

Ronald G. Larson

Revisiting the God of the Gaps

Ronald G. Larson

Although design arguments for the existence of God are sometimes dismissed as God of the Gaps apologetics, reasons for rejecting them based on the history of science, philosophy, religion, and pragmatism are not as compelling as is often implied. I argue that using multiple evidences of design in nature, with regular updates to accommodate new findings, can be a sound and convincing approach to apologetics.

In several popular recent books, prominent atheistic scientists and philosophers insist that scientific advancement has rendered religious belief irrational.¹ While their arguments vary, I believe that the common themes can be summed up in the following “principles”:

1. *Science is comprehensive.* Given its track record, there is no good reason to doubt that science can eventually address any question that a person can legitimately ask about what exists, including humans themselves.
2. *Science is concise.* Science seeks explanations with minimal presuppositions.
3. *Scientists are courageous.* Scientists reject beliefs that are unwarranted or unneeded, even if those beliefs provide comfort to society or themselves.

These “principles,” along with the modern definition of science as the search for naturalistic explanations, seem to imply that belief in God or supernaturalism in any form is unnecessary, unscientific, and even irrational or cowardly. An atheistic philosophy is thus the hallmark of the good scientist. Or so the authors of recent books would have us believe.

How should this increasingly insistent argument be addressed? One response is to focus mostly on the heart—the seat of affections and moral orientation. While this approach has merit, it must be recognized that the case made for atheism is not solely an intellectual one, but a moral one as well, as indicated by the third “principle” above. From the assertion that belief in God is without intellectual foundation, it is concluded that such belief is nothing more than wishful thinking, and this is immoral as it abandons hard truth for sentimentality.

Another approach is to accept that science can, in time, provide satisfactory answers for anything humans can observe, including their own mental life,

Using multiple evidences of design in nature, with regular updates to accommodate new findings, can be a sound and convincing approach to apologetics.

Ronald Larson is GG Brown Professor of Chemical Engineering at the University of Michigan. He received BS, MS, and PhD degrees in chemical engineering from the University of Minnesota. After working for sixteen years at Bell Laboratories in Murray Hill, New Jersey, he moved to the University of Michigan in 1996. His research interests are in the structure and flow properties of “complex fluids,” which include polymers, colloids, surfactant-containing fluids, and biological macromolecules such as DNA. He has written three books on these subjects. He is former president of the Society of Rheology, a Fellow of the American Physical Society (APS), and a member of the National Academy of Engineering (NAE). He enjoys his marriage to his wife Bebe, his relationships with his four children, Rachel, Emily, Andrew, and Eric, and worshipping at his church, Knox Presbyterian in Ann Arbor, MI.

Article

Revisiting the God of the Gaps

but to argue that there is a second “layer” of explanation that involves God. That explanations involving God are often complementary to, rather than competitive with, naturalistic explanations is no doubt true. However, the success of science is measured not only in how much it can explain, but also by how concisely it can do so, as summarized by the second “principle” above. A major trend in science is the minimization of ontologies or realities needed for satisfactory explanations. Eliminating God from the list of ontologies is a major step in economizing one’s worldview, making it very attractive to scientists.

A final approach, which I take, is to call into question the first of the above “principles” – the notion that all of a human’s observations and experiences can eventually be explained by materialistic science alone. The inadequacy of a materialistic view of what is real can be based on (1) cosmology, such as the apparent “fine-tuning” of the constants of physics needed to produce a universe compatible with human existence; (2) biology, especially the origin of life; (3) humans’ consciousness, and (4) human morality. These arguments, especially the first three, are primarily design (or teleological) arguments. One can find good expositions of them in a number of books, to which I refer any reader seeking details for which there is no space here.² All highlight weaknesses in the philosophy of materialistic naturalism held by many scientists.

Some of my colleagues have expressed the view that such an apologetic uses inappropriate God of the Gaps (GOG) arguments. They point out that science is actively seeking explanations for problems of the sort that I (and others) highlight, and, in time, it may find the answers. A related critique is that such an apologetic is an “argument from ignorance,” or fallaciously implies that “absence of evidence” means “evidence of absence.”³

To address this criticism, I will first attempt to define how the term “God of the Gaps” is used. I will then argue that, notwithstanding the objections that are sometimes raised, an apologetic based on design arguments such as those mentioned above can be both legitimate and effective. My summary notes that, while such an apologetic can be helpful in clearing away manmade obstacles to faith, it can neither replace the need for faith nor provide a satisfactory theological viewpoint on its own.

What are God of the Gaps Arguments?

An early GOG critique of apologetics comes from the nineteenth century evangelical Henry Drummond in a lecture he gave on the “Ascent of Man.”⁴ In it, Drummond rebukes Christians who point to the things that science cannot yet explain – “gaps which they will fill up with God.” An oft-quoted explanation of the idea can be found in the writings of Dietrich Bonhoeffer:

How wrong it is to use God as a stop-gap for the incompleteness of our knowledge. If in fact the frontiers of knowledge are being pushed further and further back (and that is bound to be the case), then God is being pushed back with them, and is therefore continually in retreat. We are to find God in what we know, not in what we don’t know; God wants us to realize his presence, not in unsolved problems but in those that are solved.⁵

Although prompted especially by resistance to evolutionary theory, Bonhoeffer’s warning can be applied to any argument claiming that deficiency in scientific explanation can count as evidence for God’s design in nature.⁶ A recent theopedia entry defines GOG argumentation:

God of the Gaps arguments are a discredited and outmoded approach to apologetics, in which a gap in scientific knowledge is used as evidence for the existence of God ... From a philosophical point of view, the inherent problem with a God of the Gaps apologetic is that it relegates God to only a portion of creation – the portion that we do not understand yet ...

From a pragmatic point of view, the main problem with a God of the Gaps apologetic is that the gaps are getting smaller with every passing year ...⁷

Although such warnings are widely noted, and sometimes applied to all design arguments, many scientists continue to use some design arguments while disparaging others as GOG arguments. For example, in his recent book *The Language of God*, Francis Collins explicitly rejects GOG arguments, but attempts to convince skeptics of God’s existence by appealing to (1) cosmological fine-tuning and (2) the existence of a moral law (or the “Law of Human Nature”).⁸ At least the first of these is a design argument that can be viewed as a GOG

argument, since scientists are trying to explain fine-tuning naturalistically.⁹ The second one might also be viewed as a GOG argument, since scientists are also seeking to explain the emergence of human conceptions of morality through evolutionary theory.¹⁰

Like Collins, Alister and Joanna Collicutt McGrath, in their rebuttal to Dawkins' recent book, *The God Delusion*, disparage GOG apologetics.¹¹ To refute Dawkins, they invoke "limits" on science, which they seem to distinguish from "gaps" in that the former cannot, even in principle, be overcome by advances in science. They give the following examples of questions that are beyond the limits of science: "How did everything begin?" "What are we all here for?" "What is the point of living?" However, some argue that science might eventually answer the first of these questions by showing how our universe resulted from a fluctuation in an eternal "multiverse."¹² The second two questions involve purpose and can be considered "why" questions (as opposed to the first, which is a "how" question). Materialistic scientists either dismiss such "why" questions as meaningless,¹³ or convert them to "how" questions by seeking to show how human thinking on such questions arose through natural selection.¹⁴

The effort to dodge questions of meaning and purpose by insisting that "real" knowledge be limited to "objective" scientific categories was exposed as absurd more than fifty years ago by Polanyi,¹⁵ among others. Unfortunately, Polanyi was equally prescient in his assessment of the tenaciousness of scientists' adherence to "objectivist" (or "positivist") philosophy (i.e., "what science cannot discover, humankind cannot know"¹⁶). Indeed, in my experience, many scientists fail to recognize that their positivist view even constitutes a peculiar philosophical position, rather than being the proper outlook of a scientist. Interestingly, at least some scientists and philosophers find that scientific evidence for design provides compelling grounds for belief in the existence of God. For example, Antony Flew, one of the world's leading atheistic philosophers, recently announced that he now believes in God; his belief is based primarily on the strength of design arguments, such as the origin of life.¹⁷

Besides the possible difference between "gaps" and "limits," it might be of some use to distinguish between *explanatory* gaps and *continuity* gaps. For

example, it is one thing to claim that a lack of transitional fossils indicates a *discontinuity* in the evolutionary record and another to claim that such transitions cannot be wholly *explained* by natural processes. A similar distinction can be made for the origin of life. In general, claims of continuity gaps are more vulnerable to disproof through scientific discovery than are claims of explanatory gaps. Del Ratzsch has made a similar distinction between design arguments that rely on gaps in "causal history" and those that do not, the latter of which he does not consider to be "gap" arguments at all.¹⁸

**If there is any consistency in its use,
it is that "God of the Gaps" is
a pejorative title for design arguments
that are deemed unappealing or
likely to be undone by scientific advance.**

Another distinction might be made between gaps in the ongoing processes of nature and gaps at specific points in natural history. Long ago, Leibniz objected to gaps of the first kind after Newton suggested (erroneously, as the religious skeptic Laplace¹⁹ later showed) that planetary orbits would be unstable unless God intervened regularly to repair them. Leibniz responded as follows:

Nay, the machine of God's making, is so imperfect, according to these gentlemen; that he is obliged to clean it now and then by an extraordinary concourse, and even to mend it, as a clockmaker mends his work ... I hold, that when God works miracles, he does not do it in order to supply the wants of nature, but those of grace.²⁰

Leibniz' theological objection to God filling gaps in *ongoing* processes does not seem to apply to miracles God may have used to set up the "clockwork" of the universe. Note that Leibniz could not have known the laws of thermodynamics that imply that the universe is, in fact, "winding down" on cosmological time scales, not mechanically but thermodynamically.

Still another distinction has been made between a "gap on account of nature"²¹ (also called a "nature gap"²²) and a "gap on account of ignorance" (a "sci-

Article

Revisiting the God of the Gaps

ence gap”). In the former, the properties of the components and their environment are thought to be understood well enough to conclude that structures made from these components are unlikely to have come about without an external designer. In the latter case, the cause of the structure is unknown, but only because of our ignorance, rather than an inadequate potential in the materials or environment to produce that structure naturally. Obviously, the decision to place a given gap in one or the other of these categories can be controversial.

A perhaps related approach suggests dividing what we do not know into two categories: what is “knowable” and what is “unknowable,” assuming natural processes only.²³ It is argued that we rarely know that something is “unknowable” under assumptions of naturalism, and even if we did, that this would be a doubtful reason to appeal to supernatural agency.

Finally, Barr has distinguished design arguments in biology from those in physics and cosmology.²⁴ It is believed by most biologists, including many of those with religious faith, that natural selection can account for biological structures and, hence, that arguments for design in biology are misguided GOG arguments. Since there are so many other good reasons for belief in a personal God, many feel that biology is not a promising area for apologetics.

Therefore, if there is any consistency in its use, it is that “God of the Gaps” is a pejorative title for design arguments that are deemed unappealing or likely to be undone by scientific advance. For many scientists, any argument for God’s existence is a GOG argument. Thus, in most of what follows, I will not distinguish between GOG arguments and design arguments in general, but will survey how much of a threat, or an opportunity, such arguments might present for apologetics. For convenience, I have divided the material into four sections, with overlapping content.

History of Science

Let me first note that Bonhoeffer urges avoidance of GOG argumentation based on his view of scientific history, in which science is continually “filling in gaps.” It is true that some arguments for design in biology, such as William Paley’s famous “watchmaker” thesis, are now often viewed as defunct due

to scientific advances. And it is clear that even a superficial view of history should make one hesitant to put limits on what science might discover.

The inherent unpredictability of
revolutionary advances and
their implications for theology
suggest that we look again
at scientific history to see
if science has not only filled gaps,
but has also exposed new ones.

Flush with success, many scientists hope that a unified “theory of everything” will eventually be discovered.²⁵ This theory, they hope, might be expressible as a small set of equations, or even a single equation, from which all our laws of physics emerge through spontaneous “symmetry breaking.” Moreover, in the most optimistic scenario, the equation will have few, or no, adjustable constants. From this single equation, the evolution of the universe might be predictable, including the emergence of stars and life-supporting planets. Furthermore, it is hoped that steps by which life arose on Earth might eventually be reproduced in the laboratory and shown to be plausible, given known early-earth conditions.²⁶ It is already widely held that evolutionary processes involving only material interactions are adequate to explain the rise of all organisms, including humans, along with all their cognitive powers.

If science achieves the above, then any apologetic based on its unlikelihood would be exposed as another failed GOG argument. To avoid this, one might restrict apologetics to philosophical arguments, and avoid scientific ones. However, philosophy has had its own historical development,²⁷ which has shown a weakening in the credibility of at least some arguments for God’s existence. In addition, science has rendered some philosophical opinions obsolete. For instance, the view that the earth is the center of the universe, which was grounded as much on Aristotelian philosophy as it was on theology, was falsified through scientific discoveries.²⁸ Thus, many scientists do not take philosophical objections to scientific progress very seriously. For example, it has been forecast that computers with

cognition similar to, or even much greater than our own, will emerge in a few decades.²⁹ Such futuristic computers, if they are built, would revolutionize our understanding of the human mind, with unpredictable consequences for philosophy and even theology. The inherent unpredictability of revolutionary advances and their implications for theology suggest that we look again at scientific history to see if science has not only filled gaps, but has also exposed new ones.³⁰ Indeed, one can find many examples of the latter.³¹

The most compelling fine-tuning arguments are rather recent. For example, consider the following statement from the foreword to a 2006 book by Leonard Susskind, a leading string theorist:

The real mystery raised by modern cosmology concerns a silent “elephant in the room,” an elephant, I might add, that has been a huge embarrassment to physicists: why is it that the universe has all of the appearances of having been specially designed just so that life forms like us can exist? This has puzzled scientists and at the same time encouraged those who prefer the false comfort of a creationist myth ... In the past most physicists (including me) have chosen to ignore the elephant—even to deny its existence. They preferred to believe that nature’s laws follow from some elegant mathematical principle and that the apparent design of the universe is merely a lucky accident. But recent discoveries in astronomy, cosmology, and above all, String Theory have left theoretical physicists little choice but to think about these things ...³²

Other discoveries over the last one hundred years have had similar effects on other scientists. For example, the discovery that our observable universe had a beginning shocked scientists who had expected an eternal universe, since it seems more compatible with naturalism.³³ The exploration of cellular life in the last fifty years has similarly revealed the “simple” cell to be a wonderland of complexity, challenging the notion that it arose spontaneously.³⁴ Thus, the notion that scientific history is a tale of continual and irreversible closing of gaps in a fully naturalistic account of nature, is, ironically, yet another argument by theists that has been undermined by scientific progress.

Philosophy

Despite the pejorative designation, “God of the Gaps,” it is evident that explanatory gaps can be used to show the insufficiency of a particular idea, as has been pointed out by both Larmer and Snoke.³⁵ Snoke, in particular, has given simple examples of the use of negative arguments or “gaps” in scientific reasoning. An additional, especially relevant, example can be found in the *Origin of Species*, where Darwin argued that the then-prevailing concept of special creation was inadequate to explain many features of living things. These include the differences in flora and fauna in habitats isolated from each other, and the numerous cases of mismatch between structure and function, such as cases of geese with webbed feet living in non-aquatic uplands while grebes with toes joined only by membranes live aquatically.³⁶ Thus, Darwin argued against special creation, in part, by showing gaps in its explanatory power, which could be filled by an appeal to evolution. If his approach was valid for this purpose, then clearly, gaps in the explanatory power of an idea can legitimately be used to argue against the idea.

As another example, some prominent philosophers believe that there is an “explanatory gap”³⁷ in the power of materialism to explain human consciousness, and thus infer the existence of a nonmaterial reality underlying it.³⁸ Materialistic scientists assert that consciousness only *seems* to be nonmaterial because science has not yet shown how material interactions alone can explain it. This argument parallels that of creationists who hold that apparent vestigial structures only *seem* to be unexplained, but that, in time, science may find the functions of these structures. Thus, an assertion that “gaps can be filled” is not a satisfactory response when there are good reasons for doubting its possibility.³⁹

Of course, the failure of one naturalistic scenario does not mean that all naturalistic explanations will fail, and one should certainly look diligently for alternative natural explanations. Yet, sometimes such a search leads only to implausible naturalistic explanations. An example of this is the suggestion by Francis Crick, co-discoverer of DNA, who, on considering the difficulty of spontaneous origin of life on earth, once proposed that the first cells arrived in rockets sent here from another planet.⁴⁰ Perhaps more persuasively, one could argue that the human mind is not sufficiently imaginative to

Article

Revisiting the God of the Gaps

hit upon the most likely naturalistic scenarios. Thus one should always prefer an unknown natural cause to any possible supernatural cause.

The position that
naturalistic explanations,
even ones lacking in evidence,
are preferable to
theological ones is a position
that has been defended philosophically.

However, if such an approach is valid for science, should it not also hold in other disciplines, such as the historical and archeological sciences? Just as scientific discoveries have forced a re-evaluation of our understanding of the origin of species, so too have they forced a re-evaluation of biblical interpretation. If, as a result of such discoveries, we should learn not to contest the likelihood that the physical sciences will, without invoking God, eventually close all gaps in the history of the cosmos, should we not also assume that the archeological sciences will do the same for biblical history and the origins of Christianity? Indeed, archeological discoveries are being made at a rapid rate and have the potential to transform our view of biblical history.⁴¹ If we apply methodological naturalism to the history of Christianity, and avoid GOG thinking, are we not led to seek to explain the origin of Christianity entirely naturalistically, and so assume that the early church came to believe in the resurrection of Jesus through error, fraud, or legend? To assert otherwise would be to insist on a gap that history and archeology might one day fill, for example, by finding the remains of Jesus' body.

One could argue that GOG arguments should be avoided in the physical sciences, but not in history, or at least not in the history covered by the Bible. However, this special pleading seems arbitrary. As William Lane Craig notes, "The universal disapprobation of the so-called 'God of the gaps' and the impulse towards methodological naturalism *in science and history* [emphasis added] spring from the sense of illegitimacy attending such appeals to God."⁴² Thus, a strong resistance to the miraculous in nature is discordant with a simultaneous receptivity to it in history.

The position that naturalistic explanations, even ones lacking in evidence, are preferable to theological ones is a position that has been defended philosophically.⁴³ But a consistent adherence to this position covering both science and biblical history seems to lead, at best, to a remote, deistic (rather than theistic) view of God or to no God at all. If one is insistent that even glaringly obvious gaps in naturalistic scenarios (such as evidence of fine-tuning or problems in origin-of-life theories) are not reasonable places to see God's design, then why is it reasonable to assert that God's activity can be seen anywhere else, including in biblical narratives?

Theology

An important source of resistance to GOG arguments is the recognition that the existence of a gap in the ability of science to explain a given phenomenon does not necessarily provide a good basis for theism. Perhaps even more serious is the concern that a GOG *apologetic* might degenerate into a GOG *theology*.⁴⁴ GOG theology limits God's activity to the gaps in the natural order, ignoring or slighting his active creating and sustaining of the entire natural order.⁴⁵ Christians rightly reject GOG theology, and are right to be wary that a design, or GOG, apologetic might lead to this kind of bad theology. These concerns, I believe, partially account for the resistance of Christian scientists to seize on problems, for example, in evolutionary theory, as evidence of God's workings.⁴⁶ Thus, a view that seems to limit God's role to the filling in of a few gaps in the evolutionary record is more problematic for a theist than the gaps themselves are for an atheist.

While I concur with these concerns, I believe that they ought to arise at the tail end of the evangelistic process, rather than at the front end. That is, as we reach out to those who are "without excuse" in failing to recognize God's "eternal power and divine nature,"⁴⁷ in grace, we point out indications of the reality of God that might appeal to them, given their present mindset. In this, we are doing no more than God himself did when he exhorted Isaiah to "Lift your eyes and look to the heavens: Who created all these?"⁴⁸ In pointing to the stars and asking how they got there, God was not implying that he was not equally the Creator of every blade of grass or mote of dust, nor that it was harder for him to make stars than to make dust. In grace, God was pointing Isaiah's audience to what they, given their

limited understanding, would find to be especially compelling evidence of God's activity. Once God's power over any part of his creation is recognized, his sovereign control over all of it can be more readily acknowledged. This is the essence of apologetics, which should not be confused with the development of a mature theological understanding of God and his interaction with creation.

Once God's power over any part
of his creation is recognized,
his sovereign control over all of it
can be more readily acknowledged.
This is the essence of apologetics,
which should not be confused
with the development of
a mature theological understanding
of God and his interaction with creation.

What should we make of Bonhoeffer's admonition that we are to look for God in "problems that are solved," not those that are unsolved? Attempting to follow this advice, one might argue that evidence for God is not to be found in any failing of the laws of nature alone to explain all that is, but is rather to be found in the very success of these laws, which points to a God who created such elegant laws and imposes them so uniformly.⁴⁹ A key issue, however, is whether the existence of such laws points to a *personal* God, rather than some impersonal force, or even to the laws themselves, as the ultimate reality. Einstein's God, for example, was an impersonal Creator of the cosmos and its laws, as revealed in quotes such as the following:

I believe in Spinoza's God who reveals himself in the orderly harmony of what exists, not in a God who concerns himself with the fates and actions of human beings.⁵⁰

Einstein's belief might be reasonable if there were no evidence that the laws governing the universe have been, in some way, *designed* to produce results consistent with the goals of a personal God. Theists believe that human existence reflects the *intent* of a Creator to produce humans, which he accomplished, in part, through his design of the laws of physics. The recent discovery of indications that the laws of physics are

fine-tuned for human life thus support the theistic view, rather than mere deism.

Might one argue that fine-tuning is not a GOG argument since it deals with the laws of physics themselves, not with the outworking of those laws in nature? But the laws of physics, expressed, say, as differential equations, require initial conditions. Should apparent fine-tuning of an initial condition be regarded as a GOG argument, but not the fine-tuning of the laws themselves? It is hard to see why God might tune the laws of physics, and not the initial conditions. Humans create complex games such as chess from relatively simple rules. The rules for such games not only govern how pieces are moved, but also the initial positions, and the latter are as important as the former. Just as we do not expect an interesting game to emerge from random rules or random initial positions, we should not expect our intricate universe to arise from random laws or random initial conditions. But, for a timeless God, is not specification of conditions at any point in time equivalent to specification of initial conditions? These considerations make it difficult to endorse fine-tuning arguments while summarily rejecting other kinds of design arguments for God's existence, such as the origin of life.

Pragmatism

Bonhoeffer's critique of GOG arguments suggests that no matter how strong an argument for the existence of God might now seem to be, it is better not to present it if it might be overturned by future science. This expresses a fear that believers in God will lose credibility should their arguments be disproved. It should be borne in mind, however, that no apologetic is holy writ. While surprises may be in store for believers, atheists are likely to be in for some of their own, such as the surprise expressed by Susskind at the evidence for fine-tuning. Few atheists are embarrassed by setbacks, such as the inaccuracies discovered in Haeckel's drawings of embryos that supposedly showed evolution recapitulated in the womb,⁵¹ or the "Piltdown man" fraud.⁵² More recently, Dawkins' claim that evolution follows a tree-like pattern, with no exceptions,⁵³ has proven false, as evidence for "lateral transfers" of genes has accumulated.⁵⁴ If arguments for the theory of evolution can be adapted to new findings, why should not arguments for theism be adapted as well? After all, the validity of an idea is determined by the best

Article

Revisiting the God of the Gaps

current arguments for it, not the worst outmoded ones. It may be that Christians, who believe in Scriptures that are unchanging, think their apologetics should be unchanging as well. However, an apologetic that bridges an unchanging theology to a changing science must change along with science.

The challenge for apologetics
is to show the limitations of
undirected natural forces,
without putting arbitrary limitations on
the ways God might direct or supersede
those forces to produce
what we observe.

Furthermore, by preemptively abandoning arguments out of the fear that they might one day be weakened by scientific advance, we risk inadvertently helping to sustain the myth of a continual retreat of theistic arguments in the face of an ever-expanding naturalistic science. To the extent that large, important areas, such as the origin of life, are abandoned as dangerous grounds on which to argue for the existence of God, atheistic scientists feel increased confidence to dismiss any remaining arguments, whether based on science or philosophy, as last-gasp GOG arguments. In this way, an absurdly optimistic outlook on what naturalistic science might accomplish can be built up, like a house of cards, by eminent scientists who should know better.⁵⁵

Because of this, I feel that the origin of life is a pivotal area for apologetics. While other aspects of biology might, at least in principle, be explained by natural selection, it is clear that the origin of life from simple chemicals cannot be. This is because natural selection acts on heritable genetic material, which is not present in the simple chemicals from which life is supposed to have sprung. And yet, many biologists simply annex the origin of life to the origin of species as though it were part of the same overarching theory.

In my view, this should not be allowed to go unchallenged, even though there are plenty of other areas, for example, in cosmology, where God's design is evidenced. The reason is that it leaves


unchallenged the practice of taking naturalistic mechanisms as far as they can go, and when they run out of gas, relying on naturalistic speculation alone to continue the process of "explaining" the universe. One can see this clearly in the astonishingly brazen subtitle of Richard Dawkins' book *The Blind Watchmaker: How the Evidence of Evolution Shows a Universe without Design*. How can Dawkins claim that evidence from *biology* shows that the *universe* has no design? It is by emphasizing that the origin of species is governed by an entirely *naturalistic* mechanism, and then extrapolating this confidence to everything else, *even without providing convincing mechanisms*. Because of its superficial similarity to the origin of species, the origin of life is a *pivotal point* at which the need for a mechanism is dropped and naturalism alone is deemed adequate. Once this step is taken, no phenomenon, whether in biology or cosmology, lies beyond the scope of naturalism, and any claim to the contrary can be viewed as a GOG argument. It is therefore important to mark the point at which insistence on a credible scientific mechanism gives way to glib acceptance of naturalistic speculation.

More generally, the challenge for apologetics is to show the limitations of *undirected* natural forces, without putting arbitrary limitations on the ways God might *direct or supersede* those forces to produce what we observe. I believe that the inadequacy of natural forces alone is indicated by evidence from cosmology, biology (origin of life), humans' consciousness, and morality. I also believe that Scripture testifies to God's special attention to all these aspects of his creation.⁵⁶

Summary and Final Thoughts

Some design arguments that emphasize continuity gaps in the fossil record or explanatory holes in specific scientific theories perhaps deserve to be dismissed as GOG arguments. Moreover, design arguments should not be allowed to degrade into a "GOG *theology*" that ignores God's sovereignty as Creator and Sustainer of everything, including what he rules through physical laws. However, considerations from the history of science, philosophy, theology, and pragmatism suggest that broad design arguments for the existence of God can be a legitimate approach to apologetics. Although gaps in naturalistic explanation are sometimes filled by science, other gaps emerge or become wider. Discoveries in

science are unpredictable, *both in their content and in their implications for philosophy and theology*. Believers in a God who created the universe have reason to believe that evidence for his design will always be evident, even if we sometimes mistake how it is evidenced. As Michael Polanyi convincingly argued, all knowledge, including scientific knowledge, contains a “fiduciary” component, and risks falsification.⁵⁷ This also applies to the idea that one ought to avoid design (or GOG) arguments for God’s existence, especially since this maxim is neither a scientific finding nor a dogma of the Bible or the church.

Still, we must bear in mind that while God is the ultimate explanation of creation, science only reveals secondary, tertiary, or higher-order explanations.⁵⁸ Thus, since we cannot empirically examine the ultimate source of nature,⁵⁹ apologetics cannot become an impregnable fortress for belief. Moreover, the Scriptures indicate that it is the Holy Spirit, not apologetics, that produces belief in God’s truth.⁶⁰ Apologetics can, however, be used by God to break down manmade obstacles to belief. Since, increasingly, many of these obstacles arise from an inflated view of what naturalistic science is likely to accomplish, I believe that breaking them down can be helped by highlighting limits or gaps that science seems unlikely to overcome, even if this risks using what some would call GOG arguments. 

Acknowledgment

I am grateful for helpful discussions with Peter Payne, Tom McLeish, Loren Haarsma, and many other wonderful Christian colleagues in the sciences who continue to challenge and shape my thinking.

Notes

- ¹Richard Dawkins, *The God Delusion* (New York: First Mariner Books, 2008); Victor J. Stenger, *God: The Failed Hypothesis. How Science Shows that God Does Not Exist* (New York: Prometheus Books, 2007); Sam Harris, *The End of Faith: Religion, Terror, and the Future of Reason* (New York: W. W. Norton and Co., 2004).
- ²Francis S. Collins, *The Language of God* (New York: Free Press, 2006); Gerald L. Schroeder *The Hidden Face of God: Science Reveals the Ultimate Truth* (New York: Simon and Schuster Adult Publishing Group, 2002); Fazale Rana and Hugh Ross, *Origins of Life: Biblical and Evolutionary Models Face Off* (Colorado Springs, CO: Navpress, 2004); C. S. Lewis, *Mere Christianity* (London: C. S. Lewis Pte. Ltd. 1952, 1980); Stephen M. Barr, *Modern Physics and Ancient Faith* (Notre Dame, IN: University of Notre Dame Press, 2003);

- and Owen Gingerich, *God’s Universe* (Cambridge, MA: Harvard University Press, 2006).
- ³R. Larmer, “Is There Anything Wrong with ‘God of the Gaps’ Reasoning?” *International Journal for Philosophy of Religion* 52 (2002): 129–42.
- ⁴Henry Drummond, *The Lowell Lectures on the Ascent of Man* (Glasgow: Hodder and Stoughton, 1904), chapter 10.
- ⁵Dietrich Bonhoeffer, “Letter to Eberhard Bethge,” (29 May 1944) in *Letters and Papers from Prison* (New York: Simon and Schuster, 1997), 310–2.
- ⁶Richard Bube, *Putting It All Together* (New York: University Press of America, 1995), 60; A. R. Peacocke, *Creation and the World of Science* (Oxford: Oxford University Press, 1979), 78; and Del Ratzsch, *Nature, Design and Science* (Albany, NY: SUNY Press, 2001), 47.
- ⁷www.theopedia.com/God_of_the_Gaps
- ⁸Collins, *The Language of God*.
- ⁹Leonard Susskind, *The Cosmic Landscape: String Theory and the Illusion of Intelligent Design* (New York: Little, Brown, and Company, 2006).
- ¹⁰Jonathan Haidt, *The Happiness Hypothesis: Finding Modern Truth in Ancient Wisdom* (New York: Basic Books, 2006).
- ¹¹Alister McGrath and Joanna Collicutt McGrath, *The Dawkins Delusion?* (Downers Grove, IL: IVP Books, 2007).
- ¹²Susskind, *The Cosmic Landscape*.
- ¹³Richard Dawkins, “God’s Utility Function,” *Scientific American* (November 1995); and Bertrand Russell, “Science and Ethics” in *Religion and Science* (Oxford: Oxford University Press, 1961).
- ¹⁴Haidt, *The Happiness Hypothesis*.
- ¹⁵Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (Chicago, IL: The University of Chicago Press, 1962).
- ¹⁶Russell, “Science and Ethics.”
- ¹⁷Antony Flew with Roy Abraham Varghese, *There Is a God: How the World’s Most Notorious Atheist Changed His Mind* (New York: HarperOne, 2007).
- ¹⁸Del Ratzsch, *Science and Its Limits*, 2d ed. (Downers Grove, IL: InterVarsity Press, 2000), 100–32.
- ¹⁹C. B. Boyer, *A History of Mathematics*, 2d ed. (New York: Wiley, 1968), 538.
- ²⁰Albert Ribas, “Leibniz’ Discourse on the Natural Theology of the Chinese and the Leibniz-Clarke Controversy,” *Philosophy East and West* 53, no. 1 (January 2003): 64–86.
- ²¹Jack Collins, “Miracles, Intelligent Design, and God-of-the-Gaps,” *Perspectives on Science and Christian Faith* 55, no. 1 (2003): 22–9.
- ²²Craig Rusbult, “God of the Gaps: What Does it Mean? Should We Say It?” www.asa3.org/ASA/Education/origins/gaps-cr.htm.
- ²³Randy Isaac, “From Gaps to God,” *Perspectives on Science and Christian Faith* 57, no. 3 (2005): 230–3.
- ²⁴Barr, *Modern Physics and Ancient Faith*.
- ²⁵Susskind, *The Cosmic Landscape*; and Stenger, *God: The Failed Hypothesis*.
- ²⁶Robert M. Hazen, *Genesis: The Scientific Quest for Life’s Origins* (Washington, DC: Joseph Henry Press, 2005).
- ²⁷William Lane Craig, *Reasonable Faith: Christian Truth and Apologetics* (Wheaton, IL: Crossway Books, 1994).
- ²⁸Thomas Kuhn, *The Copernican Revolution* (Cambridge, MA: Harvard University Press, 1957), 87.

2008 Reviewers

- ²⁹Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Penguin Books, 2005).
- ³⁰Ratzsch, *Science and Its Limits*, 2d ed.
- ³¹Barr, *Modern Physics and Ancient Faith*; and David Snoke, "In Favor of God-of-the-Gaps Reasoning," *Perspectives on Science and Christian Faith* 53, no. 3 (2001): 152–8. Snoke's questioning of the claim that science is "continuing filling in gaps" is quite similar to mine, although he emphasizes the limited number of "gaps" that science has filled, while my emphasis is more on the opening of new gaps.
- ³²Susskind, *The Cosmic Landscape*.
- ³³Robert Jastrow, *God and the Astronomers* (Toronto, ON: George McLeod Limited, 1992); and Barr, *Modern Physics and Ancient Faith*.
- ³⁴Rana and Ross, *Origins of Life*.
- ³⁵Larmer, "Is There Anything Wrong with 'God of the Gaps' Reasoning?"; and Snoke, "In Favor of God-of-the-Gaps Reasoning."
- ³⁶Charles Darwin, *The Origin of Species*, 6th ed. (New York: Prometheus Books, 1991), 135, 304–5.
- ³⁷J. Levine, "Materialism and Qualia: The Explanatory Gap," *Pacific Philosophical Quarterly* 64 (1983): 354–61.
- ³⁸David J. Chalmers, *The Conscious Mind* (New York: Oxford University Press, 1996); David J. Chalmers, "Facing Up to the Problem of Consciousness," *Journal of Consciousness Studies* 2, no. 3 (1995): 200–19; and Barr, *Modern Physics and Ancient Faith*.
- ³⁹Larmer, "Is There Anything Wrong with 'God of the Gaps' Reasoning?"
- ⁴⁰Francis Crick and Leslie E. Orgel, "Directed Panspermia," *Icarus* 19 (1973): 341–6.
- ⁴¹K. A. Kitchen, *On the Reliability of the Old Testament* (Grand Rapids, MI: Eerdmans, 2003).
- ⁴²Craig, *Reasonable Faith*, 296.
- ⁴³David Hume, "An Inquiry Concerning Human Understanding," in *The Clarendon Edition of the Works of David Hume* (New York: Oxford University Press, 2000); and Antony Flew, *The Presumption of Atheism and Other Philosophical Essays on God Freedom and Immortality* (New York: Pemberton/Elek, 1976).
- ⁴⁴Rusbult, "God of the Gaps: What Does it Mean? Should We Say It?" www.asa3.org/ASA/Education/origins/gaps-cr.htm.
- ⁴⁵Alvin Plantinga, "God of the Gaps? (Precisely What Is It?)" www.asa3.org/ASA/Education/origins/gaps-ap.htm.
- ⁴⁶Bube, *Putting It All Together*.
- ⁴⁷Rom. 1:20.
- ⁴⁸Isa. 40:26.
- ⁴⁹Richard Swinburne, "Is There a God?" (Oxford: Oxford University Press, 1997), chapter 4.
- ⁵⁰In response to the telegraphed question of New York's Rabbi Herbert S. Goldstein on 24 April 1929: "Do you believe in God? Stop. Answer paid 50 words." Einstein replied in only twenty-five (German) words.
- ⁵¹M. K. Richardson, J. Hanken, M. L. Gooneratne, C. Pieau, A. Raynaud, L. Selwood, and G. M. Wright, "There Is No Highly Conserved Embryonic Stage in the Vertebrates: Implications for Current Theories of Evolution and Development," *Anatomy and Embryology* 196 (1997): 91–106.
- ⁵²J. S. Weiner, F. P. Oakley, and W. E. Le Gros Clark, "The Solution of the Piltown Problem," *Bulletin of the British Museum (Natural History) Geology* 2 (1953): 139–46.
- ⁵³Richard Dawkins, *The Blind Watchmaker* (New York: W. W. Norton and Co., 1996), 259.
- ⁵⁴S. L. Saltzberg, O. White, J. Peterson, and J. A. Eisen, "Microbial Genes in the Human Genome: Lateral Transfer or Gene Loss?" *Science* 292 (2001): 1903–6; E. Pennisi, "Is It Time to Uproot the Tree of Life?" *Science* 284 (1999): 1305–7; E. Pennisi, "Sequences Reveal Borrowed Genes," *Science* 294 (2001): 1634–5; and A. Rokas, "Genomics and the Tree of Life," *Science* 313 (2006): 1897–9.
- ⁵⁵Dawkins, *The God Delusion*; and Stenger, *God: The Failed Hypothesis*; and M. Shermer, "Believing in Belief," *Science* 311 (2006): 471–2.
- ⁵⁶Isa. 45:18–19; Ps. 104:24; Ps. 8:5, 6; Rom. 2:15.
- ⁵⁷Polanyi, *Personal Knowledge*.
- ⁵⁸Walter R. Thorson, "Legitimacy and Scope of 'Naturalism' in Science," *Perspectives on Science and Christian Faith*, 54 (2002): 2–11.
- ⁵⁹Job 38:4–6.
- ⁶⁰Ratzsch, *Science and Its Limits*, 2d ed.

Reviewers in 2008

We wish to thank the following people for their helpful work in reviewing manuscripts.

Robert A. Boomsma
Hessel Bouma III
Rolf T. Bouma
James Bradley
Roy A. Clouser
Harry Cook
John W. Cooper
Edward B. Davis
Garrett J. DeWeese
Eugene R. Dykema
Roger D. Griffioen
Terry M. Gray
Randy Haluza-DeLay
John W. Haas Jr.

Deborah B. Haarsma
Loren D. Haarsma
Gerald D. Hess
Kenn Hermann
Scott E. Hoezee
James P. Hurd
Randall D. Isaac
Tony Jelsma
Calvin Jongmsma
Christopher B. Kaiser
David C. Lahti
Denis O. Lamoureux
J. Bruce McCallum
H. Newton Malony

Stephen F. Matheson
David O. Moberg
Sara J. Miles
Paul E. Moes
J. Terence Morrison
George L. Murphy
Robert C. Newman
Thomas J. Oord
Robin Pals-Rylaarsdam
Gary D. Patterson
Thomas D. Pearson
Donald N. Petcher
James C. Peterson
Perry G. Phillips

Harry L. Poe
Mark J. Shelhamer
W. Christopher Stewart
David W. Snoke
Walter R. Thorson
Arnold E. Sikkema
Kenell J. Touryan
Matthew S. Walhout
William R. Wharton
David Wilcox
John R. Wood