

THE ARGUMENT FROM DESIGN: WHAT IS AT STAKE THEOLOGICALLY?

by Anna Case-Winters

Abstract. This article offers a brief overview of the argument for God's existence grounded in the evidence of design. It gives particular attention to the way the argument has evolved over time and in relation to changing scientific perspectives. The argument from design has in fact been formulated and reformulated in response to the discoveries and challenges it has encountered from the field of science. The conclusion of the article explores the theological importance of this argument—its extent and its limits.

Keywords: Thomas Aquinas; arguments for the existence of God; Aristotle; Karl Barth; Charles Darwin; emergence of life; evidence of design; David Hume; intelligibility of the universe; Immanuel Kant; meanings of design; Isaac Newton; William Paley; problem of evil.

Giving a survey of the history of the argument from design presents something of a challenge, for the argument has followed a long and winding road with many interesting turns and occasional Dead End signs along the way. In this limited space, an aerial survey of the landscape it has traveled will have to suffice, but perhaps even that will be instructive for our purposes. This article will consider the history of the argument from design chronologically—through its formulations, challenges, and reformulations up to its contemporary forms. Concluding comments will ask what is at stake theologically in this whole effort.¹

The argument from design should be distinguished from its close relative, the cosmological argument. Why is there something and not nothing?

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The existence of the cosmos as a whole is contingent; it is not self-explanatory; it does not by careful examination reveal to us its own necessity. An argument for the existence of God may be posed on the ground *that* something exists.

The argument from design works from *what* exists. The world evidences order, adaptation, directionality—design. Therefore, it is argued, an intelligent designer must have brought it into being. This argument gets the name teleological² from the Greek word *telos* that means “end” or “goal.” Teleological order entails the notion that processes or structures are fitted to bring about certain results—in that sense “designed” (Alston 1967, 84).

EARLY GREEK PHILOSOPHY AND EARLY CHRISTIANITY

Forms of the argument go far back in Western classical tradition. Perhaps we should begin where it all begins—with the early Greeks. The pre-Christian Stoics believed that the order and harmony of the cosmos demanded explanation (Emerton 1989, 129). In 45 B.C.E. the Roman lawyer and statesman Cicero in his book *The Nature of the Gods* presented both sides of the argument. Speaking for the Stoics who favored a teleological view, he posed the question, “When we see a mechanism such as a planetary model or a clock, do we doubt that it is the work of a conscious intelligence? So how can we doubt that the world is the work of the divine intelligence?” (2.97, quoted in Emerton 1989, 130)

The Atomists (who were in the Epicurean camp) disagreed. Cicero presented their view as well: “The world is made by a natural process, without any need of a creator. . . . Atoms come together and are held by mutual attraction.” No intelligent designer need be postulated. And if there were an intelligent designer, the Atomist Lucretius adds, the world in some respects is really *badly* designed (Emerton 1989, 130). When we read of these two contesting points of view from all the way back in 45 B.C.E., today’s conversations evoke feelings of *déjà vu*.

The early church eagerly took up the idea of nature as a witness to God. Tertullian even spoke in terms of a double revelation in “God’s two books,” the book of nature and the Bible (Emerton 1989, 131). Nature’s design—as seen in the order and beauty of the heavens, the anatomy and physiology of living creatures, and the suitability of the environment to support life—became and has continued to be for Christian theology a pointer to God.

THE MIDDLE AGES: CLASSIC FORMULATION

After the fall of the Roman Empire, interest in the natural world dwindled and with it the pursuit of science and natural theology (Emerton 1989,

132). It was not until the thirteenth century that long-lost classical philosophy and science were rediscovered. With this turn the argument from design reemerged (Emerton 1989, 132) and received its classic formulation.

Aristotelian physics with its emphasis on causality became widely influential. Purely physical processes were frequently explained in terms of “ends.” Recall that for Aristotle there were four distinguishable types of cause: *final cause* refers to the maker of an object and the maker’s intentionality; *formal cause* is the design or blueprint according to which it is made; *material cause* is the raw material from which it is made; *efficient cause* is the effort applied in actually making the object.

The point of our exploration seems to be to discuss whether there is a formal cause (a design) and whether the theological argument may proceed from there to final cause. If there is a design, must there be a designer?

Thomas Aquinas was conversant not only with theology but also with the science of his day.³ Aristotelian physics helped to shape his theology. His formulation of the argument from design derived from two assumptions: an effect cannot be greater than its cause, and the effect suggests the nature of the cause.

Thomas’s arguments for the existence of God work a posteriori from some observed facts of existence—effects—to their ultimate cause. The most famous of his arguments are the “five ways”:⁴

1. The first way begins with the point that things in the world are always changing or moving yet lack the consciousness to be self-moving or -changing. Therefore they must be moved and changed by another. These changes must ultimately derive from one unchanging cause. Thomas concludes the existence of an *Unmoved Mover*.
2. The second way argues from the observation that nothing is self-caused, or it would have had to precede itself. Again, the series of causes must stop somewhere, thus the need for a *First Cause*.⁵
3. The third way reasons from the contingent character of things in the world (none of this has to be) to the existence of a transcendent cause, a *Necessary Being*.
4. The fourth way argues from the gradations of goodness, truth, and nobility in things to the existence of a being that is *most good, most true, and most noble*—one that is the cause of these things in others. (Similarly fire—the hottest thing—is the cause of the heat in things that are hot).
5. The fifth way, perhaps the closest to our present concern, starts from the orderly character of mundane events. Things meet their goals, even things that lack consciousness. Yet nothing that lacks awareness can tend toward a goal without direction from something that has awareness. As an arrow requires an archer to reach its goal, so also

universal order points to the existence of an intelligent *Orderer* of all things. (Thomas, *Summa Theologica* I.2.3)

At the end of each “way,” Thomas simply comments, “and this is what everybody understands by God” (I.2.3).

In each case he is arguing from what is evident in the world (as an effect) to what must be true of the cause to bring about such an effect. Thomas seems to have favored the first form of the argument presenting God as the Unmoved Mover, since he treats this one most extensively. In the science of his day, thirteenth-century physics and astronomy, the four basic elements were thought to be under the dynamic influence of the stars, and lower celestial bodies were believed to be moved about by those at a greater distance from the earth. Everything that moved did so because it was moved by something else. God was the Unmoved Mover behind all the motion.

THE SCIENTIFIC REVOLUTION: CHALLENGES AND NEW FORMS

When Isaac Newton began working out the physical laws of nature, he in a sense demolished this form of the argument, for he gave an explanation of the motion of bodies according to fundamental mechanical physical laws. No appeal to direct divine intervention to move things around in space was needed.

But in another sense Newton only reformulated the argument, for he assumed that God was the architect of these physical laws he had discovered. Science could explain matter and motion without recourse to supernatural forces, but these mechanical secondary forces were simply the outworking of structural conditions given by God at the creation.

As the scientific revolution made many new discoveries, there was in fact more to work with theologically—from God’s book of nature. However, there was increased ambivalence about the place of natural theology. Some scientists were concerned that appeal to final causes might usurp attention to physical causes. Science needed to preserve its integrity and not serve as a quarry to be mined for theological arguments. Some orthodox theologians, on the other hand, were concerned that natural theology might usurp revelation (Emerton 1989, 133).

Nevertheless, most theologians, philosophers, and scientists (people such as Francis Bacon, Robert Boyle, René Descartes, and Newton) assumed the legitimacy of natural theology. Bacon, founder of the new scientific approach, adopted Tertullian’s view and wrote (in *The Advancement of Learning*, 1605, 1.6.16), “God’s two books are . . . first the Scriptures, revealing the will of God, and then the creatures expressing his power; whereof the latter is a key unto the former” (quoted in Emerton 1989, 133).

EIGHTEENTH AND NINETEENTH CENTURIES:
NEW FORM AND CHALLENGES

NEW FORM. In the eighteenth century, philosopher William Paley reformulated the argument from design by attending to specific instances of design. He took the eye as a case in point and the “ways in which the various parts of the eye cooperate in a complex way to produce sight.” To explain this adaptation of means to ends, he claimed, we need to postulate an intelligent designer (much as we would if we found a watch while “crossing a heath”; rather than assume it had come together by chance, we would assume an intelligent designer had put it together). For the record, let us note the title of Paley’s book, *Natural Theology: Or, Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature*. Those were more confident days indeed!

CHALLENGES. David Hume in *Dialogues Concerning Natural Religion* (1779) attacked Paley’s position for privileging the model of human design of artifacts. To do so, he claimed, skews the argument. Why not use another model, for instance the model of biological generation, which does not require intentional design? One could as easily say the universe is like an organism and therefore there must be a cosmic womb.

Paley’s argument is an analogy, not a proof. Of course, much of our working knowledge depends on analogies—thought constructions rather than direct access to reality, things in themselves. The question is whether a chosen analogy is a good one, bearing a useful resemblance to reality—always a contestable point.

Paley had his defenders who preferred his analogy to Hume’s. They observed that in biological generation creatures reproduce themselves rather than producing new and various things. When we query why a rabbit has organs that are so well adapted to meet its needs, we are not helped by the answer that this is because it springs from other rabbits that were similarly adapted. Such a response only relocates the question.⁶

Immanuel Kant in his *Critique of Practical Reason* (1788) also put forward objections to the argument from design. He thought that science and religion should be completely separated, and natural theology was for him a contradiction in terms (Emerton 1989, 145). Nevertheless he said of himself, “Two things fill my mind with wonder and awe . . . the starry sky above and the moral law within” (Kant 1788, Conclusion). Still it was the latter—the moral law within—and not the former that he took to be the clearer pointer to God and God’s goodness. He constructed his own *ethical argument* for the existence of God. Something must account for the “moral law within.” There must be a highest good, a coincidence of virtue and happiness. God must exist as the guarantee of the triumph of the good, for we do not see it in this life.

With the publication of Charles Darwin's *On the Origin of Species by Natural Selection* in 1859, the argument from design met a truly formidable challenge to its credibility. In the theory of evolution, a genuine alternative explanation for apparent design in organisms came to the fore. Mere chance and intelligent design were no longer the only possibilities. Organic structures come to be what they are through development from simpler forms through purely natural processes of mutation and natural selection over an extended period of time. No intelligent designer was needed to design the eye for sight.

TWENTIETH CENTURY: NEW FORMS AND NEW CHALLENGES

NEW FORMS. One might think that Darwin had dealt arguments from design the decisive blow, but the argument arose with new vitality in the twentieth century. Now the shape was no longer examination of the particular instances of design but of general principles behind apparent design. In a manner parallel to what happened with Newton's discovery of physical laws, with Darwin's discovery of principles of natural selection the theological interest shifted from particular divine interventions to the wider divine design: What makes mutation and natural selection work in the ways that they do? How did material existence come to be self-organizing in the way that it is?

We note these questions in the work of F. R. Tennant in his two-volume *Philosophical Theology* (1928–30). He presents a fresh discussion of the teleological argument pointing to six kinds of adaptation that seem to evidence design and, when taken together, to point toward a theistic interpretation (from Alston 1967, 86):

1. The intelligibility of the world
2. The adaptation of living organisms to their environment
3. The ways in which inorganic life is conducive to the emergence and maintenance of life
4. The way in which the natural environment nurtures moral development in human beings through coping with hardships
5. The overall progressiveness of the evolutionary process
6. The aesthetic value of nature

Here we have in rudimentary form elements of what will become the argument from design in the contemporary discussion—the intelligibility of the universe and its suitability for life.

NEW CHALLENGES. The twentieth century presents new challenges to design theories. I will focus on two of these challenges that are explicitly theological.

Neo-orthodoxy. With the theology of Karl Barth and the advent of neo-orthodoxy, the twentieth century experienced a theological disillusionment with natural theology—the idea that we may easily perceive God’s existence and attributes by studying the natural world. The risk of natural theology is that what we discover will not be God but our own reflection, which we then name God. It is too easy to find God in our race, our culture, our interests. Barth’s context was, as you may recall, Hitler’s Germany and the rise of the Third Reich and the failure of Protestant liberalism to issue a prophetic challenge. Barth insisted on the prophetic distance of revelation—over against the culture Christianity of his day. So the early Barth said No (“Nein!”) to natural theology and cautioned that God is “wholly other.”

Evil in the Twentieth Century. A second challenge that arises in the twentieth century is the problem of evil. While not exactly new, it is one to which any form of the argument from design has to give a thoughtful response. But the challenge has lately been sharpened in new ways. The optimism of the enlightenment and the nineteenth century—that every day and every way things are getting better and better—has been severely chastened in our time. Two world wars, the holocaust, ethnic cleansing—evil has proven too pervasive and too heinous in the twentieth century for it to be dismissed as a brief passage on the way to God’s good ends, the necessary dark shades in God’s beautiful painting.

Any argument for the existence of God that works from evidence of design has some hard questions to answer here. Some forms of the argument simply will not stand the test of evil. If by “design” we mean that whatever comes to be in world process can unequivocally be identified as happening by God’s design, according to God’s will, then the theodicy problem arises. Unless we are willing to sacrifice the theological affirmation of divine goodness, we must reconsider what we mean by “God’s design.”

The mixture of good and evil offers evidence sufficiently ambiguous not to require belief in a good and all-powerful creator. Many theologians today, particularly process theologians (those who base their work on the philosophies of Alfred North Whitehead and Charles Hartshorne), are giving a more careful accounting of the nature of God’s power. The exercise of divine power must be sufficiently subtle to allow for real freedom in world process. Both the problem of evil and the scientific picture of how the world works invite us to a reconstruction in this direction. The role of God at work in setting initial conditions conducive to flourishing of life and working in concert with natural processes is more theologically arguable and more consonant with what we know from science than one that presents God as overriding natural processes and controlling events so as to unilaterally determine every state of affairs. Minimally, if the shape of things can be admitted to be conducive to the realization of valuable ends,

we may more credibly support the hypothesis that the universe is designed for good purposes.

Chaos Theory and Quantum Mechanics. Finally, the traditional argument from design is challenged by quantum mechanics and chaos theory. The reintroduction of the roles of chance and contingency in the way the world works has, for many, challenged notions of design. Biologist Jacques Monod in *Chance and Necessity* has expressed the conclusion of some: "The ancient covenant is in pieces: man at last knows that he is alone in the unfeeling immensity of the universe, out of which he has emerged only by chance. Neither his destiny nor his duty has been written down" (Monod 1972, 167).

Some renderings of the teleological argument for the existence of God do assume that by design we must mean that there is "a detailed preexisting blueprint in the mind of God" (Barbour 1990, 173). This plan is foreordained and is working itself out in all its detail. Such a view of design is antithetical to chance.

But must design be understood in such a constraining mode? What if it is part of the design that some things happen by necessity, others by chance, and others in open interplay of relative freedom? A design might include a whole range on the spectrum: contingency as well as regularity, chaos as well as order, novelty as well as continuity.

Ian Stewart, in his mathematics of chaos, noted that with the advent of quantum mechanics the clockwork universe of Newton's day has become a cosmic lottery (Stewart 1989, 1). "The very distinction . . . between the randomness of chance and the determinism of law, is called into question. Perhaps God can play dice, and create a universe of complete law and order, in the same breath" (1989, 2). As we learn more about chaos theory the question becomes "not so much *whether* God plays dice but *how* God plays dice" (1989, 2).

Contemporary theologians who wish to uphold design are responding variously to the observations of science that much of what occurs in the universe is random activity, pure chance. Ian Barbour (1990) has offered a helpful typology that I think accurately reflects the basic theological options on the horizon today:

1. One way of responding is to claim that what appears to be random is only apparently so. Albert Einstein himself was persuaded of this position (Stewart 1989, 1–2). We simply cannot see the causal activity behind it. Some theologians see God in control of even the subatomic indeterminacies. If such a view is taken, there are questions to be answered regarding all the blind alleys, waste, suffering, and evil that have attended this process so carefully designed and closely controlled by God (Barbour 1990, 173).

2. Another way of responding—more common among theologians—is to rethink the meaning of design as a general directionality and not as a detailed blueprint. Design may be the systemic conditions that make life and consciousness possible. This view is more conducive to evolutionary understanding and has the capacity to incorporate into “design” elements of chance as well as necessity. This has profound implications for the way in which God and God’s relation to the world are viewed. As John Polkinghorne (1987, 69) expressed it, this view is “consistent with the will of a patient and subtle Creator, content to achieve his purposes through the unfolding of process and accepting thereby a measure of the vulnerability and precariousness which always characterize the gift of freedom by love.”
3. The third view is very much like this one except that it wants to extend the role of God in the process. While the second view has God setting the conditions conducive to life and then not interfering with the system, process theology envisions a more interactive role for God. God’s purposes are expressed not only in the unchanging structural conditions but also in the novel possibilities introduced. Divine creativity works within order and chaos, persuading toward good ends. It works with and does not coerce the self-creating activity of creatures.

There is, generally speaking, a willingness to reconstruct as our theology is illumined by what we learn from science about the way the world works. Thus we see these revisions attending the discoveries of quantum mechanics and chaos theory.

CONTEMPORARY FORMS: INTELLIGIBILITY AND SUITABILITY FOR THE EMERGENCE OF LIFE

Today we see forms of the argument from design that seem actually to be generated within the field of science rather than theology. This happens when scientists reflect upon their discoveries and begin to ask the meta-questions, which are not the sole province of philosophers and theologians. Forms of the argument from design are grounded in the intelligibility of the universe and its suitability for the emergence of life. Remarkably there are attributes of the universe that make it amenable to our rational understanding and to life as we know it.

*Intelligibility.*⁷ Mathematician and physicist Paul Davies has observed: “The success of the scientific method at unlocking the secrets of nature is so dazzling it can blind us to the greatest scientific miracle of all: *science works*. Scientists themselves normally take it for granted that we live in a rational, ordered cosmos subject to precise laws that can be uncovered by human reasoning. Yet why this should be so remains a *tantalizing mystery*” (Davies, 1992, 20).⁸

Why is the universe intelligible? Why do mathematical principles apply? Why does our science work? “Einstein said that the only thing that is incomprehensible about the world is that it is comprehensible” (Barbour 1990, 141).

Our universe manifests order, unity, and coherence such that “laws of physics discovered in the laboratory apply equally well to the atoms of a distant galaxy” (Davies 1944, 47). It is not only orderly; it manifests a very *particular kind of order*—poised, as Davies has noted, between the twin extremes of simple regimented orderliness and random complexity. Organized variety is what we see.

Suitability for the Emergence of Life. Moreover, this organization was not built into the universe at its origin. It has emerged from primeval chaos in a sequence of self-organizing processes that have progressively enriched and complexified the evolving universe in a more or less unidirectional manner (Davies 1994, 45).⁹

Nature seems to operate with a kind of “optimization principle whereby the universe evolves to create maximum richness and diversity. The fact that this rich and complex variety emerges from the featureless inferno of the Big Bang, and does so as a consequence of laws of stunning simplicity and generality, indicates some sort of matching of means to ends that has a distinct teleological flavor to it” (Davies 1994, 46).¹⁰

Theoretical physicist Stephen Weinberg at the end of his book, *The First Three Minutes*, makes the statement, “the more the universe seems comprehensible, the more it also seems pointless” (Weinberg 1977, 149). Analysis of the cosmos does not for him yield clear and evident purpose. But advocates of the anthropic principle John Barrow and Frank Tipler (also theoretical physicists) make a rather different interpretation. The very laws that Weinberg takes to be indifferent to human beings seem to them to suggest the presence of an intelligence that “wanted” beings like us to evolve.

Biological systems do have some very particular requirements, and these requirements are in fact met by nature. There are cosmic coincidences of striking proportions. The odds against spontaneous emergence of this special set of physical conditions and natural laws that make our lives possible are astronomical. Stephen Hawking has said, “The odds against a universe like ours emerging out of something like the Big Bang are enormous. I think there are clearly religious implications” (Hawking 1985, 121).

Detractors will say that we could only observe a universe that is consistent with our existence—and surely that is a truism—and there is a possibility that there are other universes. Perhaps if there were a near infinite number of universes the probability does increase that somewhere this special set of conditions would obtain. It is also possible that other forms of life vastly different from our own have emerged elsewhere under different

initial conditions and physical laws. So far we do not know of any. For now this must remain an open question.¹¹

“If it is the case that the existence of life requires the laws of physics and the initial conditions to be fine-tuned to high precision, and that fine-tuning does in fact obtain, then the suggestion of design seems compelling” (Davies 1994, 51). It is at least not a more extravagant metaphysical claim than the claim for infinite random universes. In fact some would argue that the hypothesis that there exists an intelligent designer serves as a simpler and therefore better explanation¹² (applying the Ockham’s-razor criterion).

CONCLUSION: WHAT IS AT STAKE THEOLOGICALLY?

We have in the intelligibility of the universe and in its suitability for life arguments from design that are emerging from within the scientific community. From this scientific picture of the universe, theologians make the interpretive leap to the existence of an intelligent designer—a Creator with an investment in life, and even, apparently, intelligent life.

Do we see design in this highly improbable “unified system of mutually adjusted and mutually supporting adaptive structures” (Alston 1967, 86)? Is it reasonable from this to suppose that an intelligent being created the universe? If we do see design, it is hard not to make the leap to thoughts of an intelligent designer. It is a Cheshire-cat sort of phenomenon. While we may imagine a designer without a design, a design without a designer would be a surprising thing indeed!

Even if we grant that this is a reasonable inference, it is still an interpretive leap, not something all impartial observers would automatically conclude. The evidence of design does not coerce a conclusion that there is a designer. But it is at least a reasonable inference. Theologically that gives us something. However, it does not give us everything. Natural theology can take us so far and no further. Evidence of design gives us a designer but not yet “God” in the sense of the creator of all things visible and invisible, infinite in goodness, wisdom, and power.

If I were to answer my own question posed in the title—What is at stake here theologically?—I would have to say not as much as we might imagine. In the argument from design we have a pointer toward God, not a proof for God. Whether one believes or does not believe is a question of interpretation. Any conclusion we reach is “underdetermined by the data.” But what *do* we make of the fact that design is everywhere apparent?

For believers, it feels like a substantial confirmation of our belief in God. There is a consonance between what we see here and what we believe. There is a reason to believe that it is not unreasonable to believe. For persons who do not believe in God, the evidence of design in the universe is a source of fascination and wonder—not unlike the experience to which believers refer when they talk about encounter with the profoundest, most

awesome mystery (*mysterium tremendum et fascinans*) (Otto 1923).

Does the universe as a whole have an “end” in the sense of a *telos*, a purpose? Is it in actualizing maximal value? Is it in the evolution of conscious being capable of relation and moral development? Is it in the glory of God? What *is* a suitable candidate for, in Tennyson’s words, the “far off divine event, toward which the whole creation moves” (Alston 1967, 86)? And how would we show that the process manifests progress toward this end? Many questions remain here. Further exploration beckons.

NOTES

1. There are three other classical arguments for the existence of God. The teleological argument should be seen in their company: (1) The ontological argument from Anselm, that God must exist by definition. For if by definition God is “that than which nothing greater can be conceived,” and it is better to exist than not to exist, then existence must be attributed to God. (2) The ethical argument from Kant, that something must account for the “moral law within.” There must be a highest good, a coincidence of virtue and happiness. God must exist as the guarantee of the triumph of the good, for we do not see it in this life. (3) The cosmological argument, which asks, Why is there something and not nothing? The existence of the cosmos as a whole is contingent, not self-explanatory; it does not by careful examination reveal to us its own necessity. An argument for the existence of God may be posed as a response to the question of why there is anything at all.

2. The concept of teleological ordering should be distinguished from simple causal ordering. To say that the wind is fitted to circulate dust in the air is an example of causal ordering, but to say that the eye is fitted for sight is an example of teleological ordering. It pertains to the adjustment of means to (presumably valuable) ends.

3. For Thomas faith (*fides*) is midway between opinion and knowledge (*scientia*).

4. These five ways are not entirely original with Thomas but rely upon Plato, Aristotle, Avicenna, Maimonides, and Augustine. The section in which they are found takes the form of a question, Is there a God? and begins with the objections that there must not be a God because there is evil in the world and because natural effects can be explained by natural causes.

5. Another observation regarding causality is in order here. For Aquinas, all causes acting in the physical universe were instrumental and had to be used, as it were, by a primary agent. To assume that all this causation is self-explanatory is like expecting that a bed will be constructed if only one puts the tools and materials together “without a carpenter to use them.” Aquinas then imaged God on the model of a craftsman.

6. All is not explained by this response, however. Hume countered that, if the best answer is that there is an intelligent designer, we still have to account for why the designer has a mind that is so well fitted for designing. If the design comes from the designer, where does the designer come from? Either way, the end is an infinite regress.

7. “Human beings have always been struck by the complex harmony and intricate organization of the physical world. The movement of the heavenly bodies across the sky, the rhythms of the seasons, the pattern of a snowflake, the myriads of living creatures so well adapted to their environment—all these things seem too well arranged to be a mindless accident. It was only natural that our ancestors attributed the elaborate order of the universe to the purposeful workings of a deity” (Davies 1994, 44). But with the increased understanding that science has brought we no longer need explicit theological explanations for these phenomena. We know that the laws of nature are such that “matter and energy can organize themselves into complex forms and systems” (Davies 1994, 44). The questions that remain concern *why* the universe is lawful and coherent and unified in this way. *Why* is it intelligible?

8. “This cosmic order is underpinned by definite mathematical laws that interweave each other to form a subtle and harmonious unity. The laws are possessed of an elegant simplicity, and have often commended themselves to scientists on grounds of beauty alone. Yet these same simple laws permit matter and energy to self-organize into an enormous variety of complex states, including those that have the quality of consciousness and can in turn reflect upon the very cosmic order that has produced them” (Davies 1992, 21).

9. The evolutionary process seems to reflect at the very least a directionality, “a general trend toward greater complexity, responsiveness, and awareness” (Barbour 1990, 172). Even Monod (studiously avoiding the term *teleology*) will admit in this a “teleonomy” that attends all evolutionary biology in reproductive invariance and structural teleonomy.

10. Sir John Eccles has helpfully shown that, whatever may be the case about a designer having purposes for world process, it is certainly the case that there is evidence of “purposes” *internal* to the system. These he breaks down into various differentiated levels: apparent purpose, living purpose, conscious purpose, and self-conscious purpose. They roughly correspond to levels of the prebiotic world, the reptile, the mammal, and the human being.

11. Analysis of the laws of nature reveals a finely tuned system conducive to the emergence of life. Even a small change in the physical constants would result in an uninhabitable universe. (For example, the inverse-square laws that apply to gravitational, electric, and magnetic forces are essential to the stability of the atoms and solar systems. Even a small change in the force-distance relation would jeopardize life as we know it. There are countless other instances of “remarkable coincidences” (Barbour 1990, 136). As Paul Davies observes, “attempts to explain this ‘too good to be true’ arrangement by invoking an infinity of random universes require metaphysical assumptions at least as questionable as those of design” (Davies 1994, 56).

12. “In the most general terms, we claim that the relation between fine-tuning and the theory of design is hypothetico-deductive: *if* there is a designer, this fact explains the fine-tuning and is thereby confirmed. More specifically, our claim is that given a theological research program that includes the theory that the universe was created (designed) by a God whose aim was personal relations with sentient beings, the fine-tuning of the universe can be seen to provide *novel* confirmation, in Imre Lakatos’s terms” (Murphy and Ellis 1996, 63).

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