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SUFFERING THROUGH TO SOMETHING HIGHER

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The Darwinian world is often said to be "red in tooth and claw," recalling Tennyson's phrase (1850). Some biologists continue to speak of "survival of the fittest," though most prefer to characterize the process as "survival of the better adapted" – recognizing that various skills, not just bloodshed, contribute to survival. The central determinant is the struggle for life. Such struggle is not present in all causal relations; there is none in astronomy or geology. It appears in biology, where over evolutionary time the fight for life deepens into sentience, and sentience into suffering. Darwinians were not the first to realize that struggles drive life. That is an ancient truth, found, for instance, in the first noble truth of Buddhism. Theodicy has been a perennial task in theology. But struggle for survival has come to be seen as the paradigm truth in biology, where nothing makes sense without it. This forces philosophers and theologians to see what sense they can make of it.

Stress versus suffering

Ursula Goodenough chooses to use the term "suffer" to describe any organism under stress. In her use, plants suffer, as do microbes. She appeals to the Latin etymology, to bear up (*ferre*, to bear; *sub*, up). "Endure" is a close synonym, from the root *durare*, to harden. All organisms have "awareness" – she says – through which they focus "attention;" and, facing threat, they have coping "amelioration systems" which can make things better. Plants detect and act upon environmental signals. A protozoan moves up a gradient toward light or away from a toxic substance. In simpler organisms, an aversive action is "just" suffering, not "experienced" suffering. She can, of course, stipulate such meanings; she must also realize that she is stretching more common meanings of these terms. In the usage of most English speakers, "unexperienced suffering" is a contradiction in terms. If a physician reported: "The patient is suffering but doesn't feel anything," we would hardly know what to think. Biologists do commonly say that plants are "irritable," may be under "stress," "healthy," or "sick."

The terms above are found in ordinary English, but Goodenough has a more technical term: "nociception," which describes "the ability to detect and respond to aversive/noxious environmental stimuli." This is present in organisms without neurons, such as plants. Other organisms (perhaps insects) have the kinds of neurons that detect such threats, but lack the kinds of neurons that register pain. Pain seems to arise in vertebrates. These pain-generating neurons are called nociceptors, although she also tells us that there is nociception without neurons. There she is atypical; most define "nocioception" as "the neural process of encoding and processing noxious stimuli."

While I generally agree with what she is trying to say, I would phrase it differently. Plants clearly defend their own lives. Plants make themselves; they repair injuries; they move water, nutrients, and photosynthate from cell to cell; they store sugars; they make tannin and other toxins and regulate their levels in defense against grazers; they make nectars and emit pheromones to influence the behavior of pollinating insects; they emit allelopathic agents to suppress invaders. They can reject genetically incompatible grafts. As much as animals, they are tested for adapted fit, for their capacity, in Goodenough's term, to "endure." Their stress, by my account, stops short of suffering,

Felt experience, neural suffering

As most biologists would use these terms, "pain" comes only with neurons, when there appears, in Goodenough's terms, "experienced suffering," In evolutionary natural history, there are two singularities. The first, from the origin of life onward, is the evolution of the genetic capacity to store and process information, genotypes producing functional, adapted phenotypes. But with neuronal nets of increasing complexity, life crosses another singularity: the threshold of felt experience.

As with everything else in evolutionary development, this crossing and its subsequent development will have taken place gradually, but that ought not to obscure the fact that there is momentous emergent novelty. Both scientists and philosophers seek to have precise concepts, clear definitions, daylight or dark, but discover a world with increments across twilight zones. With increasing neuronal complexity, there appears *inwardness,* felt experiences. With still more, there appear what philosophers call *qualia,* consciously entertained experiential mental states such as sensations, feelings, perceptions, desires. Increasingly, there is "somebody there." There appears phenomenology of experience, as when a person (or a rat?) smells strong cheese. Across the spectrum, there is agency, awareness, in the sense that action is provoked by felt stimuli, but only with increasing neuronal sophistication is there self-awareness, reflective inwardness. (Compare the difficulty of analysis here with reflecting on a person's own coming into existential being – fetus, newborn, infant, child, adult.)

Goodenough here portrays simple neurology as little different from other cellular reactive responses. "Neuronal nothing-buts are simple variants on the nothing-buts of cellular sentience." A neuron in an eye registers light; a root cell in a plant registers water. She can easily do this, given the way she uses "awareness." She can then move to "brain-based awareness." She may be right about whatever were the

simplest neurons in earliest evolutionary history, perhaps right about some today (such as the simplest neurons in an ant). Next, Goodenough moves to human brains with their "emergent modality we can call symbolic sentience," and emerging from that "our sense of an 'I-self,' the narrative being that wakes up in the morning [...] and dominates what we often call our consciousness." There is, as she well knows, several billion years of evolutionary emergence telescoped here, with radical transformations.

Just when and how there appeared what might be a precursor to neurons is not known; with some evidence this was about 700 million years ago. The diversity of existing nervous systems is enormous. Some scientists have wondered if nerves evolved independently more than once, although recent opinion, based on genetic and molecular analysis, indicates a single (monophyletic) origin (Hirth and Reichart 2007). The most primitive organisms to possess a nervous system are cnidarians, a phylum of mostly marine animals. In their diffuse nervous systems (as found in jellyfish, sea anemones, corals), nerve cells are distributed throughout the organism, often organized into nerve nets with synapse-like connections, perhaps with ganglia, local concentrations of neurons that are more highly connected. Sensory neurons connect with effector neurons without central integration. Presumably there is present some diffuse experience of feeling; it is difficult to know.

Central nervous systems evolve later. It is not known when they first appeared nor what their earliest function was. The presumed earliest ancestors are identified as "urbilateria," of which there are fossil traces (Arendt *et al.* 2008). Flatworms exhibit bilateral symmetry, breaking previously radial symmetry. This more is different. The nervous system evolves to consist of longitudinal nerve cords, with peripheral nerves connecting to sensory cells, and at one end a "brain," as for instance in the two joined cephalic ganglia in *Planaria.* There does appear to be present felt experience, though such mental states are simple (Tye 1997). There are endorphins (natural opiates) in earthworms, which indicates both that they suffer and that they are naturally provided with pain buffers (Alumets *et al.* 1979). So nerve cells appear and radically elaborate capacities across evolutionary history.

There is a sense, however, in which tracing this as incremental elaboration obscures the radical, startling innovation of organisms with felt experience (subjects) in what were before living organisms devoid of such felt experience (objects). The evolutionary account can seem to deliver felt experience bit by bit, rather than swiftly, but it is also true that felt experience appears where absolutely none was before. Incremental qualities joined and rejoined are also re-formed and transformed into novel qualities. One gets, at length, pleasure and pain by organizing millions of unfeeling atoms.

Slowing things down and putting together molecular parts does not really alleviate the lack of theory explaining how inwardness comes out of outwardness. It only spreads the inexplicable element thinly, rather than asking us to swallow it in one lump. No doubt there was an evolutionary genesis of neurally based mind, capable of conscious pleasures and pains. But we have no logic by which one derives biological conclusions out of physical premises, and, taking these as premises in turn, one then derives psychological conclusions.

The molecular accounts of ionic currents and chemistries in neurons describe the technical conditions necessary for the production of subjective experience, with no

account of the necessary or intelligible derivation of what emerges. "Nobody has the slightest idea how anything material could be conscious. Nobody even knows what it would be like to have the slightest idea about how anything material could be conscious" (Fodor 1992: 5).

Goodenough is agnostic about whether non-neural organisms can be said to "experience" suffering, though fairly confident that they "suffer," since they have her "awareness." She is not willing to "set the bar at having a nervous system" since the wounded plant "pays the suffering price, but does not feel the price," leaving us back at her puzzle of unfelt suffering. Perhaps her main point is that we hardly know what to think, and, put that way, she does have a point. It is difficult to extrapolate to animal levels and make judgments about the extent of their suffering.

A safe generalization is that pain becomes less intense as we go down the phylogenetic spectrum, and is often not as acute in the non-human as in the human worlds (Eisemann *et al.* 1984). The main evidence for this is their simpler neurology and absence of pain-like behavior – as in the case that Goodenough cites of insects continuing to eat while they are themselves being eaten.

Pain in evolutionary and cultural history

Each seeming advance – from plants to animals, from instinct to learning, from sentience to self-awareness, from nature to culture – steps up the pain. Earthen natural history might almost be called the evolution of suffering. But it would be equally plausible to call it the evolution of caring. Pain is both experientially and logically in counterpoint to pleasure, but Goodenough tends to let the evolution of pleasure lie in the background of her account.

Another generalization from both evolutionary and cultural history is that all advances come in contexts of problem solving, with a central problem in sentient life the prospect of hurt. In the evolution of caring, the organism is quickened to its needs. The body can better defend itself by evolving a neural alarm system. There are logical and empirical connections between the heroic and the harsh elements in life.

An organism can have needs, which is not possible in inert physical nature, a feature simultaneously of its pro-life program and of the requirement that it overtake materials and energy. 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, arriving with neuronal perception, brings the capacity to move about deliberately in the world, and also to get hurt by it. Some insects might have sense organs – sight or hearing - without any capacity to be pained by them. But sentience is not invented to permit mere observation of the world. It rather evolves to awaken some concern for it. In developing animal life, sentience with its counterpart, suffering, is an incipient form of love and freedom – to risk again stretching some terms. 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. The earthen story is not merely of goings on, but of "going concerns."

Pain is an energizing force, as much as it is disequilibrating. Suffering not only goes back-to-back with caring sentience, it drives life toward pleasurable fulfillment. Not only does the good presuppose concomitant evil, but the evil is enlisted in the service of the good. We come up in the world against suffering, but we could not come up in the world any other way. This truth is both paradoxical and partial, but nevertheless it penetrates into the essence of pain. Individually, one wants to be rid of pain, and yet pain's threat is self-organizing. It forces alarm, action, rest, withdrawal. It immobilizes for healing.

Early and provident fear moves half the world. Suffering, far more than theory, principle, or faith, moves us to action. We should not posit the half-truth for the whole; we are drawn by affections quite as much as pushed by fears. These work in tandem reinforcement; one passes over into the other and is often its obverse. In this sense, pain is a pro-life force. Not all suffering is thrust upon us from without; much of it comes from internal collapse, as with the pains of failing life in age or cancer. Even here, the body typically does things that make sense in fighting the collapse, postponing the end, although death is inevitable. The death of individuals is superseded by what this makes possible, new exploratory forms, mutant beings, which will be selected for their better adaptedness to the problems that beset their progenitors. Where pain fits into evolutionary theory, it must have, on statistical average, high survival value, with this selected for.

There is "social suffering" (in Goodenough's term) as when one is ostracized, or loses a job. This, like physical suffering, can be adaptive. The ostracized may reform and become more cooperative; those who seek and find work support both themselves and their societies. A frequent distinction here distinguishes between pain and affliction. Animals can endure pain, but not affliction, since the latter requires reflective capacities about being wronged, mistreated, unlucky, pensive about "nature, red in tooth and claw," and so on. In humans the relationship between bodily wounding or deprivation and pain is quite complex, involving cognitive factors such as cultural conditioning and psychological evaluation of the situation. In psychological experience, there can be no will without a testing of will. There can be no compassion without pain.

Such benefits are the biological and psychological purpose of pain, even though there is an overshooting of this in cases where pain is of no benefit to, and even crazes, particular sufferers. Such dysfunctional pain Goodenough calls "chronic pain." Here suffering has "gone awry" and is not correcting anything gone wrong. All that she has to say about counterproductive suffering is that those in such chronic suffering, physical or social, may take some solace in that their suffering is not "their fault." Of course, only humans have such reflective capacities. It should be possible here to inquire further whether selection for adapted fit might trim such counterproductive pain back toward productive levels. If the pain is not serving any adaptive function on average, it will not be selected for. If it results in reduced reproduction, it will be selected against.

This increase of suffering can be put bleakly. Each organism is doomed to eat or be eaten, to stake out what living it can, competing with others. Perhaps there is

more efficiency than waste, more fecundity than indifference, but each organism is ringed about with competitors and limits, forced to do or die. Each is set as much against the world as supported within it. But, seen more systemically, the context of creativity logically and empirically requires this context of conflict and resolution. The system, from the perspective of the individual, is built on competition and premature death. The generating and testing of selves by conflict and resolution is prolific, filling up habitats with better adapted fits. Organisms occupy niches providing life support, in an ecology of inter-dependent, mutually supporting species.

Suffering and creativity

The result of such struggle is cybernetic creativity. In what he calls a "twenty-first century view of evolution," James A. Shapiro concludes: "Thus, just as the genome has come to be seen as a highly sophisticated information storage system, its evolution has become a matter of highly sophisticated information processing" (Shapiro 1998: 10, 2005). The genome, a reservoir of previously discovered genetic know-how, is both conserving this and constantly generating further variations (new alleles), tested in the life of the organism (the phenotype). The better adapted (better informed) variants produce more descendants. What is novel on Earth is this explosive power to generate vital information. In this sense, biology radically transcends physics and chemistry.

The emergence of neural networks deepens the cybernetic dimensions of life. A neuron is functionally "for" information detection and transfer. Advancing neural development makes possible acquired learning, discovering information and storing it for future use in the lifetime of the individual. Behavior is more labile, less stereotyped. Increased capacities to suffer are concomitant with, and perhaps inseparable from, increased powers of cognition – broadly speaking. This means humans can suffer more than birds, and birds more than ants, made possible by increasing neuronal capacities. Within species, however, this need not mean that Einstein suffers more than the village idiot.

Although, realizing this, the cybernetic dimension of life helps to correct an over-emphasis on the accidental, the wandering in evolutionary development, this account can be misleading if it leads to an over-emphasis on the computational. An organism is not hardware, not software, but "wetware," struggling to survive and to maintain its kind. No computers reproduce themselves by passing a single set of minute coding sequences from one generation of computers to the next, like sperm and egg, with the next generation of computers self-organizing from this single transferred information set. Storing, retrieving, and using information are certainly important. But cognitive processors as such do not suffer; they do not grow hungry, fear pain, risk their lives caring for a next generation of young, or seek to avoid death. This is an agentive, emotive, affective cybernetics of historically developing, storied life.

An environment entirely hostile would slay life; life could never have appeared within it. An environment entirely irenic would stagnate life; advanced life, including human life, could never have appeared there either. Oppositional nature is the first half of the truth; the second is that none of life's explosive advance is possible

without this dialectical stress. Muscles, teeth, eyes, ears, noses, fins, legs, wings, scales, hair, hands, brains – all these, and almost everything else, come out of the need to make a way through a world that mixes environmental resistance with environmental conductance.

Mobility is inseparably related to predation. We admire the muscle and power, the sentience and skills that could only have evolved in predation. Autotrophs synthesize their own food; heterotrophs eat something else. Could we have had a world with only flora, no fauna? Possibly not, since in a world in which things are assembled, something has to disassemble them for recycling. A photosynthetic world would be a largely immobile world. Some species must sit around and soak up sunlight; other species will capture this value to fuel mobility. Still other species will rise higher on the trophic pyramid, funded by capturing resources from below for greater achievements in sentience, cognition, and mobility.

No-one thinks that a merely floral world would be of more value than a world with fauna also. In a floral world, there would be no-one to think. Heterotrophs must be built on autotrophs, and no autotrophs are sentient or cerebral. Could there have been only plant-eating fauna, only grazers, no predators? Possibly, though probably there never was such a world, 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.

Nor are all benefits to the predators. The individual prey, eaten, loses all; but the species may gain as the population is regulated, as selection for better skills at avoiding predation takes place, and the prey not less than the predator will gain in sentience, mobility, cognitive and perceptual powers. Being eaten is not always a bad thing, even from the perspective of the prey species. The predator depends on a continuing prey population; they have entwined destinies.

Goodenough concludes: "Suffering is part of the package, the price paid for the gift of being alive at all." I agree. A world without blood would be poorer, but a world without bloodshed would be poorer too. There would be no lions. "The young lions roar for their prey, seeking their food from God" (Psalm 104: 18-24). Also, it would be a world without humans – not that humans cannot now be vegetarians, but that the evolution of humans would never have taken place. The experiences of need, want, calamity, and fulfillment have driven the natural and cultural evolution of the ability to think.

Culture is a foil to the hostility of nature, though it is also a product of evolutionary inventiveness and requires ecological support. Within culture, the creative advances come when humans, facing difficulty, are roused to some unprecedented effort. Arnold Toynbee expressed this in the "challenge-and-response" formula, finding it characterizing the emergence of every great world culture (Toynbee 1935: 271ff). In the Hegelian dialectic, this is thesis, antithesis, synthesis. The major advances in civilization are processes that have often wrecked the societies in which they occurred. In cultures, only those that can respond when challenged, re-emerging from disasters, continue to shape the course of world history.

Cruciform nature

There was naiveté in the divine-blueprint model that was so upset by Darwin's discovery of nature red in tooth and claw. At the start-up creation, the Big Bang, fine-tuning does seem appropriate, as claimed by those cosmologists advocating the anthropic principle. But for genesis on Earth, this was a bad religious model, really, as well as a non-scientific one. In the Genesis stories, God brings forth Earth from a formless void, separates waters and land, and then says: "Let the earth bring forth living creatures according to their kinds" (Genesis 1: 24). God watches this happen and, as swarms of creatures come forth, sees that it is good. "The earth produces of itself (Greek: *automatically)*" (Luke 4: 28). There is spontaneous self-creation. Earth speciates.

The blueprint model knew nothing of the constructive uses of suffering in such speciation. It knew nothing of the wisdom of conflict. 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. Life needs death, if there is to be more life. Anything that would give the individual organism immortality would destroy the evolution of species. The evolutionary process seems to thrive on the struggles for fitness that slay all the successive individuals.

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" (Genesis 32: 22-32). Jacob limps physically, and this is taken up symbolically in his struggles with God. The divine son takes up and is broken on a cross, "a man of sorrows and acquainted with grief" (Isaiah 53: 3).

Biblical writers rejoice in nature; they also speak of nature laboring in travail. Paul speaks of how "the whole creation has been groaning in travail together until now" (Romans 8: 22). The root metaphor is "birthing," seen also in the Latin root for "nature:" natans, going back to the Greek. "Groaning in travail" is in the nature of things from time immemorial. Such travail is the Creator's will, productive as it is of glory.

The individual organism, self-actualizing as it is, is a player in a bigger drama that is going on, so to speak, "over its head," or that is "bigger than itself." The uniqueness of any particular genetic make-up 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 myriad other lives that ensue in that species lineage. Every species 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. Something is always dying, and something is always living on. True, the co-actors are not so much cooperators as they are enmeshed in a series of checks and balances, controls, feed loops, and feedback loops; but, equally true, just this system is the vital context of all life. Individuals are "emptied into," given over to, "devoted" to, or "sacrificed" for these others in their community. Fitness is dying to self, sending newness of life to a generation to come (Rolston 2001).

But, it will be objected, there is little or nothing voluntary in these animal and plant behaviors. 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." Freedom is within a historical and environmental necessity. Persons, like other creatures, find themselves amidst their particulars in time and space, a setting within which they must work. Any blending of option, openness, indeterminacy, contingency, with inevitability, determinism, controls, 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 to desire instinctively 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 wild organism has the power reflectively to consider voluntary self-limitation on behalf of others as one of its options. Biologists find, at most, only glimmerings of sympathy in primates (de Waal 1996: 40-88). That level of choice appears only with humans, whatever the precursors out of which it emerged. Even humans 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.

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. 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. One needs also the sign of the Logos, of intelligibility and order. In nature, there is first simply formation, and afterward information. Only still later does nature become cruciform. But the story does develop so, at least on this Earth. 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. The drama is Logos and Story, Cross and Glory. The way of history, too, like that of nature, only more so, is a *via dolorosa.* In the cruciform model, the evils both in spontaneous

nature and in history, symbolized as death, are transformed and reinforce a larger pattern, symbolized under the themes of resurrected life. "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). In that sense, the aura of the cross is cast backward across the whole global story, and it forever outlines the future (Rolston 2006: 286-93).

"I believe in Christ in every man who dies to contribute to a life beyond his life," confessed Loren Eiseley (1962: 46). But that theme, willingly or unwillingly, is everywhere in the plot; it is the alpha and omega, prefigured in nature and essential to history. All the creatures are forever being sacrificed to contribute to lives beyond their own, like the lamb slain from the foundation of the world. Blessedness is success on the far side of sorrow. 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. All world progress and developing history is ultimately brought under the shadow of a cross. 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.

Life is suffering, but life is suffering through to something higher. Life is unsatisfactory, as it is also satisfying, for the dissatisfactions drive the creative process, discovering new satisfactions. The grass, the flower of the field, is clothed with beauty today and gone tomorrow, cast into the fire. The sparrow is busy about her nest, sings, and falls. Jesus knew these things, and noticed in the same breath that trouble enough comes with each new day (Matthew 6: 25-34). Tribulations come as surely as does the Kingdom. The hard, straitened way leads to life. But day by day we press forward in trials, in the will that this pageant continue. We believe that we could not have come this far and would not have the strength to struggle on were it not for some power greater than ourselves at work in nature and history. Earth is a providing ground. Some providential power (and can it be merely a naturalistic one?) guarantees that the story continues across all its actors. In this perspective, regenerative suffering makes history. Tragic beauty is the law of the narrative.

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Further reading

Willem B. Drees, *Is Nature Ever Evil? Religion, Science, and Value* (Routledge, 2003): three dozen contributors use both science and religion to examine the value structure of the natural world, its order, goodness, beauty, life, and its harshness, disorder, death, and indifference. Austin Farrer, in *Love Almighty and Ills Unlimited* (Doubleday, 1961) concludes: "The more we love, the more we feel the evils besetting or corrupting the object of our love. But the more we feel the force of the besetting harms, the more certain we are of the value residing in what they attack; and in resisting them are identified with the action of God, whose mercy is over all flesh" (pp. 164-65). Arthur R. Peacocke, "The Challenge and Stimulus of the Epic of Evolution to Theology," in *Many Worlds*, Steven Dick (ed.) Templeton Foundation Press, 2000) describes a structural logic about creatures inevitably dying and preying on each other. We cannot conceive of any other way by which the immense variety of biodiverse organisms might have appeared. But the appearance of humans and their distinctive search for meaning raises questions the biological sciences cannot answer (pp. 89-117). For Peacocke, "The Cost of New Life," in *The Work of Love: Creation as Kenosis*, John Polkinghorne (ed.) (Eerdmans, 2001), the insight that God's relation to the world is self-offering and self-limiting can be illuminated by evolutionary history. There is continuous emergence of new and more complex life, and this inevitably involves an increase in capacities to suffer. My "Does Nature Need to be Redeemed?" *Zygon: Journal of Religion and Science 29* (1994): 205-29 answers "no," although theologians have traditionally been confused about this, thinking nature as well as humans to be "fallen." See also Rolston (2006) *Science and Religion: A Critical Survey* (cited above), especially xxxix-xliii, 133-46, 286-93 on suffering and cruciform naturalism. Gloria L. Schaab's *The Creative Suffering of the Triune God: An Evolutionary Theology* (Oxford University Press, 2007) considers the positions of prominent theologians, but focuses on Arthur R. Peacocke. The freedom, autonomy, and self-creativity of evolving life can be integrated with their constant pain, suffering, and death. The triune God can be seen to suffer in, with, and under the creative processes of natural history. For Christopher Southgate, *The Groaning of Creation: God, Evolution, and the Problem of Evil* (Westminster John Knox, 2008), pain, suffering, death, and extinction are intrinsic to the evolutionary process. The world is "very good" and also "groaning in travail;" the living creatures subjected by God to that travail are seen as essential to their creation.