

# *Think Pieces*

## WHOSE EVOLUTION? WHICH THEOLOGY?

by Gregory R. Peterson

*Abstract.* The importance of scientific conflicts for theology and philosophy is difficult to judge. In many disputes of significance, prominent scientists can be found on both sides. Profound philosophical and religious implications are sometimes said to be implied by the new theory as well. This article examines the dispute over natural selection between Richard Dawkins and Stephen Jay Gould as a contemporary instance of such a conflict. While both claim that profound philosophical conclusions flow from their own alternative account of evolution, I suggest that the implication is not as great as is claimed and that the alleged implications have as much to do with their own perceptions of theology as with the actual theories themselves. Nevertheless, evolutionary theory is not irrelevant for theology. Theologians should be aware of the possible implications of evolutionary theory and at the same time the extent and limits of such implications.

*Keywords:* Richard Dawkins; evolution; Stephen Jay Gould; natural selection; punctuated equilibrium.

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Paradigm shifts are difficult and exhilarating experiences for those who suffer through them. In the framework of Thomas Kuhn ([1962] 1970), a paradigm shift occurs as the result of a crisis, when an old, established theory becomes increasingly difficult to maintain and must be overthrown by a newer, more intellectually savvy competitor. Although Kuhn limited himself to the fields of astronomy, physics, and chemistry, this kind of competition can be seen in almost every scientific discipline. Within our own century, we have seen an eternal, steady-state universe give way to a Big Bang model in astrophysics, the static continents replaced by plate

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[*Zygon*, vol. 35, no. 2 (June 2000).]

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tectonics in geology, and old, cold-blooded models of dinosaurs compete with newer, warm-blooded versions in paleontology. Whether one adheres to the details of Kuhn's philosophy of science or subscribes to later, variant versions, it is plain that conflict is an important staple of scientific discourse and development. Through such conflicts new theories are born and old ones die, although it may take decades for the transition to take place.

If conflict is difficult for the participants, it is equally so for the casual and not-so-casual onlooker. While conflict can bring out the best in people, it can also bring out the worst. Scientists have from time to time demonstrated their willingness to vilify their opposition in ways that would make a political campaign manager proud. Old theories are pronounced dead, while new theories are declared unfounded and based on faulty data. Both sides claim the majority view and both eventually label the hard-core defenders of the opposing paradigm unscientific. News reporters, in turn, sensationalize the new theory as if it were already fact yet include both proponents and dissenters in the same article. During such debates it is difficult for the outsider to see clearly which version of science is truly the better theory, not least because the scientists themselves cannot agree.

Nevertheless, it is sometimes necessary to become involved. In the case of public policy, large sums of money (e.g., for a new telescope or super-collider) may be invested. For theologians and philosophers, the stakes are somewhat different. While some scientific disputes (such as plate tectonics) are of relatively little import for philosophy and theology, others (such as sociobiology) are not. In some cases, grand philosophical and theological claims are made on behalf of the new scientific theory, forcing other disciplines to get involved. The problem is what precisely one should say in response.

The ongoing and increasingly heated Gould-Dawkins debate in evolutionary biology represents a timely and relevant example of this sort of problem. When Niles Eldridge and Stephen Jay Gould published their seminal paper on punctuated equilibrium (Eldridge and Gould 1972), they called for nothing less than a revolution in the study of evolution. This and subsequent articles have produced a torrent of responses and research over the years, either to establish or refute their challenge to neo-Darwinian orthodoxy. Richard Dawkins, who more than anyone has taken up the public mantle of neo-Darwinism, has been a constant critic of many of Gould's claims, with the result that Dawkins and Gould have each become a major target of the other's sharply pointed pen (most recently, Dawkins 1997; 1998; Gould 1997b).

At the same time, neither one is content to limit his musings about evolution to strictly scientific matters but has felt compelled to extend his theorizing to philosophical, theological, and occasionally ethical claims as well. Whereas Dawkins replaces God with the blind watchmaker of natu-

ral selection (1996), Gould emphasizes the improbability of our existence at all (1989). More recently, Gould has written explicitly on science and religion and, in an editorial essay in *Science* (1999), waxed eloquent about the spiritual liberation provided by evolution. Should theologians care? And do the respective theories have the theological implications that their proponents claim? Does theology have any stake at all in whether orthodox neo-Darwinism or punctuated equilibrium and its allied theories win?

I suggest that the answers are Yes, No, and Maybe. At the very least, the Dawkins-Gould debate, which is only the focal point of a much broader interdisciplinary contest, is illustrative of the promise and perils of drawing theological implications from ongoing scientific arguments. What it does suggest is that most scientific theories are theologically ambiguous. Rather than forcing the theologian's hand one way or the other, complexities in science often reveal the complexities of theology.

#### DOES THEOLOGY NEED EVOLUTIONARY THEORY?

Traditionally it is assumed that evolutionary theory and especially the theory of natural selection have profound implications for theology. It is interesting to note that this is a nearly universally held assumption, wherever one may be on the theological and philosophical spectrum. Atheists such as Richard Dawkins and Daniel Dennett share with fundamentalists the view that evolution and theology are necessarily in conflict. Fundamentalists reject evolution because of religious commitment to the belief that the Earth was created in six days. Atheists such as Dawkins assert that natural selection obviates the need for any designer. Additionally, evolution proceeds from the simple to the complex, and a giant, universal mind would be the most complex thing of all (Floyd 1999).

When we move into the mainstream of theology, which generally does not hold to a literal interpretation of the six days of Genesis, we find an almost equal interest in evolution, albeit for two quite different reasons. First, Darwinian natural selection is often perceived as undermining traditional design arguments for God's existence, not only in the sense of replacing God with a purposeless process but also in the sense that the process does not seem to be going anywhere in particular. Not only is there no room for a God-of-the-gaps, there is little evidence to indicate that the whole of the evolutionary process was intended to lead toward the emergence of *Homo sapiens* or, for that matter, any other particular organism. Second, because human beings are themselves products of evolution and natural selection, it follows that evolutionary theory has a potentially significant contribution to make to concepts of human nature, a subject about which theology is profoundly concerned. It is unsurprising, then, that many in the science-religion dialogue have turned their attention to precisely these kinds of issues (Peacocke 1986; Ward 1996; Rolston 1999).

Among Christian theologians, it is only the neo-orthodox trajectory led by Karl Barth (officially passé in the United States but still prominent in many seminaries) that has steadfastly refused to have anything to do or say about evolution specifically or scientific theory generally. One might observe, however, that it is precisely because evolution and science in general potentially have so much to say about human nature that the neo-orthodox theologians refuse to say anything at all. For them, the crime of liberal theologians is precisely that they did say something, and that what they said threatened the purity of Christian faith. Refusing to take a stand is, in the end, taking a stand after all.

Inevitably, evolution matters to theology. The only means of escaping this conclusion is to deny the significance of origins and historicity. Various forms of existentialism and existentialist theology succeeded in doing this, but only at the expense of divorcing the human spirit from biology. Although this sort of stance may have been possible fifty years ago, it is much less so now. It is enlightening that poststructuralists differ from their existentialist precursors precisely in their return to historicity, moving from the category of “being” to that of “archaeology” (see Foucault 1972).

But how does evolution matter to theology? Because evolutionary theory touches on every aspect of life, the range of issues is potentially enormous, a fact fairly well represented in the literature. Evolutionary theory affects concepts of the origin of life, and thus concepts of creation. It affects questions of human origins, and thus questions of original sin. It affects concepts of human nature and behavior as well as destiny. It affects the question of human uniqueness, and thus the understanding of the image of God. It may even affect the formation and evolution of religious belief itself. Because soteriology and Christology are based partly on these prior theological claims, they are affected as well. Thus, Pierre Teilhard de Chardin (1969) can speak of Christogenesis, and Arthur Peacocke (1993) can speak of Jesus as a new species.

When we turn to competing paradigms within evolutionary theory, the territory becomes murkier. Obviously, natural selection has some important implications. But do mass extinctions? Or punctuated equilibrium? How much science does a theologian need to know? And how much does one invest in a given scientific theory?

#### WHOSE EVOLUTION?

It is worth noting at the outset that, despite their differences, there is much that Richard Dawkins (representing neo-Darwinism) and Stephen Jay Gould (representing the primary alternative theories to neo-Darwinism which in some quarters have been labeled *non-Darwinian evolution*) have in common. Both accept, as Gould is wont to say, the fact of evolution. That is, both accept that the Earth is very old, that a variety of species have

flourished and perished over geological time, and that the chronologically later organisms evolved from some of the earlier ones. As such, common descent through modification is the cornerstone for both theories; the argument is over why and how the modification takes place. Both theories seek to explain why, among other things, there are mostly marsupials in Australia and virtually none in the Americas, or why human beings have ten fingers rather than eight or twelve (see Gould 1993). While this sort of basic agreement can normally be taken for granted without comment, it is worth noting precisely because when casual observers look at scientific disagreements from the outside these basic commonalities often are lost on them. Popular prose is prone to purple passages. When Gould declared that Darwinism is dead (1980a), this was widely seen by young-Earth creationists and a few other constituencies as implying that evolution was done for, or at least on the rocks. Lest one think this is a problem peculiar to biology, one has only to reflect on the different ways that concepts such as information, chaos, and quantum mechanics are sometimes used once they are removed from their scientific contexts.

Given this level of agreement, at what level does the disagreement lie? At the risk of simplification, I suggest that two levels are present. First, there is an actual disagreement on the mode and tempo of evolution. In this sense, each school of thought represents a competing paradigm or research program. At some level one must be right and the other wrong, or so we are told. Second, there is a disagreement about the interpretation of the pattern of evolution—that is, on what evolution means for us. It is this latter disagreement that has proved most significant for theology.

In the neo-Darwinist view of evolution, several claims are central. First, evolution is a gradual process. Evolution occurs in geologic time, in which a geological instant is on the order of 100,000 years. Although the early articles of Gould and Eldridge accuse neo-Darwinists of claiming that evolution occurs at a uniform rate (what Daniel Dennett derisively refers to as “constant-speedism”), many modern neo-Darwinists deny that this was ever an important part of the theory (Dawkins 1996; Dennett 1995). Second, neo-Darwinism presupposes random, modest mutations. With the advent of modern genetics, this claim has in many ways been the most successful, because we are now able to isolate and track mutations within species lineages. Third, the unit of selection is individualistic. In the case of Dawkins and many (likely most) others, this unit is an individual gene. For others, the unit of selection may rather be the individual organism itself. In either case, the claim is that the relevant unit of selection can be isolated, and it is this unit which is the atom, so to speak, of evolution. Fourth, selection is primarily a process of local optimization. In any given generation, those who survive are the ones best adapted for their given environment. They then pass on their genes to the next generation, whose members must go through the process themselves. Over geological time,

enough differences may accumulate between two populations that they can be considered separate species. But the only differences that will accrue are those which in some sense contribute to the fitness of the organism. While there are caveats, the primary focus of neo-Darwinists is to search for and explain phenotypic characteristics in terms of their optimal function. Likewise, evolution is seen primarily in terms of trends toward optimization for a given niche.

While the historical aspect of neo-Darwinism frequently comes under attack, it is worth noting how powerfully successful the assumption of optimization is for contemporary biology. Research on characteristics ranging from frog calls to sexual behavior is based on the premise that, however strange or unremarkable a behavior or characteristic may be, there is likely a reason behind it, a reason that will produce analogues in other organisms in similar niches. Assuming an evolutionary history of optimization helps explain why the adaptation took place in just that way. Thus, the high incidence of endemic island species is best explained by the isolation of an island and its having been populated by a few founder species (particular lineages of birds, lizards, and snails) that then proceeded to fill a wide variety of uninhabited niches.

Despite occasional rhetoric to the contrary, non-Darwinists do not seek to eliminate natural selection but rather to qualify its importance for the evolutionary process. These qualifications generally fall into three categories. The first of these comes under the rubric of punctuated equilibrium, the theory that evolution does not proceed at a gradual, even pace but produces a pattern of long periods of stasis (equilibrium) punctuated by periods of rapid morphological change. Gould and Eldridge initially proposed this thesis because their reading of the fossil record did not indicate the kind of gradualism that neo-Darwinists seemed to assume. They argued that evolution instead occurs rapidly in small, isolated populations that then explode onto the scene, often replacing existing populations wholesale. The significance and radicality of this thesis is debated (see, for example, Somit and Peterson 1989), but one of the more important implied consequences is the limit it is said to place on optimization. If founder populations are separated from major populations because of accidents of geography (shifts in a river's course), climate change (sudden formation of an ice age), or catastrophe (asteroids, floods, volcanoes), then it may be that history plays as important a role as any kind of optimization to the resulting phenotypes. In *Wonderful Life* (1989), Gould argues that in the case of the Cambrian explosion, chance and history played a more important role than optimization in determining why certain lineages survived and others did not. The constraints of natural selection, it is argued, are relatively weak.

A second claim of non-Darwinists, ultimately related to the first, is that structural constraints are imposed on the evolutionary process. In this view,

natural selection is not a potter and organisms are not shapeless clay, able to be molded in any fashion the potter sees fit. Rather, natural selection is limited by what is available in the gene pool and by constraints imposed by embryological development and viable structural forms (*bauplans*). More recently the discovery of homeobox genes has been added as a further constraint. Again, the suggestion is that history and accident are more important than optimization in understanding particular organisms. In order to understand the panda's thumb, it is not enough to ask why the panda needs the thumb and how it is used (optimization); one also must ask why it evolved in such a particularly awkward fashion. The answer, suggests Gould, is that those were the only genetic resources available, and they were constrained by the biomechanical options that were available and viable (Gould 1980b).

A third claim is that genes and individual organisms are not by themselves units of selection; there is a level of group or hierarchical selection that must be spoken of as well. The exact nature of this group selection is variously understood. The point here is not to oppose optimization but to qualify what optimization implies and how it takes place, as well as to emphasize the historical and contingent character of such optimization processes. Thus, Gould argues for a hierarchical selection theory that will take account of various levels of order rather than just concentrate on the individual (Gould 1980a).

Although these modifications of natural selection are diverse, they do share two overarching qualities. First, they limit the role of natural selection in determining the pattern of evolution. Second, they emphasize the roles of chance and history as significant factors. In each case, the exact meaning and radicality of the claim is under some dispute. Thus, many neo-Darwinists do not feel particularly threatened by punctuated equilibrium, unless it is taken to imply saltationism (the sudden emergence of novel traits in a single generation) or the claim that organisms are designed to evolve more rapidly in crisis situations. Structural constraints in terms of history are regarded as unproblematic by some. Obviously, a new feature has to evolve from something. But stronger claims, such as Gould's claim that the emergence of vertebrates in history could have occurred only through a particular lineage that survived from the Cambrian period, are considered more suspect. Group selectionism, unless carefully defined (and sometimes even then), is the most suspect of all, amounting to a kind of heresy against orthodox neo-Darwinism. Despite these and other nuances, there is a tendency to identify with one or another camp, whose arguments and accusations occasionally turn bitter (notably Dennett 1995).

Beyond this primary level of disagreement, however, is a second one that deals with the interpretations and significance of these two approaches to evolution, interpretations that profoundly affect how not only experts but also other scholars and popular culture understand the significance

and character of evolution. Nothing illustrates this divide better than the recent set of back-to-back book reviews in the journal *Evolution* (Gould 1997b; Dawkins 1997).

For Dawkins, the process of evolution is a rationally understandable, largely goal-directed (in an adaptationist sense) phenomenon. Evolution is primarily about design and natural selection, and to understand evolution is to understand the lawlike character of evolutionary processes that predictably produce adaptations that are functionally advantageous to the organism that possesses them. To speak scientifically about evolution is precisely to speak of laws, fit, design, and even progress. In Dawkins's view, neo-Darwinism is incompatible with the idea of God because it provides a competing and superior explanation of design. This sort of rationalism is taken even further by Daniel Dennett, who, much influenced by Dawkins, speaks of "natural algorithms" to explain the design and even engineered quality of biological organisms (Dennett 1995).

For Gould, by contrast, the process of evolution is predominantly characterized by contingency, history, and accident. As Gould describes it in *Full House* (1997a) and elsewhere, evolution has neither purpose nor progress. Although optimization applies to specific kinds of events, there is no necessity for us or any other organism to come into existence. If we wound up the clock of evolutionary time again, argues Gould, the result would be dramatically different. Interestingly, Gould uses this as a sort of religious argument as well. For Gould, the lack of straightforward design counts as evidence against a designer. We, *Homo sapiens*, exist not as the result of a divine plan but as a kind of freak accident. No one intended our coming, and no one will mourn our passing. Gould uses this idea to emphasize our complete freedom in an uncaring universe and recently to suggest a kind of reverence for the evolutionary process itself (Gould 1999).

It is difficult to pass up the conflicting theological intuitions present in the two accounts. For Dawkins, design of a certain kind counts against the existence of God. For Gould, it is the lack of design that does this. As we shall see, however, this conflict of intuition is reflected in competing theological claims.

A more difficult question is whether these interpretations of the evolutionary process are really reflective of the two divergent theories. Here the connection is not very clear. While Dawkins emphasizes the role of design and optimization, he does not deny the role of history and apparently chance events such as large-scale catastrophes. Likewise, Gould emphasizes history and contingency, but he allows that optimization arguments do have a role to play. The difference, it would seem, is mainly a matter of emphasis. It may also reveal a difference of discipline. The interdisciplinary character of evolutionary biology is rarely remarked upon, and it is important to note that while Dawkins is trained as a zoologist, Gould and many other supporters of non-Darwinian evolution come from paleontol-



ogy, an area of study typically housed in geology departments and profoundly affected by that field's emphasis on gradual geological processes. Too much can be made of sociology, but a solid case can be made for the role of a variety of sociological factors underlying the debate.

#### WHICH THEOLOGY?

For those engaged in the religion-and-science dialogue, the real questions remain: Is this important? Does this debate have implications for religion and theology? If so, what are they?

It is worth noting that the interpretation of evolution in terms of broadly rationalist or irrationalist categories is shared by theologians, perhaps influenced by primary scholars such as Gould and Dawkins. Theologians who emphasize a rationalist understanding of evolution seek to interpret it in terms of God's grander design. In this case, the design argument is simply pushed back a step. Divine intent is seen not specifically in the design of an eye but rather in the laws governing evolution that allow such wonderfully complex and beautiful organs to develop. For Teilhard de Chardin, God's design is woven through the general progressive pattern he saw implied in the evolutionary process. While Arthur Peacocke presents a highly nuanced view, he too presents a strongly rationalist approach. For Peacocke, evolution is understood in terms of the interaction of chance and necessity, with God pictured variously as a radar scanning evolutionary possibilities or as an improvisational dancer continuously creating novel and beautiful life-forms. While this perspective acknowledges the contingency of the evolutionary process, Peacocke also emphasizes that there is an underlying pattern as well. According to Peacocke, the laws of creation are biased toward the creation of life and higher life-forms. In short, the dice are loaded. Contingency is placed within the context of a larger rational ordering (Peacocke 1993).

There are those, however, who emphasize contingency as the significant entry point for theology, because the potential gaps implied by contingency and chance allow room for specific, divine intervention. Creationists and proponents of intelligent design look for precisely such areas of evolutionary theory as the origin of life or so-called irreducibly complex structures for which the improbabilities seem so great that they require direct divine action to explain them. In this light, there is a strong thematic continuity between Gould's approach and the approaches of those he regards as his opponents. Both attack classical neo-Darwinism in order to make room for contingent history, albeit quite different contingent histories. This emphasis on contingency, however, is not limited to conservative critics. Gordon Kaufman also emphasizes the contingent aspect of evolution, particularly in regard to human evolution, as an insight to the divine. For Kaufman, the apparently improbable evolutionary turn that

resulted in the emergence of humankind is interpreted in terms of a serendipitous creativity that inspires awe and mystery (Kaufman 1993). In Kaufman's account, the contingency and apparent randomness of evolutionary and historical events are central, for it is here that one can begin to speak of God.

But does any of this kind of reasoning depend on whether Dawkins (and classical neo-Darwinism) or Gould (and non-Darwinian theories) is correct? Apparently not. Although neo-Darwinists and sociobiologists have spilled much theological ink in their writings, debates between neo-Darwinists and foes such as Gould do not seem to play a major role in theological reactions and formulations. Arthur Peacocke, probably the theologian who has thought most about these issues, seems little concerned with the debate. Ian Barbour, in his magisterial *Religion and Science* (1997), notes the alternative of punctuated equilibrium but does not indicate any dramatic theological conclusions that would follow from choosing between classical neo-Darwinist and non-Darwinist accounts. While Gordon Kaufman emphasizes contingency in the evolutionary process, he never so much as footnotes Gould's work. If this is the case, what role should evolutionary theory play in theological thinking? Do any theological consequences flow from alternatives in evolutionary theory?

#### LISTENING TO EVOLUTION, DOING THEOLOGY

Theologians should care about the claims made on behalf of evolutionary theory. I would suggest, however, that the reasons for caring are other than those usually given. We frequently hear that evolutionary theory threatens belief in God, undermines belief in the centrality of humankind, and denies human freedom; instead it reveals a pointless universe, devoid of any ultimate meaning. While evolutionary theory may inform the way we think about such issues, to claim that it directly implies such claims involves two kinds of mistakes.

First, it makes a mistake about the nature of science itself. To make claims about the ultimate nature of things is to move beyond science and into the realm of philosophy or theology. This is clearest when one examines claims made about the significance and status of humankind. Human beings (and, more generally, intelligent life) are said to be insignificant from an evolutionary perspective because our species has been present on Earth for only a fraction of evolutionary time and because we represent only a fraction of Earth's biomass; we are dwarfed by bacteria and insects. Although the latter claim makes the mistake of conflating weight with significance (making St. Thomas famous not for his immense intellect but his immense girth), the former claim also is suspect. If human beings or their intelligent descendants persisted for another billion or more years, our significance would seem much increased. If within the next century

we discovered that intelligent life was in fact quite common across the galaxy and even the cosmos, we would likely have a different perspective on the place of intelligent life in the evolutionary scheme of things.

Second, the claim makes a mistake about the nature of theology. It is often assumed that theology is static and inflexible. On the contrary, religious and theological traditions change and evolve over time, and at any given time there are rival theological schools making competing claims. Gould's and Dawkins's conflicting theological intuitions are, somewhat ironically, testimony to this. It is virtually inconceivable for a scientific claim to invalidate theology in toto. What we should expect to see are particular kinds of scientific theories and discoveries supporting or causing trouble for particular theological claims or schools. By analogy, while it is comprehensible to speak of the overturning of Aristotelian or Newtonian physics, no one speaks of the overturning of physics as a discipline. To do so would indicate a misunderstanding of the term *physics*.

Why, then, should theologians pay attention to alternatives in evolutionary theory? Because evolutionary theory often implies particular kinds of claims that are relevant to particular theological doctrines and theological schools. While this stops short of claiming to threaten or support theology in toto, it is nevertheless important. Evolutionary theory cannot tell us whether the universe or the appearance of humankind is merely the result of chance or is a necessary product, but it can tell us what roles contingency and causal laws play. Evolutionary theory can also say something regarding the kind of physical factors that drove human evolution and, consequently, something about the constituents of human nature.

This may seem deflationary, but it is not. The sciences matter to theology. At the same time, theology is distinct from the sciences and possesses its own norms, traditions, and assumptions. As such, the choice is not between evolution and theology but between good and bad evolutionary theory and good and bad theology. This may be a more difficult choice, but it is ultimately a more rewarding one.

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