GOD AND EVOLUTIONARY EVIL: THEODICY IN THE LIGHT OF DARWINISM

by Christopher Southgate

Abstract. Pain, suffering, death, and extinction have been intrinsic to the process of evolution by natural selection. This leads to a real problem of evolutionary theodicy, little addressed up to now in Christian theologies of creation. The problem has ontological, teleological, and soteriological aspects. The recent literature contains efforts to dismiss, disregard, or reframe the problem. The radical proposal that God has no long-term goals for creation, but merely keeps company with its unfolding, is one way forward. An alternative strategy to tackle the problem of evolutionary theodicy is outlined, with an implication for environmental ethics and suggestions for further work.

Keywords: co-creators; creation; evolution; extinction; intrinsic value; natural selection; process theology; Sabbath; soteriology; status of humanity; teleology; theodicy; theology of eschatology.

In a review article that appeared in 1992 in *Nature*, a scientific journal not currently famous for its enthusiasm for theology, the biologist David Hull posed the following challenge:

> What kind of God can one infer from the sort of phenomena epitomised by the species on Darwin's Galapagos Islands? The evolutionary process is rife with happenstance, contingency, incredible waste, death, pain and horror. . . . Whatever the God implied by evolutionary theory and the data of natural selection may be like, he is not the Protestant God of waste not, want not. He is also not the loving God who cares about his productions. He is not even the awful God pictured in

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the Book of Job. The God of the Galapagos is careless, wasteful, indifferent, almost diabolical. He is certainly not the sort of God to whom anyone would be inclined to pray. (Hull 1992, 486)

These remarks reveal two important factors in the conversation between evolutionary biology and theology. First, a polemicism often creeps into the conversation that interferes with there being any way forward at all.[1] Second, behind the polemic is a real challenge posed to Christian theodicy by the narrative of Darwinism, not a new challenge but one urgently in need of work.

I begin by distinguishing the "charges" that Hull lists: happenstance, contingency, incredible waste, death, pain, and horror. These fall into different categories in terms of our analysis.

Mention of *happenstance* and *contingency* is interesting in the context of theodicy. It could be taken in two ways. It might imply that a God who allows an element of chance within creation would not know the sorts of phenomena to which such evolution might give rise. Such a-gnosis in God, however, is outside the normal range of theologizing about creation. We can easily concede Hull's point that such a God might not be worthy of worship. But suppose God did indeed intend the sort of evolving biosphere that science now describes. Many of those working at the interface of science and theology have emphasized that such a world seems necessarily to involve (on our current understanding of the universe) the creation's unfolding according to the interplay of chance and physical law. Happenstance and contingency are ingredients in the costs to creatures of the processes of evolution by natural selection, but they are not those costs themselves.[2]

Horror is part of some human beings' reaction to the process but is not part of the process itself. Although certain evolutionary strategies such as parasitism and infanticide arouse a negative aesthetic response in us, I doubt whether this constitutes an extra category of concern to the theodicist beyond those of pain and death—especially given the very particular and limited nature of our aesthetic perspectives.

Pain is experienced by individual organisms possessed of more than minimal sentience, if they are exposed to parasitism or predation (and perhaps even more so if they die of disease). Sentience, which I take to be the possession of specialized systems for registering and responding to stimuli (especially through the presence of a central nervous system), clearly enables an organism to suffer, to some greater or lesser extent. Indeed, we may reasonably set the degree of moral consideration that sentient creatures receive in terms of the sophistication of their mechanisms for perceiving threats to their well-being. A sea lion tossed into the air by orcas[3] or a deer cornered by wolves experiences more than a squid stalked by a fish.

Arthur Peacocke's point—that pain is a necessary concomitant of a richer experience of the world in higher animals (Peacocke 1998, 366–67)—is well taken. There has to be pain if there are to be higher organisms with sophisticated processing of their environment—there has to be all the suffering that goes with predation if there are to be lions. Pain and suffering can, moreover, be seen as part of the way the evolutionary process optimizes the fitness of organisms and the fitness of ecosystems (so Holmes Rolston III). In a carefully argued piece, Thomas F. Tracy has endeavored to show that it is unhelpful to speak of this suffering's being "pointless" or even "gratuitous" (Tracy 1998, 526–30).

However, just as some human beings never seem to have any opportunity for fullness of life, so the experience of many individual animals, such as the newborn impala torn apart alive by hyena, seems to be all pain and no richness. There are innumerable sufferers of the processes of predation and parasitism, including organisms for which life seems to contain no fullness, no expression of what it is to reach the potential inherent in being that creature. Indeed the "overproduction" typical of biological organisms virtually guarantees this. These organisms may be regarded as in some sense the victims or casualties of evolution. Jay McDaniel writes eloquently of the "insurance chick" hatched by many birds of prey, which if the elder chick survives is almost always killed by starvation or fratricide and is "just" there to try to guarantee that some progeny will survive from that mating (McDaniel 1989—see what follows).[4] It may be argued that the pain involved in predation is an integral part of the exchange of value between organisms and, hence, of the way the biological system gains value overall. Indeed, Rolston has shown that being the locus for the exchange of value is the respect in which an ecosystem may itself be considered of value (Rolston 1988). But (contrary to the remarks of Rolston in a recent conference paper [Rolston 2000]) the *regeneration* of life out of the suffering of other life does not of itself "redeem" the suffering experienced by individuals, be they dying sea lions or lame cheetahs succumbing slowly to hunger. Regeneration does not comprehend all that is connoted by the word *redemption*, and the suffering of individual organisms, even it promotes the flourishing of others, must still remain a challenge for theodicy.

Death is a thermodynamic necessity. It would be impossible to imagine biological life without it. It is also the prerequisite of "regeneration" (Rolston) and of "biological creativity" (Peacocke 1998, 369; Edwards 1999, 38–39). However, it deprives the individual organism, and the ecosystem of which it is a part, of that organism's particular intrinsic value.

Granted, in the case of very many organisms there is little or nothing distinctive or individual about the experience of that life other than (a) (possibly) a particular evolutionary strategy, such as toxin resistance, which if valuable in that context will tend to be passed on and reproduced in other generations and (b) (presumably) the particularity of that organism's

relationship with God. It seems reasonable to suppose that God knows each living entity, however primitive, in and of itself. Equally, however, it may reasonably be supposed that that relationship can never be wholly lost, because God will presumably never forget that to which God has related (so Haught 2000). Thus, for many organisms all that is of value in one generation is retained in the next generation and in the mind of God.

Higher organisms, however, develop an individuality of lived experience that is not transmitted in their genes or, necessarily, in the learned behavior of progeny—death is a loss of that, both to the individual itself where there is any self-consciousness, and to those to whom the individual relates, especially the kinship group. I return below to the question of whether it is enough that God remembers this experience.

What of *incredible waste*? Need we consider the processes of prebiotic cosmic development that result in destruction and "discarding," the "waste," as it might be said, of all sorts of entities other than life forms, from stars that become supernovae to terrestrial mountains that erode away to hummocks? Here I draw again on Rolston's analysis of value in his *Environmental Ethics* (1988). He makes a convincing case for intrinsic value's inhering in every *living* thing, on the grounds that every organism is an entity that experiences and processes its environment (in however primitive a way) in order to live and reproduce. This is a distinctive property of life and a distinctive locus of value. Theologically, one may recall the phrase from the Niceno-Constantinopolitan Creed that describes the Holy Spirit as "the Lord, the giver of life."[5] Life is a very particular gift of God in creation—the experience of every life form must therefore be part of our consideration of the costs of that creation. The star that must "die" in order that heavy elements may form in its supernova has no "experience" of a parallel sort. So our consideration must be of the "waste" of living things. I touched earlier on the pain, suffering, and lack of fulfillment associated with the overproduction typical of most organisms, but there is a further important element in apparent waste: the extinction of so many millions of species, each of which was an attempt on the part of the evolutionary process to establish a particular niche and many of which (like the dinosaurs) *had* to die out for mammals to flourish. The concept of waste is not perhaps the most appropriate one, in that this seems suggestive of creatures' being made to be thrown away rather than of a creative process with concomitant casualties. There is moreover a sense, as Rolston and others have emphasized, in which nothing in the biosphere is ever wholly wasted, because the free-energy content of one organism is at least partially recycled in the content of others. Extinction, however, must be conceded to be an evil for any species and always to be a loss of value to the biosphere as a whole. A whole strategy of being alive on the planet, a whole quality of living experience, is lost when any organism becomes extinct.

The Problem of Evolutionary Theodicy

There is, then, a problem of evolutionary theodicy, associated with the pain, suffering, and death of nonhuman creatures and the extinction of species, which the rest of this paper explores. I should make clear (following the categories of Terence W. Tilley) that this will be an exploration of the goodness of God in the light of the evils of the world rather than an effort to defend the likely existence of God despite those evils (cf. Tilley 1991). Written from a Christian perspective, it will be an enquiry into Christian theodicy, aimed at giving a coherent account of how God might still be accounted good as the creator, sustainer, and redeemer of such a world.

The problem of nonhuman suffering already taxes Aquinas. He writes: "Since God, then, provides universally for all being, it belongs to His providence to permit certain defects in particular effects, that the perfect good of the universe may not be hindered, for if all evil were prevented, much good would be absent from the universe. A lion would cease to live, if there were no slaying of animals; and there would be no patience of martyrs if there were no tyrannical persecutions" (Aquinas 1947, pt1.Q.xxii. art.2).

For Thomas, then, the goodness of the world is axiomatic, and necessary evils must be seen in that larger context. Consciousness since Darwin—and Dostoevsky—is less easy with these evils. Hull's charge stings: is the creator of such a world (as we now understand it to be) worthy of worship? And though his remarks could as easily have been written in 1862 as 1992, there has been surprisingly little theological response to the problem. Partly this reflects the profound anthropocentricity that so many ecological writers have noted in Christianity. Theodicy has been a human-focused science. Little attention has been given to the sufferings of the nonhuman world. But in the context of a Darwinian understanding that pain, suffering, death, and extinction are intrinsic to the life process, and to the evolutionary history that has led to the arising of human beings, the challenge to the contemporary theodicist cannot be escaped. A passage from Keith Ward illustrates the point:

> Taking natural selection alone, it seems to me highly unlikely that rational beings should ever come to exist in a universe like this. . . . To make it likely that rational beings should emerge, there would have to be some weighting of the probabilities of events occurring which would make the emergence of rationality inevitable, sooner or later. . . . I regard evolution by natural selection as a much more insecure and precarious process than seems compatible with the theistic idea of a goal-directed process . . . a continuing causal activity of God seems the best explanation of the progress towards greater consciousness and intentionality that one sees in the actual course of evolution of life on earth. (Ward 1996, 77–78).

The first problem with this view is the implication that the probability of the arising of freely choosing self-conscious beings[6] is known. The evolutionary "experiment" has run only once (to our knowledge), and there is

deep disagreement—perhaps insoluble disagreement—as to what the result would be of running it again (cf. Gould 1991; Conway Morris 1998; Peacocke 1998, 364–68). Ward has forced the science and then imposed his own particular theological solution upon it. The second great problem is the one that chiefly concerns us here. If Ward's God *guarantees* the success of the project of creating humanlike creatures via the evolutionary process, and that process *necessarily* involves—one might almost say thrives on—pain, suffering, death, and extinction, Hull's charge that this is not a God who is an appropriate object of worship begins to look formidable.

The problem of evolutionary theodicy has three main aspects: ontological, teleological, and soteriological.

At the level of *ontology*, the fact of God's giving existence to a world containing nonhuman suffering, death, and extinction extends the theological problem posed by human suffering.

The problem of God's responsibility for a world that contains so much creaturely suffering, death, and extinction is intensified in any scheme that imputes *teleology* to this process of divine creation, in the sense of God's desiring certain values to arise through the process. Gottfried Wilhelm von Leibniz's famous phrase that this is the "best of all possible worlds" begs in this connection the question, best for what? I freely concede that this may be the best possible world for the evolution of living things such as ourselves, yet the question remains of whether the creation of such a world is the activity of a good God. If, for example, God particularly desired the outcome that there be freely choosing self-conscious beings able to come into conscious reciprocal relationship with God (as Ward implies), other creatures, for example those whose extinction made possible the rise of the mammals, begin to seem no more than means to the divine end.

If some scheme of redemption of nonhuman species is used to compensate for these difficulties, there is work to do at the level of *soteriology*, because traditional Christian redemption theory has focused on an event in the history of humanity—a particular crucifixion of a particular member of a historically contingent species, lately arrived after 3.8 billion years of evolution had already passed by. What place, it must be asked, does this view of redemption have when our focus widens to embrace the whole of evolutionary history?

Some Responses to the Problem of Evolutionary Theodicy

Thinkers propose different rationales in their response to the problem.

The Problem Dismissed. The first recourse thinkers attempt is to pretend that the problem does not exist. They dismiss it, claiming that suffering, pain, waste, and extinction in the nonhuman world are just facts

of nature—they have no moral content, and we should not project on them moral categories, which properly belong only to the sphere of human beings (so, for example, Miller 1999). This is a most curious position. The facts Hull cites—about overproduction, competition, pain, and extinction in nature—cannot be challenged, even if it is conceded that the rhetoric of Darwinism has tended to emphasize these at the expense of cooperation and interdependence. To the question, Why is the nonhuman world of value? the normal Christian response would be: Because God created it and pronounced it good, because God continues to hold it in existence from moment to moment and to nurture it with the divine love. Therefore, the charge that God has no care for the sufferings of those creatures must be a problem for Christian theology, even though no human beings are directly involved in the transaction. The problem of "evolutionary evil" (a term I use not to imply that there is some malefic force operating within the evolutionary process but to serve as a parallel to the usual theodicist's categories of moral evil and physical evil[7]) is not dispelled by trying to exclude it from human consideration.

The Problem Disregarded. The second approach to evolutionary evil has been to disregard it as a major factor in the theology of creation. This is effectively the approach of Ward in *God, Chance and Necessity* (1996). His stress is on the precariousness of the evolutionary process and therefore on the need for God to prod and tweak the process to make it realize those values that were the divine goal in creation. No account is taken of the cost.[8] Likewise there is no sense in John Polkinghorne's writing of any developed theodicy of evolutionary evil. In his *Science and Providence* he outlines his "free-process" defense (Polkinghorne 1989, 66–67). In this he extends the free-will defense of the existence of moral evil to a defense of physical evil. But the sufferings of the nonhuman creation are only glancingly addressed:

> In his great act of creation I believe that God allows the physical world to be itself . . . the exploration of possibility by chance will lead not only to the evolution of systems of increasing complexity, but also to the evolution of systems imperfectly formed and malfunctioning. . . . God no more expressly wills the growth of a cancer than he expressly wills the act of a murderer, but he allows both to happen. He is not the puppetmaster of either men or matter. (Polkinghorne 1989, 66–67)

Although cancer occurs in animals as well as human beings (and may indeed be regarded as a perfectly natural manifestation of the evolutionary process and so not a "malfunction" at all), this passage does suggest that Polkinghorne's focus is very much on the impact of physical evil on human beings.

The Problem Reframed. A third approach, particularly important in two recent books that take the problem of evil very seriously indeed, is to

reframe the problem by altering the doctrine of God in such a way as to draw the sting of evolutionary evil but to move entirely away from the mainstream of Judaeo-Christian discourse about God and the world. The first of these books is the Jewish philosopher Hans Jonas's posthumously published collection of essays *Mortality and Morality* (1996). Jonas, whose own mother died in a concentration camp, is particularly sensitive to the stricture that we should not say anything at all about God today that we would not be willing to repeat in the presence of the children of Auschwitz. Although this point has already been well taken—perhaps particularly well by Kenneth Surin in his impressive *Theology and the Problem of Evil* (1986)—it bears restating and restating. The model of God to which Jonas is driven is an extreme one, however: his God self-empties of mind and power in giving the creation its existence and then allows the interplay of chance and natural law to take its course. God's only further involvement is to hold a memory of the experience of the creation—God receives being back "transfigured or possibly disfigured by the chance harvest of unforeseeable temporal experience" (Jonas 1996, 125). However authentically held, this position is a form of "sub-deism" (to borrow a term of Clare Palmer's), not a basis for a Christian theology of creation and involvement with the cosmos. Jonas's God is "not the sort of God to whom anyone would be inclined to pray" (Hull 1992, 486).

The other recent account that creatively reframes the problem of evolutionary evil but may be thought to concede ground unconcedable within Christian thought is Ruth Page's *God and the Web of Creation* (1996). This important book has had too little attention. It takes on board the problem as posed by Hull and genuinely attempts a theological solution. Page writes:

> I cannot imagine a God responsible for natural evil any more than one responsible for moral evil. . . . To those who wish to affirm full-blooded . . . [divine] making and doing, [my] version will appear anaemic. But the consequences of belief in a more virile God, who has to be responsible for the removal of around 98% of all species ever, but who fails to do anything in millions of cases of acute suffering in nature and humanity, are scarcely to be borne. (1996, 104)

The problems of theodicy associated with any long-term teleological scheme are, for Page, "scarcely to be borne." Like Jonas she emphasizes that God "lets the world be"—drawing here on the Heideggerian term *Gelassenheit*. God creates possibilities and lets them unfold. Thus far this is a clear picture and one to which no metaphysically aware scientist could object. But this is the picture for which Palmer in her review of Page's book coined that term *sub-deism* (Palmer 1997). *Gelassenheit* of itself does not do justice to the Christian vision of the God involved in the world. Page is well aware of this, and she therefore also invokes a category of divine involvement that she calls *Mitsein*, God's companioning of the world at every stage and locus. I do not believe this view to be entirely consistent in Page, because sometimes she speaks of *Mitsein* as a nonjudging mainte-

nance of relationship, and sometimes she uses a more familiar terminology very akin to process thought, as in her talk of "a God always present everywhere, offering both reproach and encouragement, and above all saving, forgiving, companionship" (Page 1996, 43–44). Divine reproach and encouragement sound very like the steering of the cosmos to me.[9] However, Page's central point is that her divine companioning is "teleology now"—it is all for the benefit of the entity concerned and does not use that entity as a means to an end.

It may be doubted whether this altogether relieves the theodicist's burden. After all, God is still responsible for the ontological aspect of the problem—for the existence of the world in which the suffering takes place. Moreover, all life, from its most primitive, is characterized by differential selection of self-replicators—and only very primitive ecosystems, lacking all sentience, involve no significant cost to organisms in terms of pain, suffering, and extinction. Page might argue that life itself, life lived in companionship with God, is worth the sufferings intrinsic to its development. Her approach does go a great way to address the teleological problem—God's using pain, suffering, death, and extinction to realize other ends—a problem seemingly ignored by such schemes as Ward's.

As with process-theological schemes, however, the strength of Page's proposal is also its weakness: the world has been distanced a vast way from being in any direct sense God's creation. Nor is it clear why such a merely companioning God should be the object of worship or the recipient of prayer.

The Problem Addressed—Some Recent Attempts. I pass to the last strategy for addressing this great problem of evolutionary theodicy, which is to tackle it head-on. Tracy attempts this, taking the problem very seriously and making a careful analysis (Tracy 1998). Tracy even uses the phrase "evolutionary evils," though without making the distinction from other "natural evils" (those befalling human beings) that I have made here. His approach is effectively to extend the "free-process" defense to cover the whole nonhuman world. There are hints of this also in Polkinghorne. In effect Tracy's position is that suffering, pain, and death are the price of sentience, and sentience is worth the price (this is also in effect the position of Patricia Williams [2001]).

The free-process defense cannot be used in its usual sense, that of the suffering-inducing operation of the natural world's being necessary to the free choice of creatures, since, as Niels Gregersen writes, "What can possibly be the benefit of freedom for nonhuman creatures if they can never be in a position to accept or reject the offer of divine love, because they don't know what it means?" (1999, 133) Tracy wants to make a slightly different case. Conceding that nonhuman creatures do not have the possibility of freely chosen personal relation to God, he affirms that they have their

own experience and express their own capacity for life in their own particular way. Pain and suffering are part of the system that makes this possible.

This bold extension of the free-will defense into the arena of natural process and nonhuman experience falls short, because the free-will defense, even as normally deployed in regard to moral evil, does not succeed of itself. The weight of innocent human suffering, the abundance of situations in which humans are deprived of their free will—these corrode the straightforward defense. It is not sustainable except in combination with a theory of secondary goods, an eschatological perspective that, while not devaluing the present, emphasizes that the sufferings of this world are indeed as nothing compared with the glory about to be revealed to us (Romans 8:18). Likewise, because intrinsic to evolutionary creation are casualties for which there is only pain and no expression of their experience, Tracy's defense fails unless there is some ultimate good that will actually *redeem* the individuals and extinct species concerned, not just other individuals and species that benefit from their suffering and extinction. I shall return to this point.

Tracy's proposal might succeed if, instead of altering radically our doctrine of God, we were to alter radically our doctrine of the cosmos by adopting a panexperiential metaphysic of the sort developed by process thinkers. If something akin to human experience and subjectivity is present throughout the creation, perhaps the free-will defense can be extended after all. So, on a process model God lures the creation toward harmony and fulfillment, but the entities of the world have a form of free will; and as they seek to express their self-interest their efforts often run counter to harmony, generating the dialectic of complexification and natural selection we so struggle to interpret. I am profoundly uneasy with this solution, from the point of view of both our understanding of the world and our model of God. Panexperientialism, held in anything more than a *very* limited sense, certainly held in a strong enough sense to function in an evolutionary theodicy, pulls us away from the narrative of nature offered by science and back toward the territory of a sort of crypto-vitalism. It relies on according even relatively simple entities in nature a whole series of properties that are like material properties, except that science cannot detect them. This is the sort of move that theology should make only in desperation, and, hard though this problem is, we are not quite yet at that pass.

Moreover, natural selection, if not quite possessing the character of a physical law, is at least a fundamental property of biological systems. It seems to be an integral part of the process by which adaptive characters and biological complexity arise, so it would be very curious to invoke it as a mechanism of resistance to the divine will. And process schemes seem to smack dangerously of having one's cake and eating it too. Page is right: such schemes do involve teleology, in that God lures the creation toward

God's ends of harmony and complexity. To credit the Creator with luring the creation on to complexity, and yet to ascribe competition and extinction to entities' desire for self-consummation, seems to separate out the evolutionary process in all too convenient a way. Again, giving God all the credit and none of the blame is precarious theology.

Reference has already been made to Rolston's important contributions, both on the character of evolutionary systems and on theories of value in the nonhuman world. Mark Wynn, reviewing Rolston's work in the context of natural theology, summarizes his view as follows: "Decay and predation, and pain, are also ecosystemic preconditions for various forms of flourishing" (Wynn 1999, 110). Wynn notes that this counts against the notion that nature is clumsy, or "merely" cruel. Rolston and Wynn are surely right that our view of the goodness of the world needs to be informed by a holistic, ecosystemic perspective. Rolston's scheme, however, does not directly attend to the loss of value in the lives of the victims of evolution. He has famously described nature as "cruciform"; he even notes in a recent essay that "Each of the struggling creatures is delivered over to preserve a line. . . . We have a kind of 'slaughter of the innocents'. . . . In their lives . . . they share the labor of the divinity" (2001, 59). This is very telling. The suffering of the children slaughtered by Herod at the time of the birth of Jesus is not redeemed by the survival of Jesus alone; it is redeemed, presumably, by his voluntary self-surrender for all at the Cross, *and* by the resurrection life of the children. Jesus *chose* the cruciform life; the casualties of evolution have it imposed on them for the longer-term good of others, and their individual redemption remains in question (see what follows). To call nature cruciform only sharpens the question of evolutionary theodicy.

Another important effort at least to acknowledge the place of evolutionary evil in a contemporary theology of creation is Peacocke's. Although Page has criticized the adequacy of his approach,[10] Peacocke does give signs of recognizing the cost of the evolutionary process. As a biologist he is very aware of the inevitability of that cost—that there must be death to bring forth new and diverse forms of life and that there must be pain and suffering if there are to be higher forms of sentience. But nowhere in his many and compelling essays on God and the evolving world is there a wholly convincing account of how this can be reconciled with the goodness and love of the creator God. Peacocke's God still seeks, as Ward's does, the prize of freely choosing self-conscious beings with whom to have free rational relationship—the "greater good," as Peacocke puts it—"of the kingdom of free-willing loving persons in communion with God and each other" (Peacocke 1997, 17). This is in accord with Peacocke's preferred theodicy of the "vale of soul-making," a view most notably propounded in recent years by John Hick (1966). Such a view is bound to focus on the

concerns of "souls," rational beings, rather than on the more-general casualties of 3.8 billion years of evolution. The interests of the casualties are not adequately addressed. As I have written elsewhere,

> our response might be analogous to the one famously given to the character Ivan Karamazov by Dostoevsky, "Listen: if all have to suffer so as to buy . . . harmony by their suffering, what have the children to do with it—tell me, please? It is entirely incomprehensible why they should have to buy harmony by their sufferings. Why should they, too, be used as dung for someone's future harmony? . . . I don't want harmony . . . too high a price has been placed on harmony. We cannot afford to pay so much for admission. And therefore I hasten to return my ticket of admission. . . . It's not God that I do not accept, Alyosha. I merely most respectfully return him the ticket" (Dostoevsky 1958, 286–87). Might we not, on behalf of the millions of discarded species and the billions of creatures brutally predated upon or parasitized, want to substitute the word "humanity" for "harmony" and "creatures" for "children" and with Ivan return our tickets? (Southgate 1999, 275).

Interestingly, Michael Ruse in his recent study of the compatibility of Darwinian thought with Christianity also invokes Ivan Karamazov (Ruse 2001, 138–39). Ruse is right—the objection to evolutionary theodicies *is* of this type—the world is simply not seen as the work of a *moral* creator, a God worthy of worship (so also Hull). Rather oddly, however, Ruse allows a retreat to mystery in this matter.

More recently Peacocke has developed a stronger link between his God and the nonhuman creation, stressing God's delight in the goodness of the world and God's suffering "in, with and under" every element of the evolutionary process. He writes: "God suffers in and with the sufferings of created humanity and so, by a natural extension, with those of all creation, since humanity is an evolved part of it. The suffering of God, which we could glimpse only tentatively in the processes of creation, is in Jesus the Christ concentrated to a point of intensity and transparency which reveals itself to all who focus on him" (Peacocke 1998, 372). Fascinatingly, Peacocke's most recent essay alters this to "intensity and transparency that reveals it as expressive of the perennial relation of God to the creation" (Peacocke 2001, 42). His thinking is clearly moving toward a focus on the sufferings of the nonhuman creation.

In that same essay Peacocke explicitly questions, "If the Creator intended the arrival in the cosmos of complex, reproducing structures that could think and be free—that is, self-conscious, free persons—was there not some other, less costly and painful way of bringing this about? Was that the only possible way?" (Peacocke 2001, 36) He goes on to infer, reasonably given our understanding of biology, that it was the only way. Therefore, in effect, this is the best possible world. Note again the anthropocentric teleological frame. Nonhuman suffering is addressed, but the deciding factor in the theodicy is God's relation to free persons. However, Peacocke's stress on the divine co-suffering with the creation, revealed in particular at the Cross, does move us in a helpful direction. I shall return shortly to the

place of the Cross in developing a comprehensive evolutionary theodicy.

The other recent effort to formulate a Christian doctrine of God that takes evolution and theodicy seriously is that of John Haught in his *God after Darwin* (2000). Haught too wants to go beyond the trite statement that God created by means of the evolutionary process. He is honest about the link between the nourishing of novelty and the disorder and instability that must accompany evolutionary change. His emphasis is strongly eschatological, emphasizing the unfinished character of the creation and based on a "metaphysics of the future"—the creation drawn onward by God, the ground of its hope and potentiality. Haught writes of God's kenotic "letting-be" of the creation, of a love "willing to risk the disorder and deviation that actually occur in the evolution of cosmic beauty" (2000, 137). Consciousness is not the goal of creation for Haught: the goal is beauty, which will persist even when consciousness passes away. He is aware too of the problem of the casualties of evolution. He recognizes that an evolutionary theology must refigure Christian thinking not only on creation, revelation, and divine action but also on redemption. Thus, for Haught, "Everything whatsoever that occurs in creation—all the suffering and tragedy as well as the emergence of new life and intense beauty—is 'saved' by being taken eternally into God's feeling of the world. . . . In God's sensitivity to the world, each event is redeemed from absolute perishing and receives the definitive importance and meaning that religions encourage us to believe in" (2000, 43). I shall return to the question of redemption of evolution, but note here that this view of redemption is all of a piece with a process-theological view that the only resurrection life is as part of the memory of God. It sits, however less easily, with the more traditional Christian affirmation that humans have some bodily resurrection that restores to them some autonomy of personality.

Indeed, Haught's very carefully nuanced account, the most thoughtful response yet to the problem this paper poses, seems to fall uneasily between two poles. Strongly influenced by the model of the self-abandoning God of Jonas as well as by the process philosophy of Alfred North Whitehead, it seems too little human-centered to do justice to the Christian tradition, yet it is uneasy with the shortage of promise, of redemption, in the model offered by Jonas. Page, disappointingly, is not cited.

Three Approaches to Evolutionary Theodicy

We have now arrived at a picture of the alternative ways forward in this problematic area.

The first possibility is to capitulate, with Page, or still more radically with Jonas, and abandon any divine involvement with long-term goals for evolution. This is a tempting way forward in the light of Page's eloquent attack on such goals. In such an approach, the answer to the question

"best possible world for what?" that occupied us above is to be answered simply, "for whatever is." We are back, in effect, at the baldness of Aquinas's statement about the lion and at the bald assertion that the world is good in, of, and for itself. But although God is not, according to this model, using the world for God's ends, God still bears responsibility at the ontological level for all to which God has given rise, including apparently pointless suffering. Hull's question remains: Is the creator of such a world a being worthy of worship?

The second strategy for the evolutionary theodicist is the response of Job 38–41, that the ways of the creator of the cosmos are simply too awesome for us to apprehend. In a sense this *is* the most tempting rebuttal of Ivan Karamazov—our tickets are punched and nonreturnable, because we are only creatures. God is God, and can make and use anything for whatever ends God chooses. Denis Edwards, in his recent effort to design a trinitarian theology of evolutionary creation, is drawn to this strategy, as well to the assertion of the need for death as part of biological creativity, and to a kenotic understanding of creation very much along the lines of Haught (Edwards 1999, 36-42).[11]

The third way forward is to bite the bullet of attempting to construct a rational theodicy that still allows a teleological framework for creation. This means asserting that God did indeed very particularly desire the evolution of freely choosing self-conscious beings and acknowledging that whatever happens while God's goals are being worked out must be something with which God is deeply involved. Are there adequate resources for theodicy if we pursue this hazardous route? Having indicated that the approaches of Tracy, Rolston, Peacocke, and Haught all (in their different ways) fall short, I now develop my own suggestion.

A Proposal for an Evolutionary Theodicy

We have seen, and must accept, the costs in pain, suffering, death, and extinction that have been intrinsic to the evolutionary process up to now. An essential part of the theodicist's response must be to say that, yes, as organisms of complexity and individuality develop, so God allows them to be individuals with their own autonomy—thus far I go with Tracy. And yes, God suffers in, with, and under every creature's pain and travail, as Peacocke states. These are necessary but not sufficient moves within a teleological scheme in which God draws the evolutionary process on in search of goals such as freely choosing beings. Such a scheme must, I suggest, also involve both an explicit concern for the casualties of evolution and also a role for freely choosing beings in the eventual redemption of the world.

My own proposal for an evolutionary theodicy that meets the concerns I have raised is grounded in the following:

1. the *ontological* claim that it was God who created and continues to sustain both the matter and the natural processes of the universe
2. the *teleological* claim that human beings' freely chosen response to the grace of God is a principal goal of God in creation
3. the *kenotic* claim that God suffers with God's creation through self-emptying love, of which Christ's Cross is indicative
4. the *soteriological* claims that (a) God does not abandon the victims of evolution and (b) humans have a calling, stemming from the transformative power of Christ's action on the Cross, to participate in the healing of the world

Schemes along the lines of 1–3 can be found in Peacocke, in Rolston, and embryonically in Richard Kropf's *Evil and Evolution* (1984), an early essay in this field, much influenced by Pierre Teilhard de Chardin.[12] But without my further proposals (4a and b), evolutionary theodicy remains pregnant with the charge that God used nonhuman creatures as means to an end and then allowed their intrinsic value to be cast aside by the very processes God had set in train.[13]

The Proposal Developed. I extend my proposal by probing a little further into the consequences of allowing the teleological and soteriological claims made. I acknowledge that the evolutionary process is unfinished and ask, In what direction is it heading? What are we becoming? What (in another phrase of Peacocke's) should we be becoming? What is the natural world becoming? Well, as far as the surface biosphere and the fate of organisms of any size are concerned, biological evolution is now profoundly dependent on the cultural evolution of human beings.[14] As H. Paul Santmire has recently written, referring to the vision of Teilhard, "we humans are beginning to realize that the whole universal process of evolution is passing through us, and to that extent that *everything depends on us for its further development*" (Santmire 2001, 51).[15] We do not now see any great sense of direction to the current evolutionary process that might accord with the divine purpose, other than the possibility that human beings might be transformed into a more ecologically aware species, that we might, as Peacocke postulates, take up our role as the priests of creation (Peacocke 1986, 104). This would mean that we would be sensitive as never before to the creature-creator relationship hinted at, for instance, in the opening of Psalm 19 and that we humans would therefore offer up in articulated form that creaturely praise which our self-centered acquisitiveness makes it so hard for us to hear. It would also mean that we would articulate and offer up to God the creaturely pain that goes with the praise.

It is a transforming redemption or re-creation of humans—so that they can take up a new calling to participate in Earth's healing—that seems of paramount importance to the survival of the biosphere in anything like its

present beauty and complexity. In a Christian scheme transformation, recreation of the human nature that is the product of evolution is principally associated with the Cross, which is both the ultimate example of self-giving love and the ultimate divine identification with the victim. I propose, then, that the Cross is *indicative* of God's co-suffering love of every entity in the cosmos, particularly those that suffer failure, rejection, or violence. The Cross is also *transformative* of that cosmos in that it inaugurates—to take up here Jürgen Moltmann's phrase in his *The Way of Jesus Christ* (1990)—the redemption of evolution. Moltmann saw that the optimistic evolutionary arrows of Teilhard and Karl Rahner did not do justice to the tragic character of evolution, and stresses therefore that

> A *Christus evolutor* without *Christus redemptor* is nothing other than a cruel, unfeeling *Christus selector*, a historical world-judge without compassion for the weak, and a breeder of life uninterested in the victims. . . . Not even the best of all possible stages of evolution justifies acquiescence in evolution's victims. . . . There is therefore no meaningful hope for the future of creation unless "the tears are wiped from every eye." But they can only be wiped out when the dead are raised, and when the victims of evolution experience justice through the resurrection of nature. Evolution in its ambiguity has no such redemptive efficacy and therefore no salvific significance either. If Christ is to be thought of in conjunction with evolution, he must become evolution's redeemer. (Moltmann 1990, 296–97)

In a sense Moltmann draws us away from the conversation with science in that he locates the solution to the problem that engages us at the Eschaton, beyond the scope of scientific reflection. It is then that every tear will be wiped away.

What I want now to explore, however, is whether there is any sense in which we can speak of the redemption of evolution's beginning in real time. Whether—without, of course, claiming any Darwinian insights for Paul of Tarsus—we might be able to appropriate his conviction that God subjected the cosmos to futility, in order that it might obtain the glorious freedom of the children of God (cf. Romans 8:20–21).[16] Redemption on this model would be through Christ, yes, but in some sense via the healing of the relationships of human beings, a healing that allows humans to take up their place not merely as "created co-creators" with their God, to use Philip Hefner's language (1993) but as co-redeemers with Christ of the whole evolutionary process.[17] This is very problematic. Either we let nature alone, and evolution takes its course, or we intervene, in which case we become *homo selector*. We could not, after all, expect to redeem the law of gravity.

However, the idea warrants further exploration. A calling to be co-redeemers offers humans a more positive role than most proposals in environmental ethics, which tend to emphasize the need for humans to back off from nature. Humans are animals of prodigious and, it might be claimed, God-given ingenuity. Perhaps it is only in being involved, in however deep a humility, in the healing of nature that we can become

human beings fully alive. In a sense my scheme is the converse of Haught's position on the unfolding story of the planet. He emphasizes the promise of nature, the world as containing the seeds of the fulfillment to which God will ultimately draw the creation. Here I postulate that it is humanity that contains the seeds of nature's transformation.

How humans might be so involved is very problematic. It is relatively straightforward to suppose that a sign of redeemed relationship with God, newness of life in community, would mean appropriate, sustainable living with the nonhuman creation. Andrew Linzey makes a persuasive case, again drawing on the Romans 8 passage, that one of the marks of appropriate, eschatological living will be vegetarianism (Linzey 1994). Certainly all animal husbandry would have to be free of the cruelty and mass exploitation it all too often involves, of the callous transporting-around of stock for commercial advantage that proved so disastrous in the recent British foot-and-mouth-disease crisis. Further, it is easy to see that wise conservation and repair of the environment as matrix for other life forms would also be marks of a redeemed human wisdom. Do these exhaust the possibilities for human co-redemption? It seems hard to imagine that humans could "improve" nature (being themselves part of it). Certainly it is hard to see what humans could do about the violence of predation. As Aquinas well knew, the lion-ness of lions seems incompatible with cohabitation with lambs.

The question of whether a redeemed humanity transcends its nature and can thus act on nature to assist in its healing, or whether it becomes attuned to its nature so as to dwell reconciled to it, is analogous to the question of whether the divine being is perfectly transcendent of, or perfectly immanent within, the created world. Christian theology wants and needs to answer *both* in respect of God, and both in respect of its vision of a redeemed humanity. Moltmann writes, "In the reconciled community of creation, human beings no longer experience nature as an object or something that confronts them, but as a continuum: they themselves are nature, and nature is in them" (Moltmann 1989, 67)—to which I would add that humans are called ultimately into the Sabbath community that is the crown of creation, there to become fully the priests and healers God created them to be.

How that might be, and what a redeemed evolution might look like, is very difficult to say, an area for much further work. We are so far from glimpsing our own liberty from greed and violence that it is very hard indeed to see how nature might obtain it. Our only hints would seem to be those around Sabbath, the divine rest and delight in creation—a most powerful and neglected motif in human life (see again Moltmann 1989)—and the holding all things in common of the first apostles.

But a particular mark of humans' obtaining the liberty of the children of God would be that wise humans, living simply but ingeniously, might

end the pattern of mass extinction that has been a necessary feature of teleological creation but that loses its necessity in a fulfilled creation. Extinction is at present at levels not seen since the transition from the Cretaceous to the Tertiary Period some 60 million years ago—and it has reached those levels almost entirely as a result of human activity (Leakey and Lewin 1996). That trend could be completely reversed by co-creative human beings' coming into their glorious liberty, their calling to be also co-redeemers. That would be to have grown into our wisdom as the species that knows the story of our origins and situation and lives toward rightness of relationship with God and others. This would be not so much to have improved nature as to have brought into effect a possibility within it that the system could not explore without us—to have liberated it, in a measure, from its travail. More than that we could not do, this side of eternity.[18]

There is an important further dimension to consider. An ongoing *process* of redemption, inaugurated at the Cross, does not wipe the tears from the eyes of evolution's myriad past victims. We also need to postulate what Jay McDaniel called "pelican heaven"—that sphere in which those victims are able to fulfil their being:

> If the [insurance pelican] chick does continue in some way (after death), and if God is immanent within him as a lure toward fulfilment in that state just as God was immanent before, it becomes imaginable that, in time, the pelican would experience his own fulfilment of needs and interests, his own redemption. The risk taken by God in luring the world into life, which set the stage for pelican life, was then worth it, even for this chick. (McDaniel 1989, 47)

I endorse this insight as to the importance of "pelican heaven"—agreeing with Moltmann that God does not abandon the victims of evolution or merely remember their lives (as Haught says) but offers them recreated life, fulfillment in company with the divine life. (Where I would differ from McDaniel is in seeing this notion of pelican heaven as necessary to postulate because of the teleological character of this creation. Otherwise, the question of why God did not simply create pelican heaven becomes a problem for the theodicist.[19])

Summary of the Proposal. This proposal of mine, then, mounts a defense of teleological creation using a combination of theological resources:

- I acknowledge the pain, suffering, death, and extinction that has been intrinsic to the evolution of creation.
- I affirm God's co-suffering with every sentient being in creation.
- I take the Cross to be indicative of this compassion and to inaugurate the transformation of creation.
- If divine fellowship with creatures such as ourselves is in any sense a goal of evolutionary creation, I advocate a very high doctrine of humanity, supposing that humans are indeed of very particular concern

to God. That does not in any way exclude a sense that God delights in every creature that emerges in evolution, but it leads to the possibility that humans have a crucial and positive role, cooperating with their God in the healing of the evolutionary process.

- I further stress the importance of giving some account of the redemption of the nonhuman creation such as the "pelican heaven" of McDaniel. A God of loving relationship could never regard any creature as a mere evolutionary expedient.

In summary, I submit that there is a genuine problem of evolutionary theodicy, insufficiently explored to date because of the persistent anthropocentrism of so much Christian theological writing. I propose that there be a reexploration of the question of the pain, suffering, and death of individual organisms that never experience life corresponding to the potential of their species and of loss of value associated with the extinction of species. I suggest the possibilities offered by a scheme that, while it accords humans a very special place within creation, extends the concern of Christian soteriology beyond the human world to cover the healing of the evolutionary process and the redemption of the many casualties of evolution.

NOTES

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1. This, of course, has been noted in many other places. See for example van Huyssteen 1998 for an account of the contrast between theology's conversations with biology and physics.
2. On the interplay of chance and law in scientifically informed Christian theologies of creation see in particular Polkinghorne 1994, Peacocke 1993, and Ward 1996.
3. This illustration is Holmes Rolston's.
4. The example of the pelican chick came originally from Rolston's *Science and Religion* (1987).
5. I owe this observation to Andrew Robinson.
6. I use this term not to imply that humans have anything like complete freedom of choice but to express the view that humans are conscious of making choices and that that awareness has some sort of reference, however partial and difficult to characterize, to reality.
7. What I term here physical evil is sometimes called natural evil. Patricia Williams has made the point that because humans are "natural" creatures (rather than special descendants of Adam and Eve) there is really only one category of evil, natural evil (Williams 2001, 169). However, the distinction between acts committed or permitted by freely choosing moral agents and events not involving such acts remains a helpful one.
8. To be fair to Ward, he makes clear elsewhere in his writings that he does extend a degree of moral concern to nonhuman creatures capable of sentience.
9. Moreover, Page is quite content to invoke resurrection in a fairly traditional fashion even though she is at such pains to remove any talk of the providential action of God (1996, 61).
10. Page describes Peacocke's approach as part of the "quite normal attitudes among Christian theologians before the ecological crisis awoke us from our dogmatic slumbers. . . . They still describe an indifferent God . . . a God who has been indifferent over the millennia of evolving creation to everything that did not contribute to humanity's arrival" (Page 1996, 98). That this does not quite do justice to the breadth of Peacocke's concerns is evident from his Bampton Lectures (Peacocke 1979, 294–318).

11. Admittedly what Edwards offers us is a Christian version of the answer to Job, in that he says the proof of God's fidelity to creation is ultimately the Cross of Christ.

12. In an article drawn to my attention only after I had completed this account, Gregersen similarly concludes that there is a case to answer in regard to evolutionary theodicy and that merely to say that pain, suffering, and death are necessary to the complexification and refinement of living things is not adequate theodicy (Gregersen 2001). He seems to accept the first three grounds on my list and to take up, though not in any very developed way, the soteriological point 4a. Important insights in his article include the concept of "deep incarnation"—Christ is incarnate in putting on not only human nature but "also a scorned social being and a human-animal body, at once vibrant and vital and yet vulnerable to disease and decay" (Gregersen 2001, 193); the perception that Christ is in solidarity with victims of the evolutionary arms race, as one put to death without genetic offspring; and last, in accord with my own conclusion, that this form of theodicy must rest on an objective theory of the atonement—reality must be *transformed* by this identification of the Crucified One with the suffering, since in the case of nonhuman creatures the force of Christ's love cannot be appropriated merely through his example.

I am also grateful to Andrew Linzey for drawing my attention to *Animals on the Agenda* (Linzey and Yamamoto 1998; see especially Part Three). This book touches on questions of theodicy and redemption raised by the suffering of animals, though without the specific focus on evolution found in the present article.

13. Of the writers surveyed above, Haught comes closest to assembling a theodicy comparable to one offered here. Haught's own solution can be seen as a fusion of 1 and 3 above with insights from Jonas, and a process-influenced version of 4a.

14. I freely concede that there are ecosystems—the black smokers of the deep ocean floor, for instance—not much influenced by humans, unless we choose to drop a nice tasty oil rig down for their flora to exploit. But those systems are remarkably stable; we do not see in them much of a move to complexification.

15. However, Santmire goes on to point out the profound anthropocentrism of Teilhard's scheme: that "the biophysical world is to be destroyed . . . so that the proper end of the cosmos, intensified, purely spiritual matter, can emerge and remain for all eternity" (Santmire 2001, 53).

16. To meditate on this passage from Romans in this context is not in any way to enter the exegetical debate about what Paul meant by these words in his own context. It is rather to note that the text we have received has extraordinary resonance for the present discussion; as such it is cited by Haught, Kropf, Peacocke, and Rolston, among others.

17. The notion of human co-redemption has also been advanced—in a somewhat different context—by Ronald Cole-Turner in his *The New Genesis* (1993; see especially chap. 5).

18. Note that I am not supposing for a moment that the Eschaton can be fully consummated on a paradisal planet Earth. As many writers have observed, Earth will ultimately cease to support life. Our ultimate hope must rest with the God whose being totally transcends space-time as we know it.

19. I am grateful to Dr. Mark Wynn for posing this question.

References

Aquinas, Thomas. 1947. *Summa Theologica*. Trans. by the Fathers of the English Dominican Province. New York: Benziger Brothers.

Cole-Turner, Ronald. 1993. *The New Genesis: Theology and the Genetic Revolution*. Louisville, Ky.: Westminster/John Knox.

Conway Morris, Simon. 1998. *The Crucible of Creation.* Oxford: Oxford Univ. Press.

Dostoevsky, Fyodor. 1958. *The Brothers Karamazov*. Trans. D. Magarshack. Harmondsworth, U.K.: Penguin.

Edwards, Denis. 1999. *The God of Evolution: A Trinitarian Theology.* Mahwah, N.J.: Paulist Press.

Gould, Stephen Jay. 1991. *Wonderful Life: The Burgess Shale and the Nature of History.* Harmondsworth, U.K.: Penguin.

Gregersen, Niels H. 1999. "Autopoiesis: Less than Self-Constitution, More than Self-Organization." *Zygon: Journal of Religion and Science* 34 (March): 117–38.

———. 2001. "The Cross of Christ in an Evolutionary World." *dialog* 40 (3): 192–207.

Haught, John F. 2000. *God After Darwin: A Theology of Evolution*. Boulder, Colo., and Oxford: Westview.
Hefner, Philip. 1993. *The Human Factor: Evolution, Culture, and Religion.* Minneapolis: Fortress.
Hick, John. 1966. *Evil and the God of Love*. London: Macmillan.
Hull, David L. 1992. "God of the Galapagos." *Nature* 352:485–86.
Jonas, Hans. 1996. *Mortality and Morality: A Search for the Good after Auschwitz.* Evanston, Ill.: Northwestern Univ. Press.
Kropf, Richard W. 1984. *Evil and Evolution: A Theodicy.* Cranbury, N.J., London, and Mississauga, Ontario: Associated University Presses.
Leakey, R., and R. Lewin. 1996. *The Sixth Extinction: Biodiversity and Its Survival.* London: Weidenfeld and Nicolson.
Linzey, Andrew. 1994. *Animal Theology*. London: SCM.
Linzey, Andrew, and Dorothy Yamamoto, eds. 1998. *Animals on the Agenda: Questions about Animals for Theology and Ethics*. London: SCM.
McDaniel, Jay. 1989. *Of God and Pelicans: A Theology of Reverence for Life.* Louisville, Ky.: Westminster/John Knox.
Miller, Kenneth R. 1999. *Finding Darwin's God*. New York: HarperCollins.
Moltmann, Jürgen. 1989. *Creating a Just Future*. Trans. John Bowden. London: SCM.
———. 1990. *The Way of Jesus Christ.* Trans. Margaret Kohl. London: SCM.
Page, Ruth. 1996. *God and the Web of Creation.* London: SCM.
Palmer, Clare. 1997. Review of *God and the Web of Creation* by Ruth Page. *Journal of Theological Studies* 48:750–53.
Peacocke, Arthur. 1979. *Creation and the World of Science: The Bampton Lectures, 1978.* Oxford: Clarendon.
———. 1986. *God and the New Biology.* London: J. M. Dent.
———. 1993. *Theology for a Scientific Age*. Revised and expanded ed. London: SCM.
———. 1997. *The Idreos Lectures 1997*. Oxford: Harris Manchester College.
———. 1998. "Biological Evolution—A Positive Theological Appraisal." In *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action,* ed. Robert J. Russell, William R. Stoeger, S.J., and Francisco J. Ayala, 357–76. Vatican City State: Vatican Observatory, and Berkeley: Center for Theology and the Natural Sciences.
———. 2001. "The Cost of New Life." In *The Work of Love: Creation as Kenosis,* ed. John Polkinghorne, 21–42. London: SPCK, and Cambridge and Grand Rapids, Mich.: Wm. B. Eerdmans.
Polkinghorne, John. 1989. *Science and Providence.* London: SPCK.
———. 1994. *Science and Christian Belief: Theological Reflections of a Bottom-Up Thinker*. London: SPCK.
Rolston, Holmes, III. 1987. *Science and Religion: A Critical Survey*. New York: Random House.
———. 1988. *Environmental Ethics: Duties to and Values in the Natural World*. Philadelphia: Temple Univ. Press.
———. 2000. Naturalizing and Systematizing Evil. Unpublished paper given at the conference "Is Nature Ever Wrong, Evil, or Ugly?" at Vrije Universiteit, Amsterdam, 23–25 October.
———. 2001. "Kenosis and Nature." In *The Work of Love: Creation as Kenosis,* ed. John Polkinghorne, 43-65. London: SPCK, and Cambridge and Grand Rapids, Mich.: Eerdmans.
Ruse, Michael. 2001. *Can a Darwinian Be a Christian? The Relationship between Science and Religion*. Cambridge: Cambridge Univ. Press.
Santmire, H. Paul. 2001. *Nature Reborn: The Ecological and Cosmic Promise of Christian Theology*. Minneapolis: Fortress.
Southgate, Christopher. 1999. "A Test Case—Divine Action." In *God, Humanity and the Cosmos: A Textbook in Science and Religion,* ed. C. Southgate, 245–83. Edinburgh: T&T Clark, and Harrisburg, Pa.: Trinity Press International.
Surin, Kenneth. 1986. *Theology and the Problem of Evil.* Oxford: Blackwell.
Tilley, Terence W. 1991. *The Evils of Theodicy*. Washington, D.C.: Georgetown Univ. Press.

Tracy, Thomas F. 1998. "Evolution, Divine Action and the Problem of Evil." In *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action,* ed. Robert J. Russell, William R. Stoeger, S.J., and Francisco J. Ayala, 511–30. Vatican City State: Vatican Observatory, and Berkeley, Calif.: Center for Theology and the Natural Sciences.
Van Huyssteen, J. Wentzel. 1998. *Duet or Duel? Theology and Science in a Postmodern World*. London: SCM.
Ward, Keith. 1996. *God, Chance and Necessity.* Oxford: Oneworld.
Williams, Patricia A. 2001. *Doing without Adam and Eve: Sociobiology and Original Sin*. Minneapolis: Fortress.
Wynn, Mark. 1999. *God and Goodness: A Natural Theological Perspective*. London: Routledge.