earth. Such kenosis is a Christian calling for the next millennium.