

EVOLUTION AND SPECIAL CREATION

by *Ernan Mc Mullin*

Abstract. The logical relationships between the ideas of evolution and of special creation are explored here in the context of a recent paper by Alvin Plantinga claiming that from the perspective of biblical religion it is more likely than not that God acted in a “special” way at certain crucial moments in the long process whereby life developed on earth. I argue against this thesis, asking first under what circumstances the Bible might be thought relevant to an issue of broadly scientific concern. I go on to outline some of the arguments supporting the thesis of common ancestry, and argue finally that from the theistic perspective, special creation ought to be regarded as, if anything, less rather than more likely than its evolutionary alternative.

Keywords: Bible; common ancestry; consilience; creation science; evolution; homologies; integrity of nature; semideism; special creation.

How did God bring the ancestral living things to be? Two broadly different sorts of answer have found favor with believers in a Creator. One is to suppose that God brings the universe into existence already containing the potentialities that are required in order that the complexities of the world we know should “naturally” develop within it. The other is to say that for some of these complexities to develop, God had to “supplement” nature in certain respects, to act in a special way, special not only in the sense of being different from God’s ordinary sustaining of the order accessible to us through natural science, but also in the sense that the interruption of that order is aimed at bringing about results that could not otherwise come to be. The first answer is the evolutionary one. What precise *theories* of evolution one chooses to defend is another matter. *Evolution* is a generic label for the natural process whereby potentialities

Ernan Mc Mullin is Director of the Program in History and Philosophy of Science, as well as of the Reilly Center for Science, Technology, and Values, at the University of Notre Dame, Notre Dame, IN 46556.

[*Zygon*, vol. 28, no. 3 (September 1993).]

© 1993 by the Joint Publication Board of *Zygon*. ISSN 0591-2385

already present are actualized. The second alternative has the somewhat clumsy title of *special creation*.

One who defends the hypothesis of special creation to account for the origin of a particular sort of being (like the first living cells or the first humans) may be quite content to allow an evolutionary account in other contexts. And one who argues, in principle, for the sufficiency of evolutionary models may (if a theist) insist that the natural order itself is created, dependent on God for its very existence. What separates the two is not the general admissibility of the notions of evolution and creation, but the need for "special" episodes in the story of cosmic development. According to one account, they were needed; according to the other, they were not. On the face of it, both sides need to exercise logical caution. How can those who invoke special creation to account for a particular cosmic transition exclude the possibility that an as-yet unthought of evolutionary explanation might later be found for it? Short of providing an already-completed evolutionary account, how could defenders of evolution exclude the possibility that special creation might have occurred at some juncture? The evolutionist is not required to hold (and if a theist will not hold) that special creation is in principle *impossible*, only that it is in general unlikely, or unneeded in specific contexts.

The vigorously negative reaction to the claims of "creation science" in recent decades might easily lead one to overlook the logical and epistemological complexities of the underlying disagreement between proponents of evolution and proponents of special creation. What came to be called creation science was an aberrant solution forced on defenders of the special creation alternative by the constraints imposed on public school education due to the accepted interpretation of the Constitution of the United States. Its manifest logical inadequacy led ultimately to the legal findings in the celebrated Overton judgment (Arkansas, 1981) striking down the mandatory teaching of creation science as an alternative to evolution¹ and might easily mislead one into supposing that special creation can at this point be dismissed out of hand in discussions of the origins of life. But creation science is only one of the many variant versions of special creation, and assuredly one of the more vulnerable.

It seems worthwhile, then, to look closely at a very different and much more sophisticated sort of defense of special creation. Alvin Plantinga is a well-known philosopher of religion whose work in epistemology, metaphysics, and modal logic is widely known and justly respected. In a recent essay, "When Faith and Reason Clash: Evolution and the Bible," he proclaims the merits of special creation

in the light of what he perceives as inadequacies in the current evolutionary account of origins, and he proposes the antecedent likelihood, in a general way, of special creation from the theological standpoint of the Christian.² His principal targets are those evolutionists who, he believes, covertly rely on an antitheistic premise in order to make inflated claims for the certainty of what he calls the "Grand Evolutionary Scheme." His essay is an extended exercise in the epistemology of scientific theory from the perspective of a religious believer; though I disagree with some of its main conclusions, I shall not, I hope, underrate their force.

THEISTIC SCIENCE

Plantinga's thesis in regard to evolution is that, for the Christian, the claim that God created humankind, as well as many kinds of plants and animals, separately and specially, is more probable than the thesis of common ancestry (TCA) that is central to the theory of evolution (Plantinga 1991a, 22, 28). His larger context is that of an exhortation to Christian intellectuals to join battle against "the forces of unbelief," particularly in academia, instead of always yielding to "the word of the experts." These intellectuals must be brought to "discern the religious and ideological connections . . . [they must not] automatically take the word of the experts, because their word might be dead wrong from a Christian standpoint" (1991a, 30). The implication many would take from this is that Christian intellectuals should ally themselves with the critics of evolution, that it may somehow be to their *advantage* to find flaws in the case for evolution.

The "science" these Christian intellectuals profess will not be of the usual naturalist sort. Their account of the origin of species, for instance, will be at odds with that given by Darwin, on grounds that are distinctively Christian in content. Despite the fact that claims such as these on the part of the Christian depend on what he or she knows "by faith, by way of revelation," Plantinga believes that they can appropriately be called science, and he suggests as a label for them "theistic science" (1991a, 29). An important function of this broader knowledge would be revisionary; he reminds us that "Scripture can correct current science." His theistic science bears some similarity to the creation science that has commanded the headlines in the United States so often in recent decades. Like the creation scientists, he maintains that in the present state of knowledge the best explanation of the origin of many kinds of plants and animals is an interruption in the ordinary course of natural process, a moment

when God treats “what he has created in a way different from the way in which he ordinarily treats it” (1991a, 22). Like them, he relies on a critique of the theory of evolution, pointing to what he regards as fundamental shortcomings in the Darwinian project of explaining new species by means of natural selection and emphasizing recent criticisms of one or other facet of the synthetic theory from within the scientific community itself. Like them, he calls for a struggle against prevailing scientific orthodoxy, one that may pit the teachers of Christian youth against the “experts.”

But the differences between Plantinga and the creation scientists are even more basic. Most of the latter believe in a “young earth” dating back only a few thousand years, and they attempt to undermine the many arguments that can be brought against this view. Plantinga allows “the evidence for an old earth to be strong and the warrant for the view that the Lord teaches that the earth is young to be relatively weak” (1991a, 15). The creation scientists argue for a whole series of related cosmological theses (that stars and galaxies do not change, that the history of the earth is dominated by the occurrence of catastrophe, and so forth); Plantinga focusses on the single issue of the origins of living things, especially of humankind. And he is in the end more concerned with combating the claims of certainty made by many evolutionists than he is with arguing that the Christian is irrevocably committed against a full evolutionary account of origins. He allows, as the creation scientists, I suspect, would not, that as evolutionary science advances, his own present estimate that special creation is more likely to account for some of the major transitions in the story of life on earth might have to give way.

In the debates regarding the teaching of creation science in the public schools, its defenders attempted to detach their arguments from any sort of reliance on Scripture, or more generally, from theological considerations, whereas Plantinga appeals explicitly to the scriptural understanding of the manner of God’s action in the world. The former make a heroic attempt to qualify their creationism as scientific, in what they take to be the conventional sense of the term *scientific*. Their effort, I think it is fair to say, was hopeless right from the start. They would undoubtedly have preferred to defend a view more explicitly based on Genesis, but the exigencies of the constitutional restrictions on the public school curriculum prevented this. The scientists among them attempted to shore up their case by citing various consonances between the catastrophism of their young-earth account and the geological record. But the inspiration for their account lay, and clearly *had* to lie, in the Bible. Trying to fudge this,

though understandable under the circumstances, proved a disastrous strategy.

Plantinga offers a far more consistent theme. True, his “theistic science” will not pass constitutional muster, so it will not serve the purposes for which creation science was originally advanced. But that is not an argument against it; it is merely a consequence of the unique situation of public education in the United States, a situation that imposes losses as well as gains. I do not think, however, that theistic science should be described *as* science. It lacks the universality of science, as that term has been understood in the later Western tradition.³ It also lacks the sort of warrant that has gradually come to characterize a properly “scientific” knowledge of nature, one that favors systematic observation, generalization, and the testing of explanatory hypothesis. Theistic science appeals to a specifically Christian belief, one that lays no claim to assent from a Hindu or an agnostic. It requires faith, and faith (we are told) is a gift, a grace, from God. To use the term *science* in this context seems dangerously misleading; it encourages expectations that cannot be fulfilled.

Plantinga objects to the sort of methodological naturalism that would deny the label *science* to any explanation of natural process that invokes the special action of God; indeed, he characterizes it, in Basil Willey’s phrase, as provisional atheism. “Is there really any compelling or even decent reason for thus restricting our study of nature?” he asks (Plantinga 1991a, 27). But, of course, methodological naturalism does not restrict our study of nature; it just lays down which sort of study qualifies as *scientific*. Calling on the special action of God to explain the origins of the major phyla in the way Plantinga does transcends the boundaries of science.⁴ This is not primarily because God is involved (Aristotle’s argument for a First Mover, for example, could be counted a broadly naturalistic one), but because the action is a special one inaccessible to any sort of test on our part and because of the sort of evidence that has to be invoked, evidence that does not lend itself to evaluation by the standard techniques of natural science, however loosely these be defined.⁵

If someone wants to pursue another approach to nature—and there are many others—the methodological naturalist has no reason to object. Scientists *have* to proceed in this way; the methodology of natural science gives no purchase on the claim that a particular event or type of event is to be explained by invoking God’s “special” action or by calling on the testimony of Scripture. Calling this *methodological* naturalism is simply a way of drawing attention to the fact that it is a way of characterizing a particular *methodology*, no more. In particular, it is not an ontological claim about what sort of agency

is or is not possible. Dubbing it *provisional atheism* is objectionable; the scientist who does not include among the alternatives to be tested when attempting to explain some phenomenon an action that would not lend itself to such test is surely not to be accused of atheism, even of a provisional sort. "What we need," Plantinga tells us, "is a scientific account of life that isn't restricted by methodological naturalism" (1991a, 29). But, of course, if it is not so restricted, it is simply improper to call it *scientific*, in the light of long and unequivocal contrary usage.

Let me make myself clear. I do not object (as the concluding section of this essay makes clear) to the use of theological considerations in the service of a larger and more comprehensive world view in which natural science is only one factor. I would be willing to use the term *knowledge* in an extended sense here, though I am well aware of some old and intricate issues about how faith and knowledge are to be related. (See, for example, Kellenberger 1972, ch. 10.) But I would not be willing to use the term *science* in this context. Nor do I think it necessary to do so in order to convey the respectability of the claim being made: that theology may appropriately modulate other parts of a person's belief-system, including those deriving from science. I would be much more restrictive than Plantinga is, however, in allowing for the situation he describes as "Scripture correcting current science."⁶ But before I analyze our differences, it may be useful first to lay out the large areas where we agree.

POINTS OF AGREEMENT

What really galls Plantinga are the views of people like Richard Dawkins and William Provine who not only insist that evolution is a proven "fact," but who suppose that this somehow undercuts the reasonableness of any sort of belief in a Creator. Their argument hinges on the notion of design. The role of the Creator in traditional religious belief (they claim) was that of designer; the success of the theory of evolution has shown that design is unnecessary. Hence, there is no longer any valid reason to be a theist. In a recent review of a history of the creationist debate in the United States, Provine lays out this case, and concludes that Christian belief can be made compatible with evolutionary biology only by supposing that God "works through the laws of nature" instead of actively steering biological process by way of miraculous intervention. But this view of God, he says, is "worthless," and "equivalent to atheism" (Provine 1987). (On this last point, Plantinga and he might not be so far apart.) He chides scientists for publicly denying, presumably on

pragmatic grounds, that evolution and Christian belief are incompatible; they *must*, he says, know this to be nonsense.

Plantinga puts his finger on an important point when he notes that for someone who does not believe in God, evolution in some form or other is the only *possible* answer to the question of origins. Prior to the publication of *The Origin of Species* in 1859, the argument from design for a Creator was widely regarded as resting directly on biological science. The founders of physico-theology two centuries earlier (naturalists like John Ray and William Derham) had shown the pervasive presence in nature of means-end relationships, the apparently purposive adjusting of structure and instinctive behavior to the welfare of each kind of organism. Someone who rejected the idea of a designer, therefore, had to face some awkward problems in explaining some of the most obvious features of the living world; it seemed to many as though science itself testified to the existence of God (Mc Mullin 1988).⁷

Darwin changed all this. By undermining the classical arguments from design, he showed that atheism was not, after all, inconsistent with biological science; from then on, the fortunes of atheism as a form of intellectual belief would, to some extent at least, be perceived as depending upon the fortunes of the theory of evolution. No wonder, then, that evolution became a crucial myth of our secular culture (as Plantinga puts it), replacing for many the Christian myth as “a shared way of understanding ourselves at the deep level of religion” (Plantinga 1991a, 17). No wonder also that an attack on the credentials of evolutionary theory would so often evoke from its defenders a reaction reminiscent in its ferocity of the response to heresy in other days.

Is evolution fact or theory? No other question has divided the two sides in the creation-science controversy as sharply. Plantinga argues that someone who denies the existence of a Creator is left with no other option for explaining the origin of living things than an evolutionary-type account. The account thus becomes “fact” not just because of the strength of the scientific evidence in its favor, but because, for the atheist, no other explanation is available. Plantinga objects to the use of the word *fact* in this context because it seems to exclude in principle the possibility of divine intervention, and hence by implication, the possibility of the existence of a Creator. *Fact* seems to convey not just the assurance of a well-supported theory, but the certainty that no other explanation is open.

The debate may often, therefore, be something other than it seems. Instead of being just a disagreement about the weight to be accorded to a particularly complex scientific theory in the light of the

evidence available, the debate may conceal a far more fundamental religious difference, each side appearing to the other to call into question an article of faith. Religious believers point out that calling the thesis of common ancestry a *fact* violates good scientific usage; no matter how well-supported a theory may be (they argue), it remains a theory. To nonbelievers, the phrase *merely a theory* comes as a provocation because it suggests a substantial doubt about a claim that appears to them as being beyond question, a doubt prompted furthermore in their view by an illegitimate intrusion of religious belief.

At one level, then, Plantinga's essay can be read as a plea for a more informed understanding of the real nature of the creation-science debate, and a more sympathetic appreciation of what led the proponents of creation science to take the stand they did. Even their defense of a "young" earth (a major point of disagreement between his view and theirs) ought not (he says) to be regarded as "silly or irrational"; a "sensible person" might well subscribe to it after a careful study of the Scriptures. One need not be "a fanatic, or a Flat Earther, or an ignorant Fundamentalist" to hold such a view (Plantinga 1991a, 15). The claim that the earth is ancient is neither obvious nor inevitable; it has to be argued for, and disagreement may, therefore, legitimately occur.

Plantinga is right, to my mind, to see more in the creation-science debate than evolutionary scientists (or the media) have been wont to allow. And the sort of challenge he offers to the defenders of evolution, though it is not new, could serve the purposes of science in the long run if it forces a clarification and strengthening of argument on the other side, or if it punctures the sometimes troubling smugness that experts tend to display when dealing with outsiders. Plantinga leans too far in the other direction, however. In the first place, those who affirm that "evolution is a fact" are not necessarily committed to a covert denial of God's existence. The affirmation itself is, of course, an ambiguous one. A plausible construal of it in this context might run as follows: The belief that the relationships attested to by the fossil record, by comparative morphology, and by molecular biology are best explained in broadly evolutionary terms is true. Calling a theoretical belief *true* customarily means that the cumulative evidence in its favor is so strong that it is safe to affirm it without qualification, just as a geologist might, for example, affirm that the continents of Africa and South America, once in physical contact, have gradually separated from one another. This ought *not* be taken to mean that the alternative can be logically excluded in a completely conclusive way; nothing more than overwhelming likelihood is what scientists normally intend by this sort of usage. One may *object* to

this usage, but one cannot impute an implicitly atheistic premise to those who follow it. Such a premise *may* be playing a covert role, but it is equally possible that it may not.

In the second place, the reading of creation science that he urges is rather too charitable. A claim does not have to be obvious or inevitable for its rejection to connote fanaticism or ignorance. If the indirect evidence for the great age of the earth is overwhelming (Plantinga himself allows that it is "strong"), if its denial would call into question some of the best-supported theoretical findings of an array of natural sciences (cosmology, astrophysics, geology, biology), then one is entitled to issue a severe judgment on the legitimacy of the challenge. Perusal of some of the standard works in creation science would lead one to suspect that no matter *how* strong the scientific case were in favor of an ancient earth, it would make no difference to their authors. Their implicit commitment to a literalist interpretation of *Genesis* is such that (to my mind, at least) it appears to block a genuinely rational assessment of the alternatives.

What bothers Plantinga, I suspect, about the use of terms like *fanaticism* here is that from *his* point of view the creation-scientist's heart is in the right place. Anyone who stands up for the maxim of *sola Scriptura* ("Scripture alone") in the modern world, even in contexts as unpromising as the debate about the age of the earth, ought not (he suggests) simply be dismissed as irrational. Creation-scientists may be wrong in holding that the earth is only a few thousand years old, but their intellectual commitment to Scripture ought to be regarded with sympathy by their fellow Christians. I am much less sympathetic to them, in part because of a deeper disagreement about the merits of the *sola Scriptura* premise as well as of the remaining major theses of creation science. Though I would not be as harsh on creation scientists as leading evolutionists have been, I would, as a Christian, want to register disapproval of creation science at least as strong as the latter's, though for reasons that differ in part from theirs. These reasons will become clear, I hope, in what I have to say about Plantinga's analysis of what happens when "faith and reason clash."

GALILEO AND THE BIBLE

In his *Letter to the Grand Duchess Christina* (1615), Galileo provided the most extended account that anyone perhaps had given up to that time of how the Christian should proceed when an apparent conflict between science and Scripture arises.⁸ Aided, doubtless, by some of his theologian-friends, he drew upon Augustine, Jerome,

Aquinas, and an impressive array of other theological authorities, in order to show that the use made of Scripture by those who opposed the Copernican theory was illegitimate. There may be some lessons to be drawn from this historic document in the context of the more recent debate about evolution, apart from the obvious one of the embarrassment that the Church would later suffer because of its ill-advised attempt to make the geocentric cosmology of the Old Testament authors a matter, equivalently, of Christian faith.

What, then, did Galileo hold about the bearing of the Scriptures on our knowledge of the natural world? It does not take long for the reader to discover that several different hermeneutic principles are proposed in different parts of the *Letter*, and to realize that Galileo almost certainly was not aware of the resulting incoherence. On the one hand, he cites the traditional view, traced back to Augustine in his influential *De Genesi ad litteram*, that in cases of apparent conflict, the literal interpretation of Scripture is to be maintained, unless the opposing scientific claim can be *demonstrated*. In that case, theologians must look for an alternative reading of the scriptural passage(s), since it is a first principle that faith and natural reason cannot really be in contradiction. However, the straightforward interpretation of Scripture is to be preferred in cases where the scientific claim has something less than “necessary demonstration” in its support because of the inherently greater authority to be attached to the Word of God (Finocchiaro 1989, 94). Let us call this the literalist principle because it maintains a presumption (though not, to be sure, an absolute one) in favor of the literal reading in cases of apparent conflict.

On the other hand, Galileo also argues that one should not look to Scripture for knowledge of the natural world in the first place: The function of the Bible is to teach us how to go to heaven, not how the heavens go, in the aphorism attributed to Baronius. God has given us reason and the senses to enable us to come to understand the world around us. Had the biblical authors attempted to describe the underlying structures of natural process, they would have baffled their readers and defeated the obvious purpose of Scripture. Galileo produces a number of convergent lines of argument to the effect that Scripture is simply not relevant to the concerns of the natural sciences to begin with.⁹ This might be called the neutrality principle, since it proposes that the Scriptures are neutral in regard to natural science.¹⁰

The implications of these two principles were, of course, quite different for the resolution of the debate about the orthodoxy of the Copernican position (Mc Mullin 1967, 33–35). But that is not our

concern here. The requirement that the claims of “reason” ought to be demonstrative in order to count is, of course, an echo of the classical Greek notion of science (equivalently, knowledge) that Augustine inherited. It is worth noting that in practice, Augustine himself seems often to have been guided by a less strict norm, even in the *De Genesi ad litteram* itself. He did not require a *conclusive* demonstration on the side of natural reason before abandoning the literal reading of the narrative of the six days of creation and espousing a highly metaphorical alternative. And he constantly stressed the antecedent importance of literary norms in determining how biblical texts should be interpreted. The strong presumption in favor of literalism that has been the main source of conflict in the debates over Scripture and science (“the text is to be interpreted literally unless a contrary reading can be established from an extrinsic source such as natural science”) is much more characteristic of post-Reformation theology.

A troublesome feature of the literalist principle, even when interpreted quite broadly, is that it sets theologians evaluating the validity of the arguments of the natural philosophers, and natural philosophers defending themselves by composing theological tracts. Either way, immediate charges of trespass result. The theologian challenges the force of technical scientific argument; scientists urge their own readings of Scripture or their own theories as to how Scripture, in general, *should* be read. In both cases, the professionals are going to respond, quite predictably: What right have you to intrude in a domain where you lack the credentials to speak with authority? The techniques of the lawyer or of the logician are inappropriate in such a context. It is not a matter of persuading a jury of the inexpert that a particular assertion is supported beyond all reasonable doubt by the evidence at hand. Nor is it a matter of laying out an abstract argument that carries weight by force of logical rule alone. The assessment of theory-strength is not a simple matter of logic and rule but requires a long familiarity with the procedures, presuppositions, and prior successes of a network of connected domains, and a trained skill in the assessment of particular types of argument.

What, then, is to be done when tensions arise between a science-based assertion and a claim inspired by Scripture?¹¹ Can trespass be avoided? A first answer might simply rely on the neutrality principle. The Bible, it could be said, was not intended to convey insights about the underlying physical structure of the world around us. The biblical writers simply made use of the language and the cosmological beliefs of their own day while recounting the story of the covenant between Creator and creature. In particular, the creation narratives

in the first two chapters of Genesis are not to be read as literal or quasi-literal history. Their meaning lies deeper; to discover it, one must take into account the wider literary context of that earlier day and the later theological appropriations of those texts, as well as the larger theological bearings of the biblical narrative as a whole (Anderson 1983; Bergant and Stuhlmüller 1985; Clifford 1988).

It is not, therefore, as though the creation stories are to be taken quasi-literally except where an opposing scientific claim can be strongly supported. If no likelihood is attached in the first place to the separate and special creation, say, of the ancestors of the major phyla of living things on the basis of a quasi-literal construal of the Genesis narrative, then the delicate balancing of opposing probabilities is not necessary. The majority of contemporary biblical scholars would, I think, favor the neutrality principle over the literalist principle in this particular context; this assessment on my part would, of course, require something more than an expression of opinion to carry any weight. The matter is, in the first instance at least, one for theologians and biblical scholars, not philosophers or biologists, to debate and resolve. This is the proper function of expertise, and the proper function of expertise is in part what is at issue in disagreements of this sort.

Does this mean that the two domains, scientific and biblical, are so disparate that real conflict *cannot* arise, that the appearance of conflict necessarily implies that one side or other is straying outside its proper boundary? Unfortunately, matters are not quite so simple; the neutrality principle only reaches so far. Even if agreement can be reached that the biblical writers are not communicating insights about the workings of nature that were specially revealed to them by God, there are still some common presuppositions about human nature that are integral to the biblical narrative as a whole: the reality of human free choice and the consequent moral responsibility for actions performed, for example. Were a psychological or psychoanalytical theory to call one or other of these presuppositions into question, real conflict *could* still arise.

At that point one would inevitably have to draw on a larger perspective where the credentials of the scientific theory would be set in the balance with the claim that the disputed assertion is indeed an integral presupposition of biblical religion. Someone whose life is guided by that religion might, then, render a different assessment of a particular psychoanalytic theory than another would. Of course, this would not, as we have seen, constitute a new level of *science*. Were an analogue of the original Augustinian version of the literal-

ism principle to hold true, one could say that if a “necessary demonstration” were available on the scientific side, one could be assured that the disputed presupposition would have to be modified in some way. But, of course, if there is one thing that philosophers of science agree on, it is that such demonstration is in principle out of reach in the domain of large-scale theory. The underdetermination of theory by the available evidence is the fulcrum of much recent discussion in sociology of science and in feminist theories of science. In our context it explains how theological considerations can play a role for some in theory acceptance (or, more likely, rejection). Can such considerations, though not scientific, still count as *epistemic* (in the sense defined, for example, in Mc Mullin 1984)? From the perspective of the religious believer, they would be held to be so, though this is treacherous ground indeed, and would require a far more extended discussion than can be given here.

The context where differences of this kind might properly occur seems restricted to issues concerning human nature. Does the theory of evolution conflict with any presuppositions that might be held to be essential to biblical theology? Human uniqueness? The promise of resurrection? Certainly it has been held to do so by some. I would argue that the apparent conflict in these cases is only apparent. Our topic here, however, is the more restricted one of special creation. Does the integrity of the biblical account of sin and salvation suggest that some plants and animals were specially created? Obviously not. Does it require a form of special creation of the first human pair that would be incompatible with the evolutionary account of human origins? It is not clear that it does, although many have held the two accounts to be incompatible on the point. Defenders of a dualistic account of human nature might come forward with a philosophical argument for the impossibility of the soul’s coming to be from matter. But no such autonomous argument is available where the coming to be of the first cells or the major phyla (Plantinga’s other candidates for special creation) are concerned.

These are large issues, requiring sensitive treatment from the epistemological standpoint because of the possibly “mixed” character of the assessments involved. My intention here has been simply to draw attention to the various possible sources of tension between the Bible and the sciences, and some of the principles that have been proposed for dealing with such tensions.¹² This done, however schematically, I can now return to Plantinga’s proposal of special creation in one form or another as a likely alternative explanation wherever the evolutionary account seems to him to be flawed.

THE ANTECEDENT LIKELIHOOD OF SPECIAL CREATION

The most distinctive feature of Plantinga's argument is that he makes a point of *not* calling explicitly upon the two creation narratives in Genesis. Historically, these narratives have provided the main warrant for the traditional Christian belief that God intervened in a special way in the origins of the living world. Defenders of that belief have tended to rely on Genesis, unless they were prevented from doing so, as the recent advocates of creation science were, by extrinsic constraints. Plantinga is, however, under no such constraints. His reason for eschewing the reference to Genesis that one might have expected to find is, rather, an awareness of the problematic character of the literalist approach to the Genesis story of creation (Plantinga 1991b, 81). Instead, he rests his case not on specific scriptural passages, but on a central defining theme in the biblical account of God's dealings with the people of Israel. In this context, at least, God evidently "intervened" or "interrupted" normal human routines in all sorts of ways. (Words like *intervene* are inadequate to convey the action of a Creator with the created universe, Plantinga reminds us, but we do not have any better ones.) Since the God of Abraham brought about God's ends in "special" ways throughout the long history of Israel, it is to be expected (Plantinga suggests) that the same may very well be true at some moments in the much longer story of the development of life on earth.

The issue, be it noted, is not whether God *could* have intervened in the natural order; it is presumably within the power of the Being who holds the universe at every moment in existence to shape that existence freely. The issue, is, rather, whether it is antecedently *likely* that God would do so, and more specifically whether such intervention would have taken the form of special creation of ancestral living kinds. Attaching a degree of *likelihood* to this requires a reason; despite the avowed intention not to call on Genesis, there might appear to be some sort of residual linkage here. In the absence of the Genesis narrative, would it appear likely that the God of the salvation story would also act in a special way to bring the ancestral living kinds into existence? It hardly seems to be the case.

Might it be that the supposed likelihood of special creation in given cases (e.g., for the "founders" of the major phyla) derives directly from the unlikelihood of there being a scientific explanation in such cases? If there are only two possible types of explanation, and one can be shown to be highly improbable on present evidence, the other automatically gains in likelihood. In this event, a reference to God's dealings with Israel would not be needed. But Plantinga made it clear

that this was not his strategy: "It is a bit more probable, *before we look at the scientific evidence*, that the Lord created life and some of its forms—in particular human life—specially" (1991a, 22, emphasis mine).

It is this casting of special creation and evolution as rivals in the domain of cosmological explanation that I find so troubling. If one assumes that there is a presumption in favor of some sort of special creation at the critical moments in the historical development of life (a presumption whose plausibility wanes in regard to specific transitions as the strength of the evolutionary explanation of those transitions increases) one inevitably transforms the field of prehistory into a battleground where the religious believer is engaged in constant skirmishes with the protagonists of evolutionary-type theories, skirmishes that most often end in forced retreat for the religious believer.

Plantinga claims that the Christian believer "has a freedom not available to the naturalist," because the believer is "free to look at the evidence . . . and follow where it leads" (1991a, 28). This would be more persuasive if he were to hold only that the believer holds an extra alternative that allows him or her to be more critical of the shortcomings of the scientific theory. But he proposes something much stronger than that: There is an antecedent *likelihood*, he says, of "special" intervention of this kind at some points in cosmic process, and hence where the scientific case is weak, the hypothesis of divine intervention has to be allowed the higher likelihood. I am not sure that this *does* in the end allow the Christian believer more freedom than the naturalist. But whatever one makes of that, it certainly ensures conflict; it is likely to maximize the strain between faith and reason, as the believer searches for the expected gaps in the scientific account.

In his 1991b, Plantinga appears to change ground somewhat. On the one hand, he says: "I remain confident that TCA is relatively unlikely given a Christian or theistic perspective and the empirical evidence" (1991b, 108). But now the warrant for claiming the antecedent likelihood of special creation appears to shift from the salvation story to the "empirical evidence." Quoting Francis Crick and Harold Kein on the difficulty of explaining how the first cells originated, he concludes that "we have every reason to doubt that life arose simply by the workings of the laws of physics" (1991b, 102). He goes on:

It therefore looks as if God did something special in the creation of life. (Of course, things may change; that is how things look *now*.) And if he did something special in creating life, what would prevent him from doing something special at other points, in creating human life, for example, or other forms of life? . . . I am therefore inclined to maintain my suggestion that the

antecedent probability, from a theistic point of view, is somewhat against the idea that all the kinds of plants and animals, as well as humankind, would arise just by the workings of the laws of physics and chemistry. (1991b, 102)

The antecedent probability (no longer strictly antecedent) now seems to depend on the current lack of plausible scientific accounts of how the first cells could have originated. (Crick, who is notably unsympathetic to theistic belief, would surely not agree with the inference being drawn from this!) In his 1991b, Plantinga is more intent on shifting the burden of proof, and on combating claims for the antecedent probability, on theological grounds, of a naturalist account favoring TCA. If TCA were correct, “we should expect much stronger evidence than we actually have. . . . The actual empirical evidence must be allowed to speak more loudly than speculative theological assumptions” (1991b, 102). So much for his original claim that the story of God’s dealings with Israel spoke loudly in favor of special creation over TCA!

THE THESIS OF COMMON ANCESTRY

Though my disagreement with Plantinga centers especially on the conclusion he draws from Christian faith in regard to the antecedent likelihood of special creation, it may be worthwhile to say something very briefly about the scientific issues also. He dismisses the evidence ordinarily presented in support of the thesis of common ancestry (TCA) as inconclusive, after a brief review. His conclusion is as follows: “It isn’t particularly likely, given the Christian faith and the biological evidence, that God created all the flora and fauna by way of some mechanism involving common ancestry” (1991a, 28). The credentials of a thesis encompassing as much of past and present as TCA does cannot, of course, be dealt with satisfactorily in a few pages. This is particularly true when these credentials are being *denied*, contrary to the firm conviction of the great majority of those professionally engaged in the many scientific fields involved.

Though a full-scale defense of TCA will not be attempted here, and would in any event be beyond my competence, it may nevertheless be worthwhile to indicate some of the lines along which a defense might proceed.¹³ First, one should note an important distinction, one to which Plantinga alludes. TCA is a *historical* claim that the kinds of living things originated somehow from one another. The various theories of evolution, on the other hand, are an attempt to *explain* how that could have occurred. The dominant theory of evolution at the present time is the so-called modern synthesis,

associated with such figures as Simpson, Dobzhansky, and Mayr. It has its critics: Goldschmidt and Schindewolf a generation ago, for example; Gould and Kimura today. Though all of these have found fault with the Darwinism of the modern synthesis and proposed alternatives to it, none would for a moment question TCA. Their confidence in TCA does not depend, then, on a similar degree of confidence in the explanatory adequacy of a specifically Darwinian account of the origin of species. Is it, perhaps, that they implicitly reject God's existence, and thus TCA is for them (in Plantinga's phrase) "the only game in town"? I do not think it is nearly as simple as this.

Much of the evidence for TCA functions independently of the *detail* of any specific evolutionary theory. Plantinga mentions three such categories of evidence, so I will confine myself to those. There is the fossil record, which has already yielded innumerable sequences of extinct forms, where the development of specific anatomical features can be traced in detail through the rock layers. Paleontologists have traced the development of eyes in no less than forty *independent* animal lineages, lineages being determined by overall morphological similarities (von Salvini-Plawen and Mayr 1977). As new fossil evidence is uncovered, paleontologists continue to define stage after stage in crucial "linking" forms, such as the therapsids, the forms that relate reptiles with the earliest mammals, gradually bridging troubling gaps. In cases like these (and there are a *lot* of them), paleontologists can point to a variety of morphological features that gradually shift over time, retaining a basic likeness (a so-called *Bauplan*) throughout.

Gould's objection regarding the rarity of transitional forms (quoted by Plantinga) has to be taken in context. Gould would not deny the morphological continuities of the fossil record; like thousands of other researchers, he has given too much of his time to tracing these continuities for him to underrate their significance. What he *would* say (and what many defenders of the modern synthesis would now be disposed to admit) is that species often make their appearance in the record without the prior gradual sequence of modifications one would have expected from the traditional gradualist Darwinian standpoint. But this leaves untouched the implications, overall, of the fossil record for TCA. It *does*, of course, affect the sort of theory that could account for the sequence found in the record.

In a recent discussion of the relation between microevolution and macroevolution, Mayr writes:

Almost every careful analysis of fossil sequences has revealed that a multiplication of species does not take place through a gradual splitting of single lineages into two and their subsequent divergence but rather through the sudden appearance of a new species. Early palaeontologists interpreted this as evidence for instantaneous sympatric speciation [speciation over a single area], but it is now rather generally recognized that the new species had originated somewhere in a peripheral isolate and had subsequently spread to the area where it is suddenly found in the fossil record. The parental species which had budded off the neospecies showed virtually no change during this period. The punctuation is thus caused by a localized event in an isolated founder population, while the main species displays no significant change (Mayr 1988, 415).

This theory of allopatric speciation (speciation involving a second—in this case a geographically isolated but adjoining—territory) allows Mayr to modify the gradualism of the original Darwinian proposal, while retaining the basic Darwinian mode of explanation and avoiding the “punctual” events of the Gould-Eldredge scenario (events that in his view are objectionable). But the debate is by no means closed.

Instead of scrutinizing the fossil record, we might look to the living forms around us and there discover all sorts of homologies and peculiar features of geographical distribution, which are best understood in terms of TCA. The arguments here are long familiar to the readers of this journal, so I will not dally with them. But there is another category of evidence which has taken on a great deal of importance in the last twenty years, namely, that deriving from molecular biology. Comparison of the DNA, as well as of the proteins which DNA encodes, among different types of organisms shows that there are striking similarities in chemical composition between them. These similarities are just of the kind one would expect from the hypothesis of common ancestry. By now many of these similarities have been charted in great detail. They yield information of a quality that the fossil record, with its many limitations, could never hope to give; they point to branchings that occurred more than 2 billion years ago, when *Archaea*, a minute organism found in some hot springs, seems to have separated from its bacterial cousins. To recall one standard example, cytochrome C is found in all animals and is involved in cell respiration (Ayala 1985). It contains 104 amino acids, in a sequence which is invariable for any given species. For humans and rhesus monkeys, the sequence is identical except in one position; for horses and donkeys, the sequence also differs in only one position. But for humans and horses, the difference is twelve; for monkeys and horses, the difference is eleven. If instead of cytochrome C another homologous protein is chosen, similar (though not necessarily identical) results are found. These very numerous resemblances and

differences between the macromolecules carrying hereditary information can be explained by supposing a very slow rate of change in the chemical sequences constituting these molecules, and therefore a relationship of common descent among the organisms themselves.¹⁴ Thus, the molecular-level differences between species give an indication of the relative order of branching between the species; with three species, for example, one can infer whether A branched from B before C did. What is impressive here is the *coherence* of the results given by examining many different macromolecules in this light. Without common descent, this intricate network of resemblances would make no sense.¹⁵

What is even more impressive is that these results conform reasonably well with the findings of both paleontology and comparative anatomy which regard to the ancestral relations between species, the postulated tree of descent that had already been worked out in some detail in these other disciplines.¹⁶ The fit, as one would expect, is not exact in each case with regard to the “closeness” between the species, but it is nevertheless quite good. When a single explanatory hypothesis (TCA) underlies the binding together of domains so diverse in character, we have the sort of consilience that carries more weight with scientists than does, perhaps, any other virtue of a theory.

It should be emphasized that specific theories of evolution are not yet involved here. The support given TCA by these diverse types of evidence does not depend on any particular explanatory account of *how* species-change takes place. One could reject natural selection as the primary agent of evolutionary change, for example, and still find this argument for TCA convincing.¹⁷ Of course, a satisfactory explanatory account of how evolutionary change occurred would greatly strengthen the case for TCA. But in the light of the continuing debates about the adequacy of this or that feature of the neo-Darwinian model, it is important to stress that there is a vast body of evidence for common descent that does not depend for its logical force on the further issue of why the transitions from one life-form to another came about as they did.

Plantinga raises one objection that bears on TCA directly. Does there not seem to be an “envelope of limited variability” surrounding each species, so that a departure of more than a small degree from the central species-norm leads to reversion or sterility? Would one not expect to find evidence of new species now and then appearing in the present (or perhaps being deliberately produced) if indeed TCA is true? The first and simplest response is to note that in the plant world (in the forest, for example) new species have indeed been

observed. And the production of fertile hybrids is an important part of agricultural research. The ability of populations of microorganisms to alter their structures quite basically over relatively short times under the challenge of antibiotics is all too well known. But defenders of the modern synthesis themselves insist on the extraordinary stability of the genotype, in the animal realm particularly; this stability is essential to the maintenance of species differences, and some progress has been made toward an understanding of its molecular basis in the constellations of genes.

TCA does not require rapid change. The presumption is that the kind of species-changes that would sustain TCA could take thousands of generations to accomplish. The rate of change required (as has been shown in detail in recent studies in population genetics) is far too slow for the sort of direct evidence to accumulate that Plantinga is asking for. There are also serious problems with the species-concept itself, the concept underlying this objection. Should it, for example, be based on morphological differences (of the kind that paleontologists or comparative anatomists can attest to), or should it be based on interbreeding boundaries (as naturalists have long preferred to maintain)? These are only two of the many possibilities (Sober 1984, sec. 7; Mayr 1963, 400–423). If we were to find the fossil remains of animals as different as a saint bernard and a chihuahua in the rock strata, we should assuredly label them different species. If we adopt the biological-species concept according to which “species are groups of interbreeding natural populations that are reproductively isolated from other such groups” (Mayr 1988, 318), how are we to apply this to populations that are widely separated in space or time? Mayr emphasizes that such application always involves complex and indirect forms of inference.¹⁸ The moral is not that the species-concept is so ambiguous as to be unusable, but only that such notions as species-change are far more difficult to handle than at first sight they seem to be. And more specifically, the claim that an “envelope of limited variability” surrounds each species has no precise empirical foundation.

I suspect that in the end, this claim simply begs the question against TCA. It asserts that the sort of change TCA would require does not occur. But this is just the issue, and this is what is challenged by the three kinds of evidence described above, all of them pointing to TCA as the most reasonable explanation. Plantinga’s way of dealing with this evidence is unconvincing: “As for the similarity in the biochemistry of all life, this is reasonably probable on the hypothesis of special creation” (Plantinga 1991a, 23). But why *should* this be probable on the hypothesis of special creation?¹⁹ Would *this*

hypothesis have been able to predict in advance that such biochemical similarities would be found? Why would God, if “specially” creating a new kind, give it the sort of biochemical constitution that would be likely to suggest that it shared a common ancestry with other organisms? Again, in regard to significant homologies between organisms, Plantinga remarks: “Well, what would prevent [God] from using similar structures?” (Plantinga 1991a, 24). But this is not the issue. Nothing would *prevent* this; i.e., it would have been *possible* for the Creator to use similar structures. But is the finding of homologies a positive reason to suppose special creation has in fact occurred? (It *is* a reason to suspect common ancestry.) Homologies would have to be antecedently *likely* (not just possible) on the hypothesis of special creation for the finding of homologies *not* to give reason to prefer the evolutionary hypothesis.

Let me stress once again the criterion of consilience. Evidence from three quite disparate domains supports a single coherent view of the sequence of branchings and extinctions that underlie TCA. If TCA is *false*, if in fact the different kinds of organisms do not share a common ancestry, this consilience goes unexplained. It is all very well to say: “but God *could* have. . .”. This hypothesis treats the consilience exhibited by TCA as a coincidence; it does not explain it. So it is not as though allowing the theistic alternative into the range of possible explanations alters the balance of probability drastically, as Plantinga supposes. TCA is, of course, a *hypothesis*, as any reconstruction of the past must be. But it remains by far the best-supported response, for the theist as for others, to the fast-multiplying evidence available to us.

THEORIES OF EVOLUTION

What about the objections to the neo-Darwinian theory of evolution, as such, as distinct from TCA? Plantinga outlines a familiar objection to any theory which relies on natural selection as the primary mechanism of evolutionary change. There is no plausible evolutionary pathway (he argues) linking an eyeless organism, say, with an organism possessing the complex structures of the mammalian eye, such that every single stage along the way can be shown to be adaptively advantageous. This is the oldest of objections to Darwin’s theory; it was the primary criticism raised by Mivart in his *Genesis of Species* (1871). Darwin’s own first response was to emphasize that his theory did not rely on natural selection alone.²⁰

Among the other processes that he proposed, one in particular is still emphasized: change of function, where a structure that originally

developed because of the adaptive advantage offered by a particular function takes on a new function (especially under the impact of change of habitat or the like). Another process whose importance has only recently come to be recognized is genetic drift. In the isolated and often small populations that furnish the likeliest starting-point for the speciation process, there can be a sort of genetic random sampling error that eventually marks off the smaller population from the parent population. Additionally, there can be "hitchhiker" effects of all sorts due to genetic linkage. These processes do not operate independently of natural selection, but they can easily bring about results not possible with the model of evolutionary change that requires an adaptive advantage at every step (Mayr 1960). Defenders of the modern synthesis are as quick as Darwin was to insist that they are *not* limited in their explanatory strategies to the selectionist model only. Mayr, for instance, repudiates what he calls selectionist extremism:

Much of the phenotype is a byproduct of the evolutionary past, tolerated by natural selection but not necessarily produced under current conditions. . . . The mere fact of the vast reproductive surplus in each generation, together with the genetic uniqueness of each individual in sexually reproducing species, makes the importance of selection inescapable. This conclusion, however, does not in the least exclude the probability that random events also affect chances of survival and of the successful reproduction of an individual. The modern theory thus permits the inclusion of random events among the causes of evolutionary change. Such a pluralistic approach is surely more realistic than any one-sided extremism. (Mayr 1988, 136, 140)

Still, he also wants to say that the modern synthesis of which he is perhaps the leading representative "was a reaffirmation of the Darwinian formulation that all *adaptive* evolutionary change is due to the directing force of natural selection on abundantly available variation" (1988, 527; emphasis mine).

Nevertheless, to some critics of the modern synthesis, these concessions are not enough. Gould, for example, has criticized what he calls the adaptationist program for its failure to take seriously the many alternatives to trait-by-trait selection on the basis of adaptive advantage. Instead, he notes the constraints that the integrity of the structure of the organism as a whole sets on possible pathways of change, so that the outcome is explicable rather more by the nature of the constraints than by the application of selectionist norms to individual traits (Gould and Lewontin 1979). Kimura has developed a controversial molecular-level theory according to which most changes in gene frequencies are "neutral," i.e., carry no selective advantage. More radical challenges come from those who rely on

macromutations (saltations) to bridge major discontinuities in the fossil record; theories of this sort, it is generally thought, face intractable problems.²¹

Where does all this leave us? The defenders of the modern synthesis base their confidence on the substantial explanatory successes of their model. They have no illusions about having explained everything; in particular, they concede that the processes responsible for the origins of the main phyla are not well understood. In the early stages of life's development on earth, sixty or seventy different phyla (morphological types) developed, most of which became extinct. Not a single new phylum, apparently, has originated since the Cambrian period, more than four hundred million years ago. It would seem that the genetic structures of this early period were not as fixed as they later became. Thus, selection then may have had fewer constraints than later on, when highly cohesive genotypes developed; the rate of species change might thus have been quite rapid, lowering the chances of an adequate fossil record of the changes.

The Darwinian model has already been substantially reshaped over the last fifty years, while retaining the original emphasis on the transformative powers of selection operating on individual differences. Undoubtedly, more such reshaping lies ahead. Like any other active scientific theory, the modern synthesis is incomplete, but its exponents argue that there are no *in-principle* barriers to its continued successful extension to the difficult cases. A minority has proposed that a more radical transformation is needed, one which abandons either the gradualism or the heavy reliance on selection that have marked the Darwinian approach.²² The most extreme view is represented by Michael Denton, who argues that *all* current theories of evolution are in principle inadequate to handle macroevolution, and that we have to await another quite different sort of theory.

Where does the burden of proof lie in a matter of this sort? The claim that principles of a broadly Darwinian sort are capable of explaining the origins of the diversity of the living world rests on the successes of the theory to date. These are very considerable; they span many fields and have shown intricate linkages between those fields. In particular, the theory has shown an extraordinary fertility as it has been extended into new domains; even when it has encountered anomalies, it has shown the capacity to overcome these in creative ways that are clearly not *ad hoc*.²³ This is the sort of thing that impresses those who are actually in touch with the detail of this research. And it gives a *prima facie* case for supposing that the theory can be further extended to contexts not yet successfully

treated. But, of course, this cannot in the strong sense be *proved*; it can only be made to seem more (or less) plausible.

On the other side is the claim that theories of a Darwinian type are incapable of entirely overcoming certain kinds of problems: gaps in the fossil record, the origin of complex organs like the eye, the origin of the broad divisions of the living world (the phyla), or the like. Claims of this sort are hard to establish because they cannot anticipate the trajectory that the theory itself may follow as it is reworked in the light of new challenge. (Could the changes of the last century leading up to the modern synthesis have been foreseen?) This is not to say that such claims can *never* be established, or at least shown to be strongly supported. So it is not that the burden of proof falls on one side exclusively. Adjudicating between modern Darwinists and their critics is a matter of weighing up the merits of the case on each side, and then making some kind of comparative assessment, informed by parallels from the earlier history of science, and a very detailed knowledge of the history and contemporary situation of the various fields where the neo-Darwinian paradigm is applied.

Concerning theories of evolution in general, Plantinga remarks that they can never tell the *whole* story of the genetic changes involved, the rates of mutation, the links between gene adaptation, and so forth: "Hence we don't really know whether evolution is so much as biologically possible" (Plantinga 1991a, 26). But first of all, evolutionary explanation begins at the level of the biological individual and the population, not the gene; natural selection operates on adaptations of whose genetic basis we may be (and usually are) entirely unaware. And the explanation is none the less real for that. But, more important, evolutionary explanation is of its nature *historical*, and historical explanation is not like explanation in physics or chemistry. It deals with the singular and the unrepeatable; it is thus *necessarily* incomplete. One must be careful to apply the appropriate criteria when assessing the merits of a particular explanation. An evolutionary explanation can never be better than plausible; the real problem lies in discriminating between different degrees of plausibility. The dangers of settling for a very weak sort of plausibility are real (recall Gould's "just so" stories). But the dangers of requiring too strong a degree of confirmation before allowing *any* standing to an evolutionary explanation ("Hence we don't really know . . .") are just as great.

The presumed inadequacy of current theories of evolution is part of what leads Plantinga to propose his own alternative: "God created mankind, as well as many kinds of plants and animals, separately

and specially” (Plantinga 1991a, 22). Which kinds? More than 99.99 percent of the species that existed since life first appeared on earth are now extinct. (These have a part to play in the evolutionary story, but ought to be puzzling for defenders of special creation.) Plantinga’s response is that he does not have to specify the points at which special creation is supposed to have occurred, since his aim is only to call TCA into question, not to propose an alternative explanation (Plantinga 1991b, 88–89). But surely his claim that for the theist TCA “is less likely than not” depends essentially on the theist’s producing an alternative explanation (i.e., special creation by some means) for those newly appearing forms for which an adequate evolutionary account is held to be lacking? His critique of TCA is aimed at establishing “enormous gaps among the major forms” (Plantinga 1991b, 104), gaps which evolution cannot account for. When he holds that it is more probable than not that God specially created “some forms” of prehuman life, he is presumably alluding to those forms which evolution cannot in his view explain. It is their supposed inexplicability in evolutionary terms that furnishes the warrant for his claim; there do not appear to be any independent *theological* grounds for it.²⁴

Establishing the presence of gaps in the evolutionary account is thus essential to his case. This stress on gaps is reminiscent in one respect of eighteenth-century natural theology. Plantinga’s intention is not, of course, to make of the gaps an argument for God’s existence; his faith needs no such support. But he *needs* the gaps to sustain his argument, just as the natural theologians did for theirs. And he fills the gaps with God’s special action, just as they did, while also emphasizing that God is at all moments sustaining the entire process as Creator. Should one use the unflattering label, “God of the gaps,” to describe this approach? Only in the sense that it has God operate “specially” within the process of life’s origins at just those points where gaps can be claimed to exist in the evolutionary account. Plantinga is open to the possibility that at some point in the future such gaps may close; his claim that there is, nevertheless, an antecedent probability that God must have intervened in the coming to be of life rests presumably on his belief that it is highly unlikely that all of the gaps will vanish.

THE INTEGRITY OF GOD’S NATURAL WORLD

Plantinga’s original argument relied on the premise that God’s special intervention in the cosmic process is antecedently probable. Here is where he and I really part ways. My view would be that from

the theological and philosophical standpoints, such intervention is, if anything, antecedently *improbable*. Plantinga builds his case by recalling that “according to Scripture, [God] has often intervened in the working of his cosmos” (Plantinga 1991a, 22). And the examples he gives are the miracles recounted in Scripture and the life, death, and resurrection of Jesus Christ. I want to recall here a set of old and valuable distinctions between nature and supernature, between the order of nature and the order of grace, between cosmic history and salvation history. The train of events linking Abraham to Christ is not to be considered an analogue for God’s relationship to creation generally. The Incarnation and what led up to it was unique in its manifestation of God’s creative power and a loving concern for the created universe. To overcome the consequences of human freedom, a different sort of action on God’s part was required, a transformative action culminating in the promise of resurrection for the children of God, something that (despite the immortality claims of the Greek philosophers) lies altogether outside the bounds of nature.

The story of salvation is a story about men and women, about the burden and the promise of being human. It is about free beings who sinned and who therefore *needed* God’s intervention. Dealing with the human predicament “naturally,” so to speak, would not have been sufficient on God’s part. But no such argument can be used with regard to the origins of the first living cells or of plants and animals. The biblical account of God’s dealings with humankind provides no warrant whatever for supposing that God would have brought the ancestors of the various kinds of plants and animals to be outside the ordinary order of nature. The story of salvation *does* bear on the origin of the first humans. If Plantinga were merely to say that God somehow leaned into cosmic history at the advent of the human, Scripture would clearly be on his side. How this “leaning” is to be interpreted is, of course, another matter.²⁵ But his claim is a much stronger one.

To carry the argument a stage further: What would the eloquent texts of Genesis, Job, Isaiah, and the Psalms lead one to expect? What have theologians made of these texts? This is obviously a theme that far transcends the compass of an essay such as this one. I can make a couple of simple points. The Creator whose powers are gradually revealed in these texts is omnipotent and all-wise, far beyond the reach of human reckoning. God’s providence extends to all creatures; they are all part of a single plan, only a fragment of which we know, and that darkly. Would such a being be likely to “intervene”

in the cosmic process, that is, deal in two different manners with it? (Let me emphasize that I am uncomfortable with this language of “likelihood” with regard to God’s action, as though we were somehow capable of catching the Creator of the galactic universe in the nets of our calculations.) Why should an omnipotent God not create a universe in which God’s ends with regard to all creatures except humans would be achieved in a *natural* way? Ought one not expect a fundamental integrity in the work of such a Creator?²⁶ If one may use the language of antecedent probability at all here—and I am not at all sure that one may—it surely must point away from special creation.

Saint Augustine may help us, perhaps, to formulate the most persuasive theological response to this question. He was the first to weave from biblical texts and his own best understanding of the Church’s tradition the full doctrine of creation *ex nihilo* as Christians understand it today. And in the *De Genesi ad litteram*, his commentary on the very texts in Genesis where the writer speaks of the coming to be of the plant and animal world on the fifth and sixth “days” of creation, he enunciated the famous theory of the *rationes seminales*, the seed-principles which God brings into being in the first moment of creation, and out of which the kinds of living things will, each in its own time, appear (Mc Mullin 1985, sec. 4). The “days,” said Augustine, must be interpreted metaphorically as indefinite periods of time. And instead of inserting new kinds of plants and animals ready-made, as it were, into a preexistent world, God must be thought of as creating in that very first moment the potencies for all the kinds of living things that would come later, including the human body itself:

In the seed, then, there was invisibly present all that would develop in time into a tree. And in this same way we must picture the world, when God made all things together, as having had all things which were made in it and with it when day was made. This includes not only the heavens with sun, moon, and stars . . . but also the beings which water and earth contained in potency and in their causes, before they came forth in the course of time. (Augustine 1982, vol. 1, 175)

This is, of course, not an evolutionary theory; the species do not come from one another, so there is no common ancestry. But Augustine would not have attributed an antecedent probability to God’s “intervening” in the midst of the cosmic process to bring the first kinds of plants and animals abruptly to be, rather than having them develop in the gradual way that seeds do.

TOO MUCH AUTONOMY?

But what are we to make of Plantinga's objection that having life coming gradually to be according to the normal regularities of natural process is "semideistic", i.e., that it attributes too much autonomy to the natural world? He says:

God could have accomplished this creating in a thousand different ways. It was entirely within his power to create life in a way corresponding to the Grand Evolutionary Scenario . . . to create matter . . . together with laws for its behavior, in such a way that the inevitable²⁷ outcome of matter's working according to these laws would be first, life's coming into existence three or four billion years ago, and then the various higher forms of life, culminating as we like to think, in humankind. This is a semi-deistic view of God and his working. (Plantinga 1991a, 21)

He contrasts this alternative with the one he favors:

Perhaps these laws are *not* such that given enough time, life would automatically emerge. Perhaps he did something different and special in the creation of life. Perhaps he did something different and special in creating the various kinds of animals and plants (Plantinga 1991a, 22).

Plantinga's characterization of the first alternative as semideistic is intended to validate the second alternative as the appropriate one for the Christian to choose. But why should the first alternative be regarded as semideistic? He allows that it was within God's power to bring about cosmic evolution, but then asserts that to say God *did* in fact fashion the world in this way would be semideistic. This is puzzling. It would be semideistic, perhaps, if we *already* knew that God had intervened in bringing into existence some kinds of plants and animals, in which case the "grand evolutionary scenario" would attribute a greater degree of autonomy to the natural world than would be warranted. But this is exactly what we do *not* know. And to assume that we *do* know it would beg the question.

The problem may lie in the use of the label *semideistic*.²⁸ A semi-deist, Plantinga remarks, could go so far as to allow that God "starts everything off" and "constantly sustains the world in existence" and could even maintain that "any given causal transaction in the universe requires specific divine concurrent activity." All this would, apparently, not be enough to make such a view acceptable. What more could be needed? Defining God's relationship with the natural order in terms of creation, conservation, and *concursum*, has been standard, after all, among Christian theologians since the Middle Ages. Perhaps what still needs to be made explicit is that God *could* also, if God so chose, relate to the created world in a different way, either by way of special creation, or in the dramatic mode of a grace

that overcomes nature and of wonders that draw attention to the covenant with Israel and ultimately to the person of Jesus. The possibility of such an “intrusion” on God’s part into human history, of a mode of action that lies *beyond* nature, must not be excluded in advance, must indeed be affirmed. I take it that the denial that such a mode of action *is* possible on the part of the Being who creates and conserves and concurs is what constitutes semideism, in Plantinga’s sense of that term.

But someone who asserts that the evolutionary account of origins is the best-supported *one* is *not* necessarily a semideist in this sense. Some defenders of evolution—notably those who deny the existence of a Creator and are, therefore, not deists of *any* sort—would, of course, exclude special creation in this way, in principle. But there is no intrinsic connection whatever between the claim that God did, in fact, choose to work through evolutionary means and the far stronger claim that God *could* not have done otherwise. Nor, of course, is there any reason why someone who defends the evolutionary account of origins should go on to deny that God might intervene in the later human story in the way that Christians believe God to have done.

In sum, then, at least *four* alternatives would have to be taken into account here. There are those who defend the evolutionary account of origins, and also rejecting the existence of God, would (if pressed) say that life could not *possibly* have come to be except through evolution. There may be those who maintain that God created, conserves, and concurs in the activity of the universe but *could* not “intervene” in a special way in its history to bring new kinds of animals and plants to be, for example. These (if they exist) are the semideists Plantinga describes. Then there are those who prefer the evolutionary account of origins on the grounds of evidence that this is in fact most probably the way it happened, but who are perfectly willing to allow that it was within the Creator’s power to speed up the story by special creation of ancestral kinds of plants and animals, even though (in their view) this was not what God did. This is a view that a great many Christians from Darwin’s day to our own have defended; it is the view I am proposing here. It is *not* semideistic. And finally, there is the option of special creation: that God *did*, in fact, intervene by bringing various kinds of living things to be in a “special” way.

When Plantinga presents two alternatives only, the second being that God might “perhaps” have intervened as defenders of special creation believe occurred, he must be supposing that the other alternative, the “grand evolutionary scenario,” is one that excludes such a “perhaps”; i.e., that excludes, *in principle*, the possibility that God

could have intervened in a special way in the natural order. What I am challenging is this supposition. The Thesis of Common Ancestry can claim, as we have seen, an impressive body of evidence in its own right. It need not rely on, nor does it entail any in-principle claim about what God could or could not do.²⁹

CONCLUSION

So, finally, how *should* the Christian regard this thesis? Perhaps better, since there are evidently “distinctive threads in the tapestry of Christianity” in Plantinga’s evocative metaphor (1991a, 30), how might someone respond who sees in the Christian doctrine of creation an affirmation of the integrity of the natural order? TCA implies a cousinship extending across the entire living world, the sort of coherence (as Leibniz once argued) that one might expect in the work of an all-powerful and all-wise Creator. The “seeds,” in Augustine’s happy metaphor, have been there from the beginning; the universe has in itself the capacity to become what God destined it to be from the beginning, as a human abode, and for all we know, much else.

When Augustine proposed a developmental cosmology long ago, there was little in the natural science of his day to support such a venture. Now that has changed. What was speculative and not quite coherent has been transformed, thanks to the labors of countless workers in a variety of different scientific fields. TCA allows the Christian to fill out the metaphysics of creation in a way that (I am persuaded) Augustine and Aquinas would have welcomed. No longer need one suppose that God must have added plants here and animals there. Though God *could* have done so, the evidence is mounting that the resources of the original creation were sufficient for the generation of the successive orders of complexity that make up our world.

Thus, common ancestry gives a meaning to the history of life that it previously lacked. From another perspective, this history now appears as preparation. The uncountable species that flourished and vanished have left a trace of themselves in us. The vast stretches of evolutionary time no longer seem quite so terrifying. Scripture traces the preparation for the coming of Christ back through Abraham to Adam. Is it too fanciful to suggest that natural science now allows us to extend the story indefinitely farther back? When Christ took on human form, the DNA that made him son of Mary may have linked him to a more ancient heritage stretching far beyond Adam to the shallows of unimaginably ancient seas. And so, in the Incarnation, it would not have been just human nature that was joined to

the Divine, but in a less direct but no less real sense all those myriad organisms that over the aeons had unknowingly shaped the way for the coming of humanity.³⁰

Anthropocentric? But of course: The story of the Incarnation is anthropocentric. Reconcilable with the evolutionary story as that is told in terms of chance events and blind alleys? I believe so, but to argue it would require another essay. Unique? Quite possibly not: Other stories may be unfolding in very different ways in other parts of this capacious universe of ours. Terminal? Not necessarily: We have no idea what lies ahead for humankind. The transformations that made us what we are may not yet be ended. Antecedently probable from a Christian perspective? I will have to leave that to the reader.

NOTES

1. For the text of the judgment, "Mc Lean vs. Arkansas," see Gilkey 1985, 266-301. The judgment is not itself without some logical difficulties; see Quinn 1984.

2. Plantinga's essay was featured in a special issue of *Christian Scholar's Review* 21 (1991), 8-32 (here 1991a). The issue carried critical responses by Howard Van Till (33-45), and myself (55-79), as well as a detailed reply by Plantinga (here 1991b). The present essay is a revised and considerably augmented version of my paper in that volume. I am grateful to Dr. Plantinga for our discussions of these issues, and for the characteristic care he took in responding to my original criticisms.

3. In defense of his usage, Plantinga notes that theology at an earlier time was called a science (1991b, 98). But this usage was recognized to be problematic from the Aristotelian viewpoint of that time. To the objection that theology cannot be regarded as a science because it proceeds from premisses not admitted by all, Aquinas responds that because these premisses are revealed by God, they can be accepted on authority, just as optics takes its principles from geometry (*Summa Theologica*, Vol. I, q. 1, a. 2). But this does not really answer the objection adequately, since the revealed character of these premisses is not admitted by all. And the Aristotelian distinction between what is better known to us and what is better known "in itself" will not do the work. When the Aristotelian conception of science (deduction from self-evident premisses) was gradually abandoned in the seventeenth century, the new conceptions that succeeded it made the extension of the term *science* to theology even more problematic, particularly in the present context of the knowledge of nature.

4. Calling it God's "direct" action would leave matters ambiguous, since it could be said that God's action in sustaining the world in existence is direct action; this sort of action is, of course, not in dispute here. What makes God's "special" action inaccessible to the methods of natural science is that it lies, as medieval philosophers put it, "outside nature," outside the pattern of regularities that afford a foothold for later inquirers. The most that science could do where "special" action is claimed, as in the case of miracles, would be to exclude, as far as possible, alternative "natural" explanations. But when special creation is supposed to have occurred in the early history of life on earth, this (as we shall see) is *very* difficult to do.

5. This argument does not depend on an ability to draw a sharp demarcation between science and nonscience. Scientists often rely on principles of natural order of a broadly metaphysical sort, but these are in principle accessible to all; they are over the long run at least partially adjudicable in terms of the "success" (in a fairly specific sense) of the theories employing them. (See Mc Mullin, in press). Reliance on Scripture is another matter entirely.

6. As an illustration of how Scripture could "correct current science," Plantinga

remarks: "If, for example, current science were to return to the view that the world has no beginning, and is infinitely old, then current science would be wrong" (Plantinga 1991a, 14). I do not believe that Scripture *does* prescribe that the universe had a beginning in time, in some specific technical sense of the term *time*; the point of the creation narratives is the dependence of the world on God's creative act, to my mind, not that it all began at a finite time in the past. A world that has always existed would still (as Aquinas emphasized) require a creator. As an illustration of how complex the notion of temporal beginnings has become, the Hawking model of cosmic origins mentioned by Plantinga does not imply that the universe is infinitely old (as that phrase would ordinarily be understood), but rather that as we trace time backwards to the Big Bang, the normal concept of time may break down as we approach the initial singularity some 15 billion years ago. The history of "real time" (as Hawking calls it) would still be finite in the same terms as before, as he explicitly points out (Hawking 1988, 138). The question of whether or not the time elapsed in cosmic history is finite or infinite depends, in part, on the choice of physical process on which to base the time scale, particularly on whether it is cyclic or continuous. The question of the finitude or infinity of past time, so much debated by medieval philosophers and theologians, cannot straightforwardly be answered in absolute terms. The notion of time measurement is far more complex and theory-dependent than earlier discussions allowed. But the theological *point* of the biblical account of creation remains untouched by technical developments such as these (Mc Mullin 1981, 35).

7. The exponents of physico-theology were not entirely sure how to classify their arguments from design concerning origins. These could not be directly tested in the normal empirical ways, but it did seem as though "naturalist" explanations could be systematically excluded.

8. Maurice Finocchiaro provides a new translation of the *Letter* in *The Galileo Affair* (1989).

9. It would be tempting to call this the Galilean principle, since it was Galileo's most distinctive contribution to the discussion and fairly clearly the principle he favored. But since he did, after all, allude to several others, it could be misleading to attach his name to one of them rather than to the others.

10. Galileo introduced one further way of dealing with tensions between Scripture and natural science, suggesting that the biblical authors accommodated themselves to their hearers. This does not, in practice, reduce to either of the principles above. The notion of accommodation had already been hinted at by theologians as diverse as Thomas Aquinas and John Calvin. But this is not the place for an exhaustive analysis of the logical complexities of the famous letter. See Mc Mullin 1983 and Moss 1983.

11. I am expressing this question, of course, from the perspective of someone who takes the Bible seriously as an authoritative source.

12. There is, of course, the larger issue of deciding on the proper approach for the Christian to take to Scripture generally. Plantinga characterizes the Reformed Christian as one who takes "Scripture to be a special revelation from God himself." Thus, for example, the story of Abraham, including the details of where he lived and journeyed and how he came to father a son, becomes a matter of history in the modern sense of that term, to be construed (in Plantinga's view) as having the standing of science. There is an implicit literalist presumption here that an Unreformed Christian like myself, someone unsympathetic, that is, to the constraints of the "*sola Scriptura*" maxim, would want to question.

13. I would like to acknowledge at this point my debt to the many who in discussions past have helped me overcome the bafflement that evolutionary theory induces in the nonexpert. In particular, my thanks go to Francisco Ayala, John Beatty, Bill Charlesworth, Ernst Mayr, Bob Richards, and Phil Sloan.

14. The rate of change depends on a variety of factors, including environmental ones, so that it is quite variable (with a variance two or three times the mean, in technical terms). By contrast, the rate of radioactive decay, also used for probing the distant past, is relatively uniform. Cytochrome C, a small molecule, changes relatively slowly, so that it would not serve to separate "recent" events like the splitting of the hominid from the

chimpanzee and gorilla lineages. (All three of these exhibit the same cytochrome C sequence.) Other molecules change much more rapidly, especially those "silent" segments of DNA that do not seem to affect the development or functioning of the organism and thus may not be subject to negative selection when changes in them occur. Because of the variability in the rates of change of particular proteins or segments of DNA, these rates must be used with caution to time branching events in the past. The "molecular clock" allows at best only a rough estimate for any particular molecule, as Ayala and other geneticists have emphasized. Since, however, literally thousands of different chemical sequences are available for scrutiny, each with its own history, cross-comparison can enable a gradual convergence to occur. Whether it *does*, in fact, occur is challenged by Scherer (1990), quoted by Plantinga. The extent to which molecular change can be relied on to furnish a chronology of past branching events is debated; most workers in this very active field of research agree, however, that it does furnish a rough clock whose accuracy will improve as more and more sequences are compared.

15. Plantinga argues that because of the numerous gaps, "the fossil record fits versions of special creation considerably better than it fits TCA: it suggests the independent appearance of the major bauplans . . . with substantial evolution proceeding out from these *Ur* forms. The enormous gaps between the major forms would be much better accommodated on such a view than on TCA" (Plantinga 1991b, 104). Here the intricate molecular relationships between the different phyla loom large: They are much more easily intelligible in the TCA scenario than on the supposition of an independent "special" origin for each phylum.

16. Against this line of argument, Plantinga objects that many species, like the lamprey and the horseshoe crab, remain morphologically unchanged over tens of millions of years (Plantinga 1991b, 106). How is this possible if a steady change is going on at the molecular level on which heredity depends? He notes that the standard response to this is to say that the molecular and the morphological levels must be decoupled, so that change can go on in the one without substantially affecting the other, but he regards this suggestion as a mere "epicycle" meant to save the theory. There is, however, a great deal of independent evidence for this sort of decoupling. Kimura and others have shown that many changes at the molecular level are neutral as far as the phenotype is concerned, and it is, of course, at the level of the phenotype that selection goes on. Mayr notes: "DNA sequences believed to be functionless, such as pseudo-genes and certain introns, behave as if selectively neutral and may thus be subject to rapid change, owing to genetic drift and to their being immune to stabilizing selection" (Mayr 1988, 102). Even among the "active" genes, most code for "housekeeping" functions, like metabolism, and do not affect morphology directly. In the 1940s, Dobzhansky studied "sibling" species which did not interbreed, though morphologically almost identical. In the 1960s, it was discovered that these species can be genetically very different. In some cases where the difference amounts to upwards of half of the total gene content, the species must have diverged several million years ago, while their morphology remained substantially the same because of strong selection pressures against change.

17. In this regard, the position adopted by Michael Denton, one of the most sweeping recent critics of evolutionary theory, is quite puzzling. On the one hand, he finds the sort of consilience described above altogether remarkable: "It became increasingly apparent as more and more sequences accumulated that the differences between organisms at a molecular level corresponded to a large extent with their differences at a morphological level; and that all the classes traditionally identified by morphological criteria could also be detected by comparing their protein sequences. . . . The divisions turned out to be more mathematically perfect than even the most die-hard typologists would have predicted" (1986, 276, 278). But the distances between the molecular sequences characteristic of different species can only be explained (he argues) by postulating a remarkably uniform "molecular clock" marking the rate of change in the constituents of particular kinds of molecules (and varying from one kind to another), and such a "clock" (he maintains) is impossible to understand on neo-Darwinian principles. What would seem, at most, to follow from this is that neo-Darwinian theory cannot explain the uniformity of the postulated "clock." But he assumes that he has also

refuted TCA, while providing no hint himself as to how the correspondences he finds so remarkable might be explained by something *other* than common ancestry. (Whether differences at the molecular level correspond as closely as he claims with differences at the morphological level is open to question; see footnote 16.)

18. A further problem is suggested by the notion of a "natural" population. Reproductive isolation in the animal world is due, in the first instance, to *behavioral* barriers, which are the main isolating mechanisms (Mayr 1988, 320). Under artificial circumstances, such barriers can be overcome, but this will not necessarily give rise to new biological species. Likewise, deliberate interbreeding to produce new varieties of domestic dog, for example, will not produce a natural population with its own behavioral barriers to outbreeding.

19. Plantinga responds without elaboration in 1991b that the molecular evidence "fits particularly well" with those versions of special creation "that involve typology, the idea that God created ancestors of the main types of animal and plant life, with subsequent evolution" (1991b, 105). But is there some antecedent reason we should expect God to restrict the first members of each type to a narrow range of structures at the molecular level? Nineteenth-century critics of evolutionary theory, like Owen and Agassiz, claimed that the evidence from morphology and paleontology points to the existence of discrete "types." These types were then taken to represent both ideas in the mind of God and immanent principles of living growth. The idealist assumption of "ideas" in God's mind that would antecedently favor discreteness over continuity is obviously open to question.

20. Indeed, he showed some uncharacteristic indignation in his comment in the last edition of the *Origin of Species* (1872): "As my conclusions have lately been much misrepresented, and it has been stated that I attribute the modification of species exclusively to natural selection, I may be permitted to remark that in the first edition of that work, and subsequently, I placed in a most conspicuous position—namely, at the close of the Introduction—the following words: 'I am convinced that natural selection has been the main but not exclusive means of modification.' This has been of no avail. Great is the power of misrepresentation" (395).

21. One such problem is that a mutation affecting the phenotype in a major way would be likely to require coordinated change in hundreds of genes; another is that a macromutation in a single individual would not be enough, in a sexually reproducing species, to establish a new kind right away. The role of mutations in evolutionary change is much less dramatic than is often conveyed in popular accounts; they serve mainly to augment the stock of variations in a population upon which recombination can work. (Recombination is the blending of paternal and maternal DNA in each new biological individual in a sexually reproducing species; it is responsible for the fact that each such individual is different from all others.)

22. The differences between the punctuated equilibrium model of Gould and Eldredge and the standard one of the modern synthesis are not nearly as great as was originally claimed. In particular, Gould's original assertion that only a "non-Darwinian" theory could handle the evidence from the fossil record was quite clearly based on a very narrow construal of what ought to count as "Darwinian." Mayr has to my mind convincingly shown that Gould's own model is compatible with Darwinian principles (Mayr 1988, ch. 26).

23. Denton's comparison of the modern synthesis to late Ptolemaic astronomy with its profusion of epicycles, and his conclusion that it is a paradigm in crisis (1986, ch. 15) cannot, I think, be sustained. The crucial question in this context would be what constitutes an ad hoc modification (what he oddly calls a tautology).

24. In his original 1991a, as we have seen, he invoked a theological premise (the salvation story reveals God as one who constantly "intervenes"). To the extent that he has in his 1991b laid aside the idea of basing the antecedent likelihood of special creation on such a premise, he is forced to rely exclusively on the "gaps" strand of the argument.

25. "God fashioned Adam from the dust of the earth and breathed into his nostrils the breath of life" (Genesis 2:7). The "fashioning" here could be that of a billion years of evolutionary preparation of that "dust" to form beings that for the first time could freely affirm or freely deny their maker. Pope Pius XII in his encyclical *Humani Generis*

(1950) allowed that such an evolutionary origin of the human body was an acceptable reading of the Genesis text. But he added that the human *soul* could not be so understood; souls must be "immediately created" by God (1950, 181). The Platonic-sounding dualism underlying this distinction requires further scrutiny. The uniqueness of God's covenant with men and women and of the promise of resurrection does not require that there be a naturally immortal soul, distinct in its genesis and history from its "attendant" body. But it is unnecessary to develop this issue here, since Plantinga's challenge extends to the evolutionary account of the plant and animal worlds, not simply of the human alone.

26. Van Till in his contribution to this discussion (1991) and more fully in his 1986 work, also stresses this theme of the integrity of the natural order under the supposition that it is the work of an omnipotent Creator.

27. *Inevitable* is a word that defenders of evolution, whether theists or not, would be inclined to challenge. It suggests that the evolutionary process is, at least in a general way, deterministic or predictable. But this is just what nearly all theorists of evolution would deny.

28. In the entry under *deism* in *The Encyclopedia of Religion*, Allen Wood remarks that the term *deism* tended over time to become "a vague term of abuse" when used by Christian writers with regard to hypotheses that in their view attributed an undue degree of autonomy to the universe.

29. There is one further perspective on this matter of semideism that I have set aside above. The occasionalists of the fourteenth century maintained that God is the *only* cause, strictly speaking, of what happens in the world. What appears to be causal action within the world is for them no more than temporal succession. Things do not have natures that specify their actions; rather, the fact that they act according to certain norms must be directly attributed to God's intentions. There is no reason in this view why God should not, for example, suddenly make new kinds of plants and animals appear, if God so wishes; since there is no order of *nature*, God is committed only to the reasonable stability of (more or less) regular succession on which human life depends. (The issue that separated the nominalists from the Aristotelian defenders of real causation in nature is brought out very well in the essay by Alfred Freddoso [1988] cited by Plantinga.) In this perspective, the issue of special creation comes to be posed in a quite different way. Any view which affirms the sufficiency of the natural order for bringing about the origins of life might be dubbed by the occasionalist as semideist. When I read the paragraph where Plantinga says that someone who maintains that God creates, conserves, and concurs in the activity of the universe can still be semideistic, my first reaction was to assume that this committed him to occasionalism, since it would seem that it is *only* from the occasionalist perspective that this view of God's relationship with the natural order would be classed as semideist. But Plantinga is quite evidently not an occasionalist; his treatment of natural science implies that he believes in the operation of secondary causation in nature. Thus, I have assumed in the discussion above that he must have had something else in mind when speaking of semideism, namely, the openness of creation to the supernatural order of grace and miracle. Incidentally, the occasionalist *would* be likely to believe that special creation is antecedently more probable, and (in Berkeley's version, at least) might tend to question a theory, like the theory of evolution, which depends on the reality of such causes as genetic mutation.

30. Though the alert reader will have caught echoes of the theology (not the biology) of Teilhard de Chardin, the affinities with the Christology of Karl Rahner are, perhaps, more immediate. See, for example, Rahner 1961, 30.

REFERENCES

- Anderson, Bernhard W. 1983. "The Earth is the Lord's: An Essay on the Biblical Doctrine of Creation." In *Is God a Creationist?*, ed. R. M. Frye, 176-96. New York: Scribner.
- Augustine, Saint. 1982. *The Literal Meaning of Genesis*, trans. J. H. Taylor. 2 vols. New York: Newman.

- Ayala, Francisco. 1985. "The Theory of Evolution: Recent Successes." In *Evolution and Creation*, ed. Ernan Mc Mullin, 59-90. Notre Dame, Ind.: Univ. of Notre Dame Press.
- Bergant, Dianne, and Carroll Stuhlmueller. 1985. "Creation According to the Old Testament." In *Evolution and Creation*, ed. Ernan Mc Mullin, 153-75. Notre Dame, Ind.: Univ. of Notre Dame Press.
- Clifford, Robert. 1988. "Creation in the Hebrew Bible." In *Physics, Philosophy, and Theology*, 151-70. See Russell 1988.
- Darwin, Charles. 1872. *On the Origin of Species*. 6th ed. London: Murray.
- Dawkins, Richard. 1987. *The Blind Watchmaker*. New York: Norton.
- Denton, Michael. 1986. *Evolution: A Theory in Crisis*. Bethesda, Md.: Adler and Adler.
- Finocchiaro, Maurice. 1989. *The Galileo Affair*. Berkeley: Univ. of California Press.
- Freddoso, Alfred. 1988. "Medieval Aristotelianism and the Case against Secondary Causation in Nature." In *Divine and Human Action*, ed. T. V. Morris, 74-118. Ithaca, N.Y.: Cornell Univ. Press.
- Gilkey, Langdon. 1985. *Creationism on Trial*. Minneapolis: Winston.
- Gould, S. J., and R. Lewontin. 1979. "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme." *Proceedings of the Royal Society of London* B205: 581-98.
- Hawking, Stephen. 1988. *A Brief History of Time*. New York: Bantam Books.
- Kellenberger, James. 1972. *Religious Discovery, Faith, and Knowledge*. Englewood Cliffs, N.J.: Prentice-Hall.
- Mc Mullin, Ernan. 1967. *Galileo, Man of Science*. New York: Basic Books.
- . 1981. "How Should Cosmology Relate to Theology?" In *The Sciences and Theology in the Twentieth Century*, ed. A. R. Peacocke, 17-57. Notre Dame, Ind.: Univ. of Notre Dame Press.
- . 1983. "Galileo as a Theologian." Fremantle Lecture presented at Oxford University.
- . 1984. "The Rational and the Social in the History of Science." In *Scientific Rationality: The Sociological Turn*, ed. J. R. Brown, 127-63. Dordrecht, The Netherlands: Reidel.
- . 1985. "Introduction." In *Evolution and Creation*, ed. Ernan Mc Mullin, 1-56. Notre Dame, Ind.: Univ. of Notre Dame Press.
- . 1988. "Natural Science and Belief in a Creator." In *Physics, Philosophy, and Theology*, 49-79, ed R. J. Russell, W. R. Stoeger, and G. V. Coyne. Notre Dame, Ind.: Univ. of Notre Dame Press and Rome: Vatican Observatory Press.
- . In press. "Indifference Principle and Anthropic Principle in Cosmology." *Studies in the History and Philosophy of Science*.
- Mayr, Ernst. 1960. "The Emergence of Evolutionary Novelities." In *The Evolution of Life*, ed. S. Tax, 349-80. Chicago: Univ. of Chicago Press.
- . 1963. *Animal Species and Evolution*. Cambridge: Harvard Univ. Press.
- . 1988. *Toward a New Philosophy of Biology*. Cambridge: Harvard Univ. Press.
- Moss, Jean Dietz. 1983. "Galileo's Letter to Christina: Some Rhetorical Considerations." *Renaissance Quarterly* 37: 547-76.
- Pius XII. [1950] 1981. *Humani Generis*. In *The Papal Encyclicals 1939-1958*, ed. Claudia Carlen. Raleigh: McGrath.
- Plantinga, Alvin. 1991a. "When Faith and Reason Clash: Evolution and the Bible." *Christian Scholar's Review* 21: 8-32.
- . 1991b. "Evolution, Neutrality, and Antecedent Probability: A Reply to Van Till and Mc Mullin." *Christian Scholar's Review* 21: 80-109.
- Provine, William B. 1987. Review of *Trial and Error. The American Controversy over Creation and Evolution*, by E. J. Larson. In *Academe* 73 (1): 50-52.
- Quinn, Philip. 1984. "The Philosopher of Science as Expert Witness." In *Science and Reality*, ed. J. T. Cushing, C. F. Delaney, and G. M. Gutting, 32-53. Notre Dame, Ind.: Univ. of Notre Dame Press.
- Rahner, Karl. 1961. "Christology within an Evolutionary View of the World." In *Theological Investigations*, 157-92. Vol. 5. Baltimore: Helicon.

- Russell, R.J., W.R. Stoeger, and G.V. Coyne, eds. 1988. *Physics, Philosophy, and Theology*, Notre Dame, Ind.: Univ. of Notre Dame Press, and Rome: Vatican Observatory Press.
- Scherer, Siegfried. 1990. "The Protein Molecular Clock: Time for Re-evaluation." *Evolutionary Biology* 24: 83-103.
- Sober, Elliott, ed. 1984. *Conceptual Issues in Evolutionary Biology*. Cambridge: MIT Press.
- Van Till, Howard. 1986. *The Fourth Day*. Grand Rapids: Eerdmans.
- . 1991. "When Faith and Reason Cooperate." *Christian Scholar's Review* 21: 33-45.
- Von Salvini-Plawen, L., and E. Mayr. 1977. "On the Evolution of Photo-Receptors and Eyes." *Evolutionary Biology* 10: 207-63.

Correction

The author's note was inadvertently omitted from T.L. Brink's article "Belief vs. Commitment, Validity vs. Value: A Response to Ward Goodenough" (vol. 28, no. 2, June 1993, p. 283). The note should have read, "T.L. Brink is on the faculty of Crafton Hills College, Yucaipa, California and Iberoamerican University, Mexico City. His U.S. address is 1103 North Church Street, Redlands, CA 92374. *Zygon* regrets the error.