

DOES NATURE NEED TO BE REDEEMED?

by Holmes Rolston, III

Abstract. In the light of evolutionary biology, the biblical idea that nature fell with the coming of human sin is incredible. Biblical writers, classical theologians, and contemporary biologists are ambivalent about nature, finding in natural history both a remarkable genesis of life and also much travail and suffering. Earth is a land of promise, and there is the conservation, or redemption, of life in the midst of its perpetual perishing. Life is perennially a struggling through to something higher. In that sense even natural history is cruciform, though human sinfulness introduces novel tragedy. Humans now threaten creation; nature is at more peril than ever before.

Keywords: conservation of nature; creation; ecological crisis; evolution; natural evils; nature; redemption; sin; suffering; wildness.

BIBLE AND BIOLOGY

Biologists believe in genesis, but if a biologist begins reading Genesis, the opening story seems incredible. The trouble is not so much the six days of creation in chapters 1 and 2, though most of the controversy is usually thought to lie there, as in chapter 3, where, spoiling the Garden Earth, the first couple fall and Earth becomes cursed. A biologist realizes that prescientific peoples expressed themselves in parables and stories. The Earth arising from a formless void, inspired by a command to bring forth swarms of creatures, generated in the seas, filling the land, multiplying and filling the Earth, eventuating in the appearance of humans, made of dust and yet remarkably special—all of this is rather congenial with the evolutionary genesis. The real problem is with the Fall, when a once-paradisiacal nature becomes recalcitrant as a punishment for human sin.

That does not fit into the biological paradigm at all. Suffering in

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a harsh world did not enter chronologically after sin and on account of it. There was struggle for long epochs before the human arrival, however problematic the arrival of sinful humans may also be. This has been Darwin's century, and biology has been painting an ambivalent picture of nature. Nature is prolific and fertile enough, creative, and the panorama of life across the epochs of natural history is a good thing, a mysterious thing. This calls for a respect for life, perhaps even a reverence for life. But nature is also where the fittest survive, "red in tooth and claw," fierce and indifferent, a scene of hunger, disease, death. And nature is what it is regardless of human moral failings, indeed regardless of humans at all.

Darwin, a biologist who started his career considering studying theology, ends with two contrary moods. He closes the *Origin of Species* resolute about how the Creator began with a few forms and produced many by natural selection:

Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved. (Darwin [1859] 1968, 459-60)

Darwin also exclaims that the process is "clumsy, wasteful, blundering, low, and horribly cruel" (Darwin, quoted in de Beer 1962, 43).

Biologists, disturbed by the first pages of the Bible, will likely not get to later chapters. But if so, there will be more ambivalence. Often the Bible extols the beauties of creation. "O Lord, how manifold are thy works! In wisdom hast thou made them all; the earth is full of thy creatures" (Psalm 104:24). Nature is a wonderland, perhaps not a paradise, but a realm to be encountered in awe. Beside these passages, the biologist will find laments over creation. Nature, sighs the Preacher, is "vanity of vanities" (Ecclesiastes 1:2). "The whole creation," asserts Paul, "has been groaning in travail until now." "The creation was subjected to futility" (Romans 8:19-22).

Should the biologist read on to the closing chapters, the Bible abandons this ambivalence and portrays a new heaven and a new earth, one fulfilling the prophetic vision of the day when the "the wolf shall dwell with the lamb, and the leopard shall lie down with the kid" (Isaiah 11:6). Paul promises, "The creation itself will be set free from its bondage to decay and obtain the glorious liberty of the children of God" (Romans 8:21). The Bible closes with Eden restored, a Garden City.

What can all of this mean, wonders the biologist, either fallen nature or its idyllic redemption? Has it any relevance for understanding biology? Can a theologian who takes these passages seriously even understand biology? Does nature need to be saved? Thus the biologist carries to the Bible a problematic concept of nature, having no doubt that there has been genesis of some sort, but ambivalent about nature's prolific fecundity, the struggle for life, the goodness of creation. The biologist is also sure that whatever nature is, its fundamental character has nothing to do with human sinfulness. Human sin did not throw nature out of joint; nature does not need to be redeemed on that account.

Biologists have no wish to talk theologians out of genesis. They do not mind being religious. Ernst Mayr, one of the most eminent living biologists, concludes, "Virtually all biologists are religious, in the deeper sense of the word, even though it may be a religion without revelation. . . . The unknown and maybe unknowable instills in us a sense of humility and awe" (Mayr 1982, 81). Biologists find nature spectacular, startling by any criteria. They also find nature stark and full of suffering, sometimes dreadful. They are almost all conservation biologists; they want to save nature. But do they think nature needs to be saved? Do theologians think nature needs to be saved?

One line of answer dissolve the questions. The Bible does not have anything to say about biology at all, nor does biology have anything to say about the Bible—a two-languages view. The Creation and Fall story is a piece of poetry, as is the lion eating straw like the ox (Isaiah 11:7), or the crystal city in the new creation. These are peace pictures imaging the hoped-for end of violence in culture. And we may hope for the end of violence in culture, but this goal has nothing to do with natural selection in nature, where lions must eat meat, and predation must continue. The wolf lying down with the lamb does not make any biological sense, since ecological harmony includes the violence of eating and being eaten, a conflict and resolution essential to biological creativity at the higher trophic levels. The wolf with the lamb makes sense only poetically, expressing human hopes for redemption within culture. Such passages do not have any biological application. Shalom in nature and shalom in culture are different categories.

But perhaps the two languages of Bible and biology are not wholly unrelated, for they do each offer a concept of nature, a worldview. The biblical language may sometimes be poetry, but not always. *Genesis* sounds like a biological word, showing up, for instance, in genes and regeneration. Both biology and Bible do seek to characterize nature and, even if one does so scientifically and one poetically,

the two descriptions need to be congenial. Even if Genesis is taken to be not so much about origins as about the present dependence of nature on God, is ecology in present-day nature conceptually any different in its operation from evolution in historical nature? There is emergence in nature, the present is more than the past. Still, in nature the process and the product, the origins and the continuing character are hardly separable. Ecology is a time-slice out of evolution.

Even prophets and poets have to come back to Earth at times; they too need to tell it like it is. Both biology and theology, then, have two views in dialectic: nature as prolific; nature as problematic. The two languages have to be spoken by one person, whether biologist or theologian. Are they commensurable?

Theologians themselves speak two languages. If we consult Luther, after human sin, nature stands under the left hand of God. "The earth is indeed innocent and would gladly produce the best products, but it is prevented by the curse which was placed on man because of sin." "And what of thorns, thistles, water, fire, caterpillars, flies, fleas, and bedbugs? Collectively and individually, are not all of them messengers who preach to us concerning sin and God's wrath, since they did not exist before sin or at least were not harmful and troublesome?" (Luther 1958, 205, 208). Likewise Calvin: "Adam . . . ruined his posterity by his defection, which has perverted the whole order of nature in heaven and earth. . . . Undoubtedly . . . they [the creatures] sustain part of the punishment due to the demerits of man" (Calvin 1936, II, I, V, vol. 1, p. 270).

Augustine insists that nature is not cursed; the whole creation groaning in travail does not apply to the nonhuman creation. The creatures are mutable, but they are not fallen (Clarke 1956). Only humans are fallen and subject to vanity. Aquinas agrees: "Man's sin did not so change the nature of animals, that those whose nature it is now to eat other animals, like lions and hawks, would then have lived on a vegetable diet" (Aquinas 1964, 1.96.1, vol. 13, p. 125). Perhaps theologians need to figure out what they believe before they talk to biologists; perhaps theologians will not be able to figure out what they believe until they have studied biology.

THE PROMISED EARTH

Let us come to the Bible story from a different perspective. The Creation stories are poetry, and sometimes also the prophecies, but overall the Bible is a historical book. We doubt the six days, we doubt the Fall; we doubt the lion lying down with the lamb. But we do not

doubt that there was Israel in Palestine, with a claim of covenant and promised land. That land is to be inhabited justly and charitably, and the twin commandments of biblical faith are to love God and to love neighbor. Israel is to be a holy people, a righteous nation, and the principal focus of biblical faith is not nature in the land, but the culture established there. At the same time, the Bible is full of constant reminders of the natural givens that undergird all cultural achievements.

Justice is to run down like waters, and the land flows with milk and honey. "The land which you are going over to possess is a land of hills and valleys, which drinks water by the rain from heaven, a land which the Lord your God cares for; the eyes of the Lord your God are always upon it, from the beginning of the year to the end of the year" (Deuteronomy 11:11-12). The Hebrew covenant of Redemption is prefaced by the covenant of Creation. The creatures of the landscape are again and again included in that covenant.

Jesus said, "My kingdom is not of this world." Teaching as he did in the Imperial Roman world, his reference in "this" is to the fallen world of the culture he came to redeem, to false trust in politics and economics, in armies and kings. God loves "the world," and in the landscape surrounding him Jesus found ample evidence of the presence of God. He taught that the power organically manifest in the growing grain and the flowers of the field is continuous with the power spiritually manifest in the kingdom he announces. There is an ontological bond between nature and spirit.

In contrast with the surrounding faiths from which biblical faith emerged, the natural world is disenchanting; it is neither God, nor is it full of gods, but it remains sacred, a sacrament of God. Although nature is an incomplete revelation of God's presence, it remains a mysterious sign of divine power. The birds of the air neither sow nor reap yet are fed by the heavenly Father, who notices the sparrows that fall. Not even Solomon is arrayed with the glory of the lilies, though the grass of the field, today alive, perishes tomorrow (Matthew 6). There is in every seed and root a promise. Sowers sow, the seed grows secretly, and sowers return to reap their harvests. God sends rain on the just and unjust. "A generation goes, and a generation comes, but the earth remains forever" (Ecclesiastes 1:4). "Thou crownest the year with thy bounty; the tracks of thy chariot drip with fatness. The pastures of the wilderness drip, the hills gird themselves with joy, the meadows clothe themselves with flocks, the valleys deck themselves with grain, they shout and sing together for joy" (Psalm 65:11-13).

This records an experience in Palestine, but it characterizes nature

as a whole. The Hebrews are moving from the particular, in Canaan, to the global Earth. This does not sound like a nature cursed and needing to be redeemed; it rather praises a promised land experienced in Israel and universal on this promised Earth.

WILDNESS

Biblical writers are principally concerned with the culture Israel established on this promised land, but they regularly appreciate the wild nature that surrounds them on their landscape. A wildland is a wonderland, a miracle. "Praise the Lord from the earth, you sea monsters and all deeps, fire and hail, snow and frost, stormy wind fulfilling his command! Mountains and all hills, fruit trees and all cedars! Beasts and all cattle, creeping things and flying birds!" (Psalm 148:7-9). "Who has cleft a channel for the torrents of rain, and a way for the thunderbolt, to bring rain on a land where no man is, on the desert in which there is no man; to satisfy the waste and desolate land, and to make the ground put forth grass?" (Job 38:25-27). God not only sends rain on the just and the unjust; God sends rain to satisfy wildlands. God not only blesses humans; God blesses the desolate wastes. These fierce landscapes, sometimes supposed to be ungodly places, are godly after all.

That the fair land of Palestine, with its cities and fields, should again become desert and wilderness is a frequent prophetic threat. The collapse of cultural life in the Promised Land is indeed a tragedy, and in that sense a relapse to the wild is sometimes used in the Bible as a symbol for judgment on an aborted, promised culture. Jackals roam the land, destroyed in punishment for sin. Such wildness is a tragedy only in foil to failed culture, but taken for what it is in itself, prior to using it to symbolize human hopes and disappointments, wildness in the Bible is never a bad thing.

"Who has let the wild ass go free? Who has loosed the bonds of the swift ass, to whom I have given the steppe for his home, and the salt land for his dwelling place? He scorns the tumult of the city; he hears not the shouts of the driver. He ranges the mountain as his pasture, and he searches after every green thing" (Job 39:5-8). God is not "for us" humans alone. God is "for" these wild creatures too. God loves wildness as well as God loves culture, and in this love God both blesses and satisfies wildness and also leaves it to its own spontaneous autonomy. To be self-actualizing under God is a good thing for humans, and it is a good thing, *mutatis mutandis*, for coyotes and columbines. That is the blessing of divinity in them.

“Is it by your wisdom that the hawk soars, and spreads his wings toward the south? Is it at your command that the eagle mounts up and makes his nest on high? On the rock he dwells and makes his home in the fastness of the rocky crag. Thence he spies out the prey; his eyes behold it afar off. His young ones suck up blood; and where the slain are, there is he. . . . Shall a faultfinder contend with the Almighty? He who argues with God, let him answer it” (Job 39: 26–40:2). “The high mountains are for the wild goats; the rocks are a refuge for the badgers. . . . The young lions roar for their prey, seeking their food from God” (Psalm 104:18–21). None of this suggests that nature is fallen and needs to be redeemed. Is there more to be said?

PERPETUAL PERISHING

If redemption means being saved from the guilt of sin, then fauna, flora, rocks, and rivers have no guilt and cannot be redeemed. If redemption means being saved from the consequences of sin, then nature can be redeemed only so far as it has been ruined by human sin that infects the natural course. That hardly seems credible before humans arrive on Earth, and it hardly seems credible where nature continues to run its spontaneous course unaffected by human vices or virtues. We may want to keep the word *redemption* in that kind of a soteriological context; certainly that is where the biblical writers are usually focused. We might be making a category mistake to try to stretch it over to nonhuman domains of experience.

If redemption can also mean being rescued from harm (Latin: *redimo* to release, to buy back), then our inquiry is still open. If redemption can mean that value in one life is rescued and restored, or that value in one life survives to contribute to lives beyond one’s own, then our inquiry is promising. If redemption can mean that there is a transformation by which destruction of the old, lower life is not really destruction but renovation, the creation of newer, higher levels of life, then our inquiry is promising indeed.

Redemption is not a word that biologists are likely to use, but consider the word *regeneration*. It can serve as a crossover between biology and theology. *Reproduction* is more likely to be the word that shows up in the index of a biology text; nevertheless *regeneration* is omnipresent in biology. Every species has to reproduce itself from generation to generation; it absolutely must regenerate or else go extinct. Every organism, even when not reproducing, has constantly to regenerate itself, day by day, hour by hour, moment by moment. Your body has regenerated millions of cells during the time you have been reading

this article. Life is lived in the midst of an ever-threatening relapse into chaos.

What does nature need to be redeemed from? What does nature need to be redeemed to? That does not quite phrase the question correctly for a biologist—not initially at least. But if we ask, Does nature need regenerating from day to day, from generation to generation? the biologist at once answers, Yes, without doubt. 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. Life is an uphill climb against the downhill tug of entropy. Without regeneration, life collapses into a sand heap. Does nature need to be redeemed? If this asks whether life must be perpetually redeemed in the midst of its perishing,¹ then nature needs to be redeemed as much as humanity. In the Psalmist's 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 biblical writers, lacking paleontological museums, had no access to the distant origins of life in evolutionary time, any more than, lacking microscopes, they had access to biochemistry and cellular biology. But they did encounter nature directly; indeed, they lived nearer to raw nature than do we. They were inspired to see into its inner character, a dialectical character, which, if not all of the truth, is part of the truth about nature. At this point, perhaps the poetry of nature as garden and as groaning in travail can be demythologized, or remythologized, for our scientific era. Also, since good and evil, about which biblical writers thought a lot, are not words that biologists handle with ease, perhaps they can teach biologists something, at least when those biologists are in a philosophical mood. Is there good and evil in nature?

NATURAL EVILS

Though there is no sin in amoral nature, there is quite a list of candidate evils from which nature might need to be redeemed: predation, parasitism, selfishness, randomness, blindness, disaster, indifference, waste, struggle, suffering, death. There are natural evils, incontestably so—at least at a first level of analysis—and this element in nature has suggested to some that nature is fallen. Biblical writers, though they rejoice in nature, can also speak of nature laboring in travail. *Travail*, in fact, is a key to understanding these evils. The root idea is that of *birthing*, of a woman in labor as she delivers her child. Now we find regeneration coupled with suffering.

Birthing, which is really also the root for the word *nature*, (Greek: *natans*, “giving birth”) is a transformative experience where suffering is the prelude to creation, indeed struggle is the principle of creation. Struggle is always going on, and it is this struggle in which life is regenerated. Nature is always giving birth, regenerating, always in travail.

Nature is random, contingent, blind, disastrous, wasteful, indifferent, selfish, cruel, clumsy, ugly, struggling, full of suffering, and, ultimately, death? Yes, but this sees only the shadows, and there has to be light to cast shadows. Nature is orderly, prolific, efficient, selecting for adapted fit, exuberant, complex, diverse, regenerating life generation after generation. There are disvalues in nature as surely as there are values, and the disvalues systemically drive the value achievements (Rolston 1992). Translated into theological terms, the evils are redeemed in the ongoing story.

Look, for instance, at predation. Certainly from the perspective of any particular animal as prey, being eaten is a bad thing. But then again the disvalue to the prey is a value to the predator, and, further, with a systemic turn, perspectives change. There is not value loss so much as value capture; there is appropriation of nutrient materials and energy from one life stream to another, with selective pressures to be efficient about the transfer. The pains of the prey are redeemed, we might say, by the pleasures of the predator. There are many biological achievements in muscle, power, sentience, and intelligence that could only have evolved, at least in life as we know it on Earth, with predation.

Could, should God have created a world with only flora, no fauna? Possibly. Possibly not, since in a world in which things are assembled something has to disassemble them for recycling. In any case, we do not think that a mere floral world would be of more value than a world with fauna also. In a mere floral world, there would be no one to think. Heterotrophs must be built on autotrophs, and no autotrophs are sentient or cerebral. Could we have had only plant-eating fauna, only grazers, no predators? Possibly, though probably we never did, since predation preceded photosynthesis. Even grazers are predators of a kind, though what they eat does not suffer. Again, an Earth with only herbivores and no omnivores or carnivores would be impoverished—the animal skills demanded would be only a fraction of those that have resulted in actual zoology—no horns, no fleet-footed predators or prey, no fine-tuned eyesight and hearing, no quick neural capacity, no advanced brains. We humans stand in this tradition, as our ancestors were hunters. We really cannot envision a world, on any Earth more or less like our own, which can give birth

to the myriad forms of life that have been generated here, without some things eating other things.

Life preys on life; all advanced life requires food pyramids, eating and being eaten. Humans are degenerate in the sense that we cannot synthesize all that we need, compared with, say, the flora, which are autotrophs. But in such degeneracy lies the possibility of advancement. If the higher forms had to synthesize all the life materials from abiotic materials (also degrading their wastes), they could never have advanced very far, not even as organisms, much less as humans in culture. The upper levels are freed for more advanced synthesis because they depend on syntheses (and decompositions) carried out by lesser organisms below. 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.

Or take bad luck. Again, it is certainly true that the creatures can be unlucky and by accident find themselves in peril. Does anything redeem the bad luck? Often not so for particular individuals. And yet, when we place local bad luck into the larger system, we realize that in a world without chance there can be no creatures with integrity, no adventures, surprises, taking risks, and the skills of life would be very different. The organism by its genetic programming, instincts, perceptions, and conditioned learning modifies its exposure to luck and thus acts as a preference sieve through a world with luck in it, partially but not wholly accumulating the lucky upstrokes and discarding the unlucky downstrokes. The organism is redeemed in the midst of its perpetual perishing as it catches its opportunities and dodges its threats.

Bad luck is sometimes catastrophic. Violent forces in nature with random probability strike animals, plants, and people; disaster often results. There is no question but that such forces can and do destroy individuals. Is there any redemption from them? Possibly these violent forces are bad, but there are good ones that overcome them. Possibly the catastrophic, negative forces are integrated with the uniformitarian, positive forces. Floods, windstorms, lightning storms, volcanic eruptions, and all such violences would become more or less like wildfire in natural ecosystems, a bad thing to individuals burned and in short range, but not really all that bad a thing systemically and in long range, given nature's restless creativity.

In March 1872, John Muir was in Yosemite Valley when it was struck by the great Inyo earthquake. He records: "I ran out of my cabin, near the Sentinel Rock, both glad and frightened, shouting,

'A noble earthquake!' . . . a terribly sublime and beautiful spectacle" (Muir 1954, 166-67). "It is delightful to be trotted and dumped on our Mother's mountain knee" (Muir 1980, 125). It was "as if God had touched the mountains with a muscled hand" (Muir, in Cohen 1984, 134). Later, Muir concludes that the earthquake was "wild beauty-making business." "On the whole, by what at first sight seemed pure confusion and ruin, the landscapes were enriched; for gradually every talus, however big the boulders composing it, was covered with groves and gardens, and made a finely proportioned and ornamental base for the sheer cliffs." "Storms of every sort, torrents, earthquakes, cataclysms, 'convulsions of nature,' etc., however mysterious and lawless at first sight they may seem, are only harmonious notes in the song of creation, varied expressions of God's love" (Muir 1954, 169). Muir certainly has an intensive faith in natural systems, but such faith is not without some impressive evidence. The great destructive forces are followed by—indeed they are part of—nature's creativity. That amounts to saying that nature is redeemed from catastrophic tragedy.

The list of candidate evils in nature is a long one, and we cannot examine all of them here. The very fact that there is such a list and that it has to be examined indicates that the inquiry is not just, Is there evil in nature? It is, What more is there to be said? The inquiry is whether there is any redemption from these evils, and often as not there indeed is. Here again, biologist and theologian need not quarrel that nature is perpetually renewed in the midst of its perishing. That is a fact of the matter. Indeed, biologist and theologian may agree that the logic of creation requires destruction as well as construction, on scales both large and small, both before humans arrived and after as well.

STRUGGLING THROUGH TO SOMETHING HIGHER

The question of whether nature needs to be redeemed is essentially an appraisal of the role of struggle in the genesis of life. Suffering is not a feature of mere causal relations; there is no suffering in astronomy or geology. It appears in bioscience, where we meet not only a functional capacity unprecedented in physical science, but something still more novel. Irritability is universally present in life; suffering in some sense seems copresent with neural structures. Matter can be meaningless, as when so much cosmic material seems tossed forth in waste; but it cannot suffer. Sentient life can suffer, most obviously with the higher forms in their subjectivity. Causality deepens into sentience.

In chemistry, physics, astronomy, geomorphology, meteorology, nothing suffers; in botany life is stressed. In some weakened sense, even nonsentient forms struggle bodily, objectively to avoid death. They have needs and endure stress. But only in zoology does pain emerge. Each seeming advance—from plants to animals, from instinct to learning, from ganglia to brains, from sentience to self-awareness, from herbivores to carnivores—steps up the pain. We are not much troubled by seeds that fail, but it is difficult to avoid pity for nestling birds fallen to the ground.

Though biology introduces suffering, understanding it is not a scientific problem. All the descriptions of science only present the facts, including any feelings (for which it has minimal descriptive power); science has no resources with which to evaluate them. The question metamorphoses into one of the meaning of problematic experiences. So much of Earth's life seems tossed forth in waste, only now the process seems cruel, at least at its advancing levels. This observation torments the possibility of divine design and can seem to reduce natural history to a desolate, evil scene. But "tragic" is not a scientific word. The question of suffering in natural history escapes the competences of science. Yet it is one of the central issues we face.

Emptiness and vastness in an oversized universe is the challenge to interpret in modern physics. The time span of ceaseless struggle is the challenge to interpret in biology. Something stirs in the cold mathematical beauty of physics, in the heated energies supplied by matter, and there is first an assembling of living information centers, and still later suffering subjects. Energy turns into pain. Is this now ugliness emergent for the first time? Or is it a more sophisticated form of beauty? Is it the emerging of life that can and must be redeemed? Bioscience as such can only amorally and nonaesthetically describe what has happened, and to assess whether this is good or bad requires valuational judgment.

An organism can have needs, which is not possible in inert physical nature. A planet moves through an environment, but only an organism can need its world, a feature simultaneously of its prolife program and of the requirement that it overtake materials and energy. But if the environment can be a good to it, that brings also the possibility of deprivation as a harm. To be alive is to have problems. Things can go wrong just because they can also go right. In an open, developmental, ecological system, no other way is possible. All this first takes place at insentient levels, where there is bodily duress, as when a plant needs water.

Sentience brings the capacity to move about deliberately in the world, and also the possibility of being hurt by it. We might have

sense organs—sight or hearing—without any capacity to be pained by them. But sentience does more than permit observation of the world. It rather evolves to awaken some concern for it. Sentience coevolves with a capacity to separate the helps from the hurts in the world. Even in animal life, sentience with its counterpart, suffering, is an incipient form of love and freedom. A neural animal can love something in its world and is free to seek this, a capacity greatly advanced over anything known in immobile, insentient plants. It has the power to move through and experientially to evaluate the environment. The appearance of sentience is the appearance of caring, when the organism is united with or torn from its loves—the step up that brings more drama brings suffering.

When we deal with nature in physics and astronomy, we meet a *causal* puzzle, one of *creatio ex nihilo*. That remains true in biology, when life appears, not out of nothing, but out of matter in which there was no-life before. How could life appear where absolutely none was before? But biology adds, in the higher if not also the lower species, a *meaning* puzzle, one of *creatio per passionem*. Life arises in passionate endurance. Struggle is the dark side of creation. This existential fact, discovered by sensitive souls, is a truth written into life's creation, though it was obscured by the facile Newtonian notion of a Divine Designer fabricating his world machine.

Organic life requires an entirely different model, one of suffering through toward something higher. Only later on, in humans, can this goal be consciously entertained. Prior to that, there is only an instinctive biological drive to survive at the cost of ordeal, present at every biostructural level. If irritability seems at first an unwelcome, adventitious intruder into the life project, by this switch of gestalts it becomes part of the biologic and logic of meanings. All advances come in contexts of problem solving, with a central problem in sentient life being the prospect of hurt. We do not really have available to us any coherent alternative models by which, in a painless world, there might have come to pass anything like these dramas of nature that have happened, events that in their central thrusts we greatly treasure. There are sorts of creation that cannot occur without death, and these include the highest created goods. Death can be meaningfully put into the biological processes as a necessary counterpart to the advancing of life.

The logic here is not so much formal or universal as it is dialectical and narrative. In natural history, whatever might be true in other imaginable worlds, the pathway to psychosomatic consciousness, the only kind of experience we know, is through flesh that can feel its way through that world. There is some sentience without much capacity

to be pained by it; we do not much suffer through our eyes or ears. But neither would we have those eyes and ears had they not evolved for the protection of the kinesthetic core of an experiential life that can suffer, whether by lack of food for which eyes may search or by predators whom ears may hear.

In general, the element of suffering and tragedy is always there; it does indeed seem that subjectively to evolve is invariably to suffer. Yet the suffering is both corollary and cause in the larger currents of life. We want to ask not whether Earth is a well-designed paradise for all its inhabitants, nor whether it was a former paradise from which humans were anciently expelled. The question is not whether the world is, or ever was, a happy place. Rather, the question is whether it is a place of significant suffering through to something higher.

We can recognize here a principle both of redemptive and of vicarious suffering, one whereby success is achieved by sacrifice. This principle does not operate in its pronounced and existential forms until evolution advances to the level of mind, reaching there layers of meaning untouched in nonhuman nature. But we can see that the biological process anticipates what later becomes paramount, and this forces us to ask about the meaning of suffering, although that question is one which biological science is incompetent to answer.

CRUCIFORM CREATION

Whatever is in travail needs redemption, whether or not there is any sin to be dealt with. If we take the moral component out of redemption (or, better, if we restrict the moral component to the redemption of humans, who are moral and immoral) and ask whether the biodiverse amoral values present in nature need to be saved, then the answer is most certainly that they do. "Conserved" is the biological word; life is the unrelenting conservation of biological identity above all else, an identity that is threatened every moment, every hour, every generation. But that threatened life has prevailed for several billion years. If we make the correct translation into theology, we will not say that nature does not need to be redeemed, nor that it has never been redeemed; to the contrary, it is ever redeemed.

The Earth is a divine creation and scene of providence. The whole natural history is somehow contained in God, God's doing, and that includes even suffering, which, if it is difficult to say simply that it is immediately from God, is not ultimately outside of God's plan and redemptive control. God absorbs suffering and transforms it into goodness. There is ample preparation for this conviction in

Judaism, but it reaches its apex in the crucifixion and resurrection of a suffering Messiah, who produces life out of death in his followers. But we must be careful here. It is not simply the experience of divine design, of architectural perfection, that has generated the Christian hypothesis of God. Experiences of the power of survival, of new life rising out of the old, of the transformative character of suffering, of good resurrected out of evil, are even more forcefully those for which the theory of God has come to provide the most plausible hypothesis.

Christianity seeks to draw the harshness of nature into the concept of God, as it seeks by a doctrine of providence to draw all affliction into the divine will. This requires penetrating backward from a climaxing cross and resurrection to see how this is so. Nature is intelligible. Life forms are logical systems. But nature is also *cruciform*. The world is not a paradise of hedonistic ease, but a theater where life is learned and earned by labor, a drama where even the evils drive us to make sense of things. Life is advanced not only by thought and action, but by suffering, not only by logic but by pathos.

The Greek word is *pathos*, "suffering," and there are pathologies in nature, such as the diseases of parasitism. But pathology is only part of the disvalue; even in health there is suffering. Life is indisputably prolific; it is just as indisputably pathetic, almost as if its logic were pathos, as if the whole of sentient nature were pathological. "Horribly cruel!" exclaimed Darwin. This pathetic element in nature is seen in faith to be at the deepest logical level the pathos in God. God is not in a simple way the Benevolent Architect, but is rather the Suffering Redeemer. The whole of the earthen metabolism needs to be understood as having this character. The God met in physics as the divine wellspring from which matter-energy bubbles up, as the upslope epistemic force, is in biology the suffering and resurrecting power that redeems life out of chaos. The point is not to paint the world as better or worse than it actually is in the interests of a religious doctrine but to see into the depths of what is taking place, what is inspiring the course of natural history, and to demand for this an adequate explanation.

The secret of life is seen now to lie not so much in the heredity molecules, not so much in natural selection and the survival of the fittest, not so much in life's informational, cybernetic learning. The secret of life is that it is a passion play. Things perish in tragedy. The religions knew that full well, before biology arose to reconfirm it. But things perish with a passing over in which the sacrificed individual also flows in the river of life. Each of the suffering creatures is delivered over as an innocent sacrificed to preserve a line, 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. They share the labor of the divinity. 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.”

The abundant life that Jesus exemplifies and offers to his disciples is that of a sacrificial suffering through to something higher. There is something divine about the power to suffer 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. God rescues from suffering, but the Judeo-Christian faith never teaches that God eschews suffering in the achievement of the divine purposes. To the contrary, seen in the paradigm of the cross, God too suffers, not less than God’s creatures, in order to gain for the creatures a more abundant life.

In the natural course there is creaturely suffering, autonomously owned, necessitated by the natural drives, though unselected by those caught in the drama. Yet this drive too may be construed, in the pantheistic whole, as God suffering with and for the Creation, diffused divine omnipresence, since each creature both subsists in the divine ground and is lured on by it. The Son of God is an innocent led to slaughter, and his production of new life for the many climaxes a *via dolorosa*, in which the struggling survivors stand under the divine watching over.

In the biblical model in either testament, 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. 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. Yet the whole evolutionary upslope is a lesser calling of this kind, 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.

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 Garden Earth, we now understand, is a symbol for a flowering Earth, and there can be little doubt that life has flourished on Earth. The Bible writers experienced that exuberance of life, and biology since has confirmed and reconfirmed it. But we cannot take this Garden Earth as paradise in which there was neither labor nor pain; even in the Garden Earth, life has to be redeemed in the midst of its perpetual perishing. The Garden Earth forebodes the Garden of Gethsemane. Creation is cruciform.

THE HUMAN FALL INTO SIN

The Genesis story concerns, superficially, a couple who live in paradise and are cast out of it as a result of sin. Traditionally, this has been called the Fall. Moral evil in history amplifies the spontaneous evils of nature and deeply compounds the story. By logic alone, the possibility of morality contains the possibility of immorality; and by the logistics of life, we cannot help each other in a world where we cannot hurt each other. We cannot have responsibilities in a world without caring. This education and evolution of moral caring inevitably introduces guilt into our storied awareness. This leads on to themes of forgiveness and reconciliation, likewise gathered into the symbol of the cross. Here, supremely, one suffers through to joy.

Humans have a superiority of opportunity, capacities unattained in animal life. Alas, however, the human capacity is forever unattained, brokenly attained. Much of the history that humans have made is sordid enough. The typical biblical verdict is condemnation of these adventures. The beast made to image God has fallen into sin. Religion has tried to face full on, cognitively, existentially, and redemptively, the stark reality of suffering and tragedy in historical life. All the classical religions find the human condition to be deeply flawed; humans are in trouble, needing salvation. Christian monotheism has insisted that there is something "original" about sin, something in our origins that produces sin perennially, something in our biology, our flesh, that makes it all but inevitable for humans to lapse into sin. At this point theology and at least some kinds of biology, sociobiology for example, are well within dialogue; indeed they can seem to be saying almost the same thing. When biology

finds within humans an innate “selfishness,” this concurs with what the classical religions have been teaching for millennia.

In this genesis of spirit, humans do have to break out of their animal natures. When animals act “like beasts,” as nonmoral beings, nothing is amiss, evil, or ungodly. To the contrary, spectacular values have been achieved, coded, used for coping over the millennia of evolutionary time. But if humans go no further, something is amiss; indeed, in theological terms, something is ungodly. They “fall back” into evil, rather than rise up to their destiny. Stagnating in animal nature, “the natural man [who] does not receive the gifts of the Spirit of God” (I Corinthians 2:14) is not so much “fallen” as nonrisen, failing rather than falling, failing to rise to the destiny of a child of God, languishing in animal nature.

There is no greater drama in Earth’s history than this long struggle (late in the evolutionary story) of the climb to humanity, with perennial failing back to the animal levels. That is the story-parable of Genesis 1–3, a story that is both once upon a time, and once upon all times, aboriginal and perennial. This story discloses our human situation, the situation into which we are now born; but it also discloses the ancient past, the story of how we humans fell into that situation. The Genesis plot is the creation of life, culminating with the creation of human life, coupled with its tragic perennial falling into a real that is less than the ideal. That is the prologue, sketched mythically there, and profoundly orienting the whole story of salvation to follow. What was and is in the animals a good thing becomes (“falls into”) a bad thing when it is the only thing in human life. This arrests advancement to the next, the human, humane stage.

The New Testament speaks of the struggle of “spirit” (Greek: *pneuma*) against “flesh” (*sarx*), sometimes of “mind” (*nous*) or “soul” (*psyche*) versus “body” (*soma*). The command to love one’s neighbor summarizes the human-divine law; by contrast the animal law is eat or be eaten. That is not a bad law for animals; for humans to live by that law is tragic, since they fail to reach their humanity. The flesh (*sarx*) is too weak for this humane, divine achievement. The “natural man,” left to biological inheritance alone, finds that this does not sufficiently empower humans for what they ought to do socially, morally, spiritually. The “natural man”—and woman—need to become the spiritual man and woman; they need their broken spirits inspired by the divine spirit (*pneuma*, “wind,” in-spiring), divine in-spiring elevating the mere biology. That does not despise the flesh, which is valuable enough in its place, good creation. But it knows that humans have to rise to spirit to become what they are destined to be. Only that can “save” the natural man or woman from lapsing

into beastliness. This genesis of spirit, recomposed from nature, requires the second birth superposed on the first, transcending natural possibilities.

In this sense, religion, carried by cultural inheritance, requires experiences beyond the previous attainment and power of biology. Those experiences come creatively, with struggle, with an arduous passage through a twilight zone of spirit in exodus from nature. This does not mean that nature is bad; nature is pronounced to be very good—not perfect, because culture is yet to come—but intrinsically good. Humans are made godward, to turn toward God, but they shrink back and act like beasts. Genesis is the story, not of the Fall from perfection, but of the “Fall” of the aboriginal couple from innocence into sin. There is awakening. After the sin, “the eyes of both were opened, and they knew that they were naked” (Genesis 3:7).

Life under natural selection is perpetually perishing, but the process systemically is prolific. When humans emerge in culture, we emerge into, and at the same time fall into a process that contains the seeds of its own destruction, which was not true before. We rise to, and fall into, a moral process. We rise to a vision of the good that has evil as its shadow side. We rise to the possibility of being sons and daughters of God, in love, justice, and freedom at the same time that we fall into being demonic, into arrogance, into lust, into bondage to sin.

Self-actualizing is a good thing for humans as well as animals. The organism does well what it has the capacity to do, a vital, productive capacity, resulting in the earthen genesis, with its swarms of creatures embedded in ecology and community. The amoral fauna and flora are checked in their possessive impulses by the limitations of their ecosystems—which provide a satisfactory place, a niche, for each specific form of life, but limit each species to its appropriate sector, where it has adapted fit. The human species is not so checked, but 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. There, too, 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, by duty empowered by spirit. We have moved out of biology into ethics, but further, out of ethics into spirituality.

Religion warns that, when humans arrive, they are warped by ambiguity, by the evil that besets their loftiest aspirations toward the good. Both morality and rationality, unredeemed from self-love, will

prove dysfunctional and tragic. This is the value crisis again, taken to a new level. Symbolically put, those who want themselves to be God fail tragically; those who wish to image God can become children of God, though made of the dust of Earth. Now selfishness in the moral sense does appear, when the organism-become-person fails to emerge and acts like a beast in culture. The dusty beast reaches to be god; that is biology gone amuck, the original sin. Culture has, in that sense, to constrain the biology, or better, to constrain what the biology becomes if extrapolated into culture without any narrative development. Better still, culture has to elevate the biology, to humanize us by lifting us higher than “nothing but” biology, to make exodus into a promised land, where humans can live as the people of God. This they do as “Israelites,” those who struggle with the question and the presence of God.

There is a great story told in the transposition from nature to culture, one not without its tragic epochs. With humans, the fourth movement of this symphony accentuates the minor key already introduced in the third movement, with animals, and even in the second movement, with plants, though it could not be detected in the first movement, with matter. The music becomes more beautiful for its conflict and resolution, for the struggling through to something higher. We will expect that the values achieved in history are checkered with disvalues, checked with lapses and falls. No one can deny that the evolutionary epic, when it comes to the human chapter at least, is the story of good and evil.

When humans arrive, and go wrong, the pain is intensified, as sin produces suffering at new levels. To sin is to betray oneself and others. Sin introduces affliction. The need for redemption becomes more urgent. It is this human problem that the Bible principally addresses. There is an obvious sense in which redemption is for people and for people alone. All the vocabulary of redemption—sin, forgiveness, repentance, faith, hope, love, righteousness—is addressed to humans; animals are incapable of these vices and virtues.

But when moral responsibility does come, this does not change the sign of natural history. It rather intensifies a theme already crucially there, enriching this motif because it adds moral self-awareness. After this, history begins to turn on concepts of right and wrong, justice and guilt, obligation and retribution. But the way of history too, like that of nature, only more so, is 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.

THE HUMAN THREAT TO CREATION

Look to the future we must, for we face peril and promise. Nature today is in crisis, a crisis generated by human culture. The two great marvels of our planet are life and mind, so far unknown elsewhere. Life is a product of evolutionary natural history, the toil and achievement of three and one-half billion years. For perhaps two hundred thousand years, the human brain and hand have produced cultures superposed on natural systems—cultures broken and failed enough in the midst of their glories. Meanwhile, diverse combinations of nature and culture worked well enough for nature to continue over many millennia, but no more. In the last century, our modern cultures threaten the stability, beauty, and integrity of Earth and thereby of the cultures superposed on Earth. Behind the vision of one world is the shadow of none.

The late-coming moral species, *Homo sapiens*, has still more lately gained startling powers for the rebuilding and modification, including the degradation, of nature. Human desires for maximum development drive population increases, escalate exploitation of the environment, and fuel the forces of war. Those who are not at peace with one another find it difficult to be at peace with nature, and vice versa. We are sowing the seeds of our destruction. We worried throughout most of this century, the first century of great world wars, that humans would destroy themselves in interhuman conflict. Fortunately, that fear has subsided. Unfortunately, it is rapidly being replaced by a new one. The worry for the next century is that humans may destroy their planet and themselves with it.

We are turning a millennium. The challenge of the last millennium was to pass from the medieval to the modern world, building modern cultures and nations. In the ancient world, in millennia before that, the challenge was to build civilization in Greece and Rome and to baptize it with the religion of the Hebrews. Or so we thought in the West, at least. The Western conquest of nature is the story of such civilization, increasing its power with the coming of modern science and the Enlightenment. The Hebrews put humans over nature, under God, and urged them to subdue and conquer their Earth. This vision blended with and transformed the Greek rationalistic bent, sustained the medieval centuries, and produced the modern era.

In the secularizing of the modern age, though the monotheism lapsed, the axioms about human dominion persisted. We rejoiced in our exodus from nature. We admired the pilgrim, the settler, the explorer, the scientist, the engineer for their prowess against the

recalcitrance of nature. We tamed continents, cleared forests, built roads, bridged rivers, and, often in the name of religion, urged the conquest of nature and redeeming of the fallen world. And yet we have discovered that our most modern civilizations, whatever their genius, remain infected with the original sin of concupiscence, of desiring to be God. Technology becomes god; consumption becomes god. The spirit of conquest becomes an Earth-eating mentality. The planet is plundered, poisoned. The wildlife are decimated. Species are endangered and lost. On our present heading, much of the integrity of the natural world will be destroyed within the next century. It is five hundred years since Columbus discovered the New World, but the spirit of the conquistadors cannot continue. The next five hundred years cannot be like the last five hundred years.

The biologist is sure that whatever nature is in itself, today and for millennia past, its fundamental character has nothing to do with human sinfulness. Yet the biologist, in consensus with the theologian, now does fear that human sin can henceforth throw nature out of joint. Both can agree that nature does now need to be redeemed on that account. Sin pollutes the world. An ancient insight is breaking over us anew. We had almost thought that geology, biology, and anthropology had drained the truth out of the Genesis stories. They enshrined, we conceded at length, only theological truth, not biological truth, and we were increasingly less sure of that.

But then we discover that these stories contain a profound myth of aboriginal community and the human fall from it. We are made for fellowship at multiple levels: with God, with persons, with the Earth. When that sense of community breaks, the world begins to fall apart. Now we see anew the difference so subtly put in those stories between being God and being like God. Those who image God will use the Earth with justice and charity, but those who want to be God will use the Earth any way they please, any way they find the power to dominate it. They think they are God; they play God. They make of the world something to boss around.

The root sin is pride—the theologians say. It is concupiscence, covetous lust. It is ingratitude. Animals are incapable of such vices; but humans, simultaneously with their rise into humanity fall into a perennial struggle with moral evil, from which we do need to be redeemed. Such sin destroys human relationships; sin alienates from God. And sin is also ecological. Dissatisfied with their ecological niche, the man and the woman reach to be gods. The crown of creation humans are, and it is proper for us to be stewards over Earth, our home. But creature among creatures we humans would not be. We reached to decide our own goods and evils. Imaging God on

Earth was not enough; we did not know when to say, Enough! Nor have we yet, over the millennia since, learned when and how to say, Enough! We have fallen into a consumption mentality. Earth is our resource, nothing more; and treated with such lust, it frustrates us.

Now, if we ask the question whether nature needs to be redeemed, we must answer: Yes, urgently, more urgently today than ever before! Humans, as a result of their failings, degrade the natural world, and nature is at peril owing to human cultures on Earth. There is something perverse about an ethic, held by the dominant class of *Homo sapiens*, that regards the welfare of only one of several million species as an object and beneficiary of duty. We lust. We are proud. We are selfish. These escalating human desires, coupled in this century with more power than ever before to transform the earth, have put nature in travail. In this sense, the fall of nature, far from being archaic, is among the most imminent threats; nature is at more peril today than at any time in the last two and one-half billion years. We may face the end of nature, unless human cultures can be redeemed.

Several billion years worth of creative toil, several million species of teeming life, have been handed over to the care of this late-coming species in which mind has flowered and morals have emerged. Yet this sole moral species has not yet been able to do anything less self-interested than count all the products of an evolutionary ecosystem as resources for our consumption. That does not sound like trusteeship; that sounds like corruption, a fall from human nobility. Insatiable overconsumption is cancerous, if not psychotic. Worse still, it is depraved.

THE NEW CREATION

What are we to make of the biblical vision of a new creation? Perhaps there is some eschatological sense in which there will, in the further future, come an ultimate redemption of both heaven and earth, of culture and of nature. I am not sure that I know what that means. Looking past, this Earth is very old; looking forward, if we can redeem it now, Earth might last a very long time. But I do not believe that this Earth will last forever. One day it will perish. Can God find a way to redeem Earth in that ultimate perishing? Who knows? It is hard enough to look back several billion years; it is impossible to look forward several billion more. Perhaps some transfigured Earth lies ahead. Perhaps God saves more than souls. Like the human body, which Saint Paul considers a kind of seed planted here that will flourish in a life beyond the grave, the fauna and flora will perish

here to be regenerated in an age beyond our own. The end of the Earth story will not be dust and ashes; it will end by being lifted up into God.

The book of Revelation portrays every creature in heaven and on earth and under the earth and in the sea joining the saints who surround the throne of God to sing God's praises (Revelation 5:9-14). If such redemption comes, it will be God's doing. In a world where what lies behind us has actually managed to happen, almost anything can happen. Paul's image of planting a seed can seem naive; when we plant grass seed we do get more grass, but we get just more grass, nothing transformed. But if we place Paul's image on an evolutionary scale, you can plant a protozoan and get, a billion years later, a person. If we plant persons, and wait a million years, what might we get?

The same God that lured protozoans into persons may be still at work on scales that we cannot imagine scientifically but can only hope for mythically. The miracle of a new heaven and a new earth would be a lesser miracle than the fact that this past and present heaven and earth are and have been here in the first place. The story of the last several billion years has not been so much the loss of value as of its transformation into new levels of attainment and power. Perhaps that will be the story of the next several billion years. Perhaps God is able to save all that is of value in the story, not just human spirits.

Meanwhile, this we do know. Nature has been redeemed across the last several billion years, but the current threat is the greatest that nature has yet faced. Unless we can in the next millennium, indeed in the next century, regulate and control the escalating human devastation of our planet, there will be little or nothing to worry about after that. To recall the Pauline lament, the Creation is being subjected to futility, and it cannot be set free from this degradation until the human race rises to its glory, imaging God and governing in suffering love. Does nature need to be redeemed? It can, it must, and let us work and pray that such redemption is at hand.

Pride is the original sin. It was feared by some that the space flights, reaching for the stars, were acts of human arrogance, hubris in extreme, more of the conquest and dominion by *Homo sapiens* that had already ravaged the planet. But people responded unexpectedly. The haughty, the high, and the mighty of spirit failed to materialize with the flight into space. Rather humility, from *humus*, meaning "earthy," also the root of "human," was the dominant experience. The value and beauty of the home planet and our destiny in caring

for it has been the repeated reaction. One reason that we have so seldom gone back to space is the conviction that our more urgent responsibilities are earthbound: they lie in constructing a human future on Earth in harmony with conserving nature. Perhaps that is a truth in the beatitude: "Blessed are the meek, for they shall inherit the Earth." For Earth is indeed a planet with promise, a promised planet, and we humans have both the right to share in and the responsibility to help to keep that promise.

NOTES

1. This idea, even the phrase, goes back through Whitehead to Locke and eventually Heraclitus, where it is not necessarily restricted to living organisms (Whitehead [1927-28] 1978, 29, 60, 146-47, and others).

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