David Snoke

Defining Undesign in a Designed Universe

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The argument from design, recast today in the Intelligent Design movement, relies critically on the contrast of designed things with undesigned things. This poses a problem for Christians, however, because they affirm that God designed the whole universe. How then can we call anything undesigned? I argue that this problem is equivalent to the problem of free will, or the problem of moral evil, and as such can be addressed by the same philosophical frameworks developed in the past for addressing those issues, in particular the notions of different levels of description and Augustine's different levels of giftedness.

The argument from design, associated with William Paley[1] but with roots in antiquity,[2] has long seemed persuasive to many people at a gut level—if something looks designed, then it is reasonable to conclude that it is designed. In Paley's famous analogy, if we are walking in the woods and find a watch, even without knowing the history of the watch at all, we conclude that there was a watchmaker. Or in a similar example, if we walk into a room and find a table with one hundred six-sided dice all with the number 1 facing up, we "know" that some person arranged them to be that way. We do not know how or when—perhaps the other person tediously turned them all that way by hand, or perhaps some other person manufactured them with weights on one side and then threw them—but either way, the pattern of the dice has attributes that seem to demand of our intuition that intelligence and planning were involved somewhere along the way.

Modern intelligent design (ID) proponents, such as Dembski[3] and Behe,[4] have essentially followed this same argument, but have tried to tighten up the definition of the attributes we look for when we say something looks designed. Humans seem to have a built-in sense of design just as we have built-in senses of other things, such as hot and cold temperatures and loud and soft sounds, or more subtle things such as beauty and guilt. These built-in senses make it easy to know it when you see it, but they can be a hindrance to conveying to others exactly what you mean—one person can say "that looks designed to me" while another says it does not, just as one person might say a painting is beautiful and another says it is not.

Yet modern science gives us hope that many things originally thought to be subjective impressions can be defined more rigorously. For example, a few hundred years ago, hot and cold were merely subjective impressions: one person might say a room was cold, and

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another person could disagree, saying it felt hot. With the advent of thermometers and the kinetic theory of heat, we can now talk much more rigorously about these previously only subjective impressions. In the same way, we can now quantify the loudness of sounds using decibel meters instead of just saying, "It sounds loud to me." It is therefore reasonable to hope that our sense of design need not remain forever in the category of the subjective and undefinable.

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Intrinsic to this increase of rigor is the need to make distinctions. In both examples used above, the watch in the woods and the dice on the table, we identify the designed thing in contrast to other things which do not look designed. The watch stands out as designed precisely because it is not like a rock or other object which we would expect to find on a path in the woods. The dice stand out as having a pattern produced by a person because they do not look like the result of a random throw. Our intuition identifies designed things partly by detecting contrast with other things that are undesigned. ID proponents argue the same way. Some things, e.g., the mechanisms of living cells, are identified as designed in contrast to the products of random forces.

An intrinsic problem for Christians, however, is that we affirm that God designed the entire universe. If we say that some things look designed, and other things do not look designed, are we rejecting the idea that God is glorified by everything that exists? This problem seems to underlie many Christians' discomfort with the ID movement—do ID proponents see God's hand only in the unusual or the miraculous, and not in the daily workings of the universe?

There seems to be a dilemma. On one hand, if we say that all things look designed, then the force of the design argument goes away. We are essentially just saying that all things look alike in some way, and we cannot say anything about what they would look like if they were not designed. On the other hand, if we say that only some things are designed and not others, then we seem to accuse God of not doing some things well.

The Inductive Conclusion of Design

To put the problem into focus, let me restate the argument from design in a more rigorous manner. This argument is intrinsically an inductive argument, as follows:

1. In our experience, some things are known to be designed by intelligent agents, namely us, or animals with some degree of intelligence.

2. In our experience, some other things are known to not be designed by intelligent agents.

3. In our experience, we find that all of the things which we know to be designed by intelligent agents have certain properties, and none of the things which we know are not designed have those properties.

4. Therefore, when presented with something of unknown history, if it has the properties of a designed thing, then we conclude inductively that it is designed by an intelligent agent.

As it stands, this is a perfectly legitimate inductive argument, used all the time in daily life as well as in science. For example, scientists argue inductively that since we observe that all hydrogen has the property of absorbing light with certain exact wavelengths, and no other atoms or molecules absorb light at those exact wavelengths, therefore, if something (e.g., an interstellar gas cloud) absorbs light at those wavelengths, then we can conclude that it contains hydrogen. "Telltale" signs of the existence of one thing by their close association with something else are used in our thinking all the time.

Two objections are often made to this argument. One objection is that, in step 4, "an intelligent agent" is poorly defined. Since the only intelligent agents with which we have regular experience are living beings that have flesh and blood, does the intelligent agent need to have flesh and blood? If the agent is not exactly like us, how do we know what it is like? Could it be a Great Spaghetti Monster? Are we warranted in identifying this designer with the God of the Bible?

Clearly, this argument does not take us all the way to the God of the Bible. Designed things are evidence of only one attribute of the designer, namely, the ability to generate teleological forces; that is, the designer must have at a minimum the ability to set a goal (to visualize a state of things not as they are) and to act as a causative agent to bring about that goal. Any number of intelligent agents might possess this ability, including the God of the Bible, Zeus, Thor, or indeed, the Great Spaghetti Monster. To distinguish between these possibilities we must look to other arguments and evidences, such as evidence of communication and self-revelation from these beings.

Because of this limited nature of the design argument, some have accused ID proponents of deceptiveness—we all know they "really" believe in the God of the Bible (though this is, in fact, not true: Anthony Flew,[5] Paul Davies,[6] Michael Denton,[7] and Frank Tipler[8] have made strong intelligent design arguments but are all deists of one variety or another; the Jewish author Gerard Schroeder[9] and Muslim writer Mustafa Akyol[10] have also embraced ID arguments). Such accusations betray a misunderstanding of the nature of evidential argument. Evidence can often be used to narrow the field of possibilities without specifying exactly one possibility; for example, a prosecutor in a court might produce a black hair to show that the killer had black hair; this does not specify a single person but reduces the set of possibilities. Making a final decision on a specific candidate requires other information, or sometimes just a best guess.

The other objection, which is the topic of this article, has more weight. In step 2, how can we say that we have a set of things which we know not to be designed? Christians say that all the universe is designed by God.

Levels of Description

To approach this dilemma, we can start by understanding the concept of different levels of description. Many authors, e.g., Douglas Hofstadter[11] and Donald MacKay,[12] have pointed to the need for different levels of description in regard to the problem of reconciling apparently free will and consciousness with an underlying determinism. The same distinction between levels of description helps us to reconcile the existence of undesign in a world designed by God. I contend that the problem of defining undesign in a designed universe maps directly to the problem of defining free will in a universe controlled by God; they both involve the same problem of talking about things which God did not do. To some readers, this will not at all seem helpful—to make the argument from design we need to first solve one of the greatest philosophical problems of all time. Yet seeing the connection can help us by letting us draw on how the great minds of the past have delineated the problem.

In each problem, we have the concept of a "domain of control" in which we may say that a living being acts as the only relevant teleological agent. In the problem of free will, Christians affirm on the one hand that God is the first cause of all things, but they also affirm that there are some things which humans control and for which they are responsible, to such a degree that we can say that God did not do them. Indeed, it would be improper to say that God did all things, for that would make us pantheists—to say that God does everything is to say that when we see a creature doing anything, we should say we see God doing it. Christian theology insists that God is separate from his creation, and while we may say that God ultimately caused an action, it would be improper to say that God did the action. If a tree falls down, we properly say the tree fell, not that God fell. If a beaver builds a dam, we do not say that God built the dam—the beaver did. In the same way, if a person sins, we do not say that God sinned.[13]

In the problem of defining undesign, Christians can affirm that God is the designer of the universe in the same way that he is the first cause of the universe, although he made some things in the world of humans over which we have control and responsibility. Just as we can do things badly, without accusing God of badness, we can also leave things undone and undesigned, without accusing God of laziness. Within our sphere of control, the sphere of our consciousness, we have the freedom to do good or evil and also the freedom to design or to leave things undesigned.

In classical theology, this distinction between spheres or levels of control is discussed in terms of the distinction between "first" causes and "second" causes. First causes are actions directly attributable to God, such as the original creation and later miraculous interventions. Second causes are actions

attributable to agents which exist in this world, which, of course, ultimately owe their existence to God's first causes, but which operate by themselves as causative agents. This is another way of talking of different levels of description. God is the first cause of the "lower" level, that is, the laws of physics and all the things which lead to our own existence. At the same time, we are causative agents in the "upper" level of our own experience. Although I am not the creator of the universe or the controller of it, I operate within a realm over which I have control. I can make my bed or not. I can design a birdhouse or not.

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Christians of all types accept this type of distinction; on the one hand, we agree that people can sin and can be held accountable for their sins, and on the other hand, we thank God for decisions of other people which are answers to our prayers. We are not saying that God bypassed the will of those people in answering our prayers, or that, in fact, it was God who did it instead of the people who thought they were making decisions; rather, we acknowledge that God arranged the "lower level" story to bring about the end result. I do not pray, "Thank you, God, for offering me the job"; I pray, "Thank you, God, for leading that employer to give me a job offer."

While we make such distinctions naturally, a difficulty arises in speaking coherently of the relationship between the lower level and the upper level. Within orthodox Christianity, two main schools of thought have debated how to reconcile the two levels of description.[14] "Arminian" theologians affirm that God is the first cause of all things, including the existence of humans and other causative agents in the universe, but they also would say that humans have been given a unique ability to share in the first-cause power of God. In this view, once God has created humans, some of the things humans choose to do are outside the control of God.

"Calvinist" theologians would say that nothing is outside God's control, including all the decisions of people, but that this does not take away their freedom. In Calvinist thinking, God's causal power operates at the lower level, leading to the desires themselves upon which people act. As Jonathan Edwards argued,[15] the statement "You always do what you want" is both a statement of freedom and a statement of predestination. Given what we want, we make teleological decisions about what we can do to bring it about, but what we want is something which precedes our decisions and controls them. In the upper level, we start with our desires as they are and act on them; in the lower level, God brings about all the various causes which lead to those desires, in the long chain of cause and effect of all the influences and physical feelings which go into who we are.

I will certainly not resolve the debate between Arminianism and Calvinism in this article. Instead, I simply argue that regardless of which school of thought one holds to, the distinction between levels of description is natural, and this distinction helps us to understand what we mean by calling some things undesigned. Consider the following example: a teenager who has control over the arrangement of things in his or her room. Walking in, we may see some things which the teenager has taken the time to design, such as a set of CDs organized alphabetically, and some things which the teenager has left to chance, such as clothes on the floor. We might, of course, say that the position of the clothes on the floor is not really random, that they all obeyed the designed laws of physics when cast down, and going further, we might even say that the exact way in which the teenager threw them was also not random, being ordained by God before all time for his inscrutable purposes. Yet at the level of the sphere of responsibility and control of the teenager, such considerations are irrelevant. While God may have ordained and designed all things, the teenager certainly did not, and we can therefore split the things in the room into two categories, those things into which the teenager put energy to arrange for a purpose, and those which were not so arranged. The question then becomes simply, can we find any observable properties which belong only to the things in the first category and not to those in the second? There is no a priori reason why we cannot expect to find such properties.

Indeed, to reject the notion that we can say some things are undesigned is to reject the idea of randomness altogether. To insist that all things are created good by God, and therefore that we cannot say anything is undesigned, is to say that no examples of random and unplanned events exist—at any level—which could be contrasted to planned events. Yet the notion of randomness underlies the well-established scientific field of statistical mechanics. Even while assuming that all atoms in a gas follow deterministic laws, we can say that as far as we know, their behavior is random. The idea of "coarse graining" in thermodynamics[16] is just another way of distinguishing between levels of description. At the microscopic level, atoms act deterministically, while at the macroscopic level, their behavior can be treated as random.

At the macroscopic level, treating the behavior of many things as random has led to successful mathematical laws with sometimes surprising implications, such as spontaneous pattern formation. The proposal of Prigogine[17] and many others is that all macroscopic phenomena can be understood by means of such statistical laws. The proposal of ID is that only some phenomena can be explained by statistical laws, and that some other things are best explained by nonrandom events, namely, events either directly caused by God in miracles or events "rigged" by God by means of specially chosen initial conditions.

The ID inductive argument can therefore be restated as follows:

1. Within our "domain of control," we see three types of things: (1) things of which we know the origin, which some intelligent person or animal has designed, (2) things of which we know the origin, which are the product of only random and undirected forces, i.e., undesigned, and (3) things of which we do not know the origin.

Note that saying we know the origin of a thing does not refer to the ultimate origin of all its parts, but only to the origins within our domain of control. This assumes that humans (and some animals) have creative power—that some things are indeed created new by us. For example, I may create a birdhouse. I did not create all its parts—I use wood, nails, glue—but the entity which is a birdhouse did not exist before, and now it does. If I look down on the floor afterwards, I see other new entities which I also created, but without plan or purpose: piles of sawdust, leftovers from the building process. I did not design the arrangement of those piles—they formed randomly, as viewed in my macroscopic level of description. Thus here are some newly created entities of which I know the origin, within my domain of control.

Living things belong in category (3) above. Even though we may see a new living thing being born or spawned, properly viewed this is simply a new instance of an existing system, not a new creation, and we have no direct knowledge about the origin of life.

2. Within the subset of things in categories (1) and (2) of which we know the origin in our domain of control, we can identify property set A that applies to all things which we know a person designed, and that applies to no things which we know were randomly formed.
3. We inductively conclude that property set A is a telltale for designed things. We then apply this test to things in category (3) of which we do not know the origin.

Furthermore, we can try to generalize this test to things at other levels of description. Thus, for example, going to the microscopic level, I might want to decide whether the values of the constants of nature (the electron charge, the speed of light) can be described purely as the result of random events at an even lower level (quantum fields) or whether they have the attributes A which are associated with designed things in the domain in which I derived my rule.

More Than One Level

This last point leads to a possibility of hierarchies of design. So far, I have focused on only two levels of description, namely my own level in which I have a domain of control, and the microscopic level of things below mine, which I usually treat as random. It is possible to go further, however, and allow for many levels in each of which some things appear random and other things appear designed. In the same way, one can talk of a hierarchy of levels of causes (e.g., subatomic, atomic, cellular, organic, human, community, societal) instead of just the two categories of first causes and second causes of classical theology. Essentially, this approach breaks down the category of second causes (things not immediately caused by God) into several subcategories.

Augustine of Hippo envisioned a similar hierarchy of levels of creation,[18] and proposed that each level was gifted by God, with higher gifts for higher levels, but none having all the good attributes of God himself. This view of levels of giftedness is also seen in Jesus' words, "You are of more value than many sparrows" (Luke 12:7), at the same time that he said God cares for each and every sparrow. This concept of levels of giftedness can be adapted to allow us to speak of levels of design. At the lowest level, all things have design in the sense of obeying well-designed laws of nature. At a higher level, some things have even higher levels of design, in that they demonstrate patterns which cannot be derived solely from the lower levels of design. Thus one may argue that life is an additional designed pattern added onto the design of the lower microscopic level, and consciousness is yet another level of design added onto life. In so saying, one is not arguing that things with design only on the lower levels are badly done by God. One is merely arguing that they do not show as much design as other things when viewed at a higher level.

This was Augustine's approach to the problem of evil. He argued that every level has some degree of goodness, so that one can properly say that all of creation is good, but that not every level has the highest degree of goodness. Thus even unrepentant people are gifted with a certain level of goodness, in that they have the dignity to make moral choices, but they have not received the higher gift of being able to repent. Augustine would not say they were badly made, just that they had not received God's highest gifts. In the same way, an ID proponent who says that the clothes in a messy teen's room or the sawdust on a workshop floor are not designed is not saying that God is not glorified in this part of creation, just that these things lack a higher gift, the property of design on a higher level.

Some have also proposed even higher levels of description, of societies and nations. In the Bible, God often talks directly to nations as entities with their own character, even though from the national perspective, the actions of individual people may be treated as random.

One can also talk of differing degrees of design within the same level of the hierarchy of design. Some anti-ID arguments take the approach of noting less-than-optimal design as an indicator that God was not involved; for example, the Panda's thumb or the inverted human retina are supposedly examples of bad design. Yet in Augustine's approach, no created thing has been given every good gift, and some have been given more gifts than others. Finding something further down in degree of design does not imply that nothing has design. For example, finding a simple little ditty written by Mozart does not mean he was a poor composer; finding a Mercedes-Benz with hubcaps which are not as aerodynamic as we might like does not mean the car was made randomly. People make various things for various uses, and there is no reason why God could not do the same. This leads to the possibility of a quantitative scale of the degree of detected design in a system. For example, clothes hanging from a drawer in a teenager's room could be scored as having more design than clothes randomly strewn on the floor, though clothes neatly folded would score even higher.

The Missing Grand Metanarrative

ID has been criticized because it does not supply a "grand metanarrative," that is, a story of how everything came to be. In the above, I have argued that the ID community primarily deals with the local statements "This looks designed," and "That looks undesigned" (at the appropriate level of description). This frustrates some people[19] because ID proponents do not typically supply a story of where the design came from.

This frustration arises from a conflict of paradigms about the nature of explanation itself. In the standard view of science, an explanation consists of a history, that is, a story which includes a causal chain of events leading to the present state. The ID revolution lies in its proposal that the best available explanation of the state of things is not necessarily a history at all.

This can be illustrated with the example of the hundred dice, mentioned above. If I come into a room and see one hundred six-sided dice all with the number 1 facing up, I know that a person was involved somehow. I could imagine any number of possible histories which would all lead to the same state: a person tediously placing them that way one by one, a person manufacturing them with weights on one side, a person taking them out of a store-bought package in which they all were already

aligned, etc. To the ID proponent, it would seem odd to reject the conclusion that a person was involved just because no further information is available to select between these different scenarios. In all cases, the relevant fact is that a person made sure that the dice were arranged and not randomly thrown. I might like to know more, but I must work with what information I have. Based on appearances, I can rule out a narrative which involves only random dice throws, without determining the truth of any of the alternative stories.

As mentioned above, the emergent phenomena approach of Prigogine and others says that all macroscopic phenomena can be explained in terms of statistical laws which treat all behavior of the underlying microscopic world as random. The ID view insists that some things cannot be explained this way, that some things evidence design which could not come about by random events. How, exactly, did God insert this design? There are various possible scenarios which have been suggested by different ID proponents. One scenario is that God used first causes, i.e., miracles, multiple times in the history of the universe. Another is that the initial state of the universe was "rigged" at the microscopic level with specially chosen initial conditions from the very beginning of creation, to eventually lead to the design we see.

Is this latter view any different from the Prigogine emergent view? In both the Prigogine view and the rigged-microscopic-level view, design at an upper level arises from the deterministic actions of things in a lower level. The difference is that in the rigged-microscopic view, the elements which lead to the appearance of design at the higher level are not random. As Michael Behe has put it, a pool player may use a chain of precisely chosen causes and effects to bring about a final effect.[20] We are impressed with this precisely because we cannot imagine the final event happening by means of lower-level events which we view as random.

In other words, in the rigged-microscopic view, one classes the lower-level events into two categories: those which are effectively random (from our point of view) and those which are not, having the initial state of their causal chain chosen carefully by an intelligence. The Prigogine view says that all macroscopic phenomena, including life, can be understood in terms of one class of lower-level phenomena, namely random events. The ID view rejects this and hypothesizes another class of causes in addition to random events. Whether this new class is first-cause miracles, as proposed by the many-miracle ID approach, or second-cause special initial conditions, as proposed by the rigged-microscopic ID approach, or some combination of both, is a secondary question.

The ID community is therefore unlikely to come up with a grand metanarrative about the history of the universe and is unlikely to care. In the ID view, the observation, "This looks designed," is entirely supportable as a local story based on our experience with things in the domain of our experience. This observation may fit into various grand metanarratives, such as young-earth creationism, old-earth interventionism, theistic evolution, Platonic deism, or even Spaghetti-Monster creation, but it is not dependent on them.

The scientific import of ID is a limiting principle, that random events at a lower level can do only so much and no more. In this sense it is a negative, not a positive principle, but negative principles are common in science: the uncertainty principle of quantum mechanics gives us a limit to how much we can know about a particle, the second law of thermodynamics tells us that entropy cannot decrease spontaneously, relativity tells us that things cannot go faster than the speed of light, and so forth. ID says that certain physical processes cannot lead to certain other physical outcomes; for example, random chemical processes cannot construct the machinery of life, and random mutation and selection cannot produce new organs. (Behe has recently proposed even tighter restrictions, that changes of even three or four elements of a gene are beyond the limit of random mutation and selection.[21]) In each case, a prediction is made which can be falsified—it would take only one example of a perpetual motion machine to overturn the second law of thermodynamics, and only one example of a new organ generated by random processes in the lab to overturn ID.

We might like to have more positive principles, but good science must deal with reality as it is. We have no more reason to expect ID to come up with predictions for new types of biology than we do to expect physics to come up with ways to defeat the second law of thermodynamics.

The apologetic or theological import of ID is that it undermines a grand metanarrative used by many atheists, that all things came to be by undirected random events, and all that seems well designed and beautiful has emerged spontaneously and without direction. This view lends relative evidential support for theism, though it clearly does not take one all the way to the Christian God.

Conclusion

As discussed above, a main objection to ID, the problem of defining undesign in a world designed by God, maps directly to the problem of free will, and thus also to the problem of the existence of moral evil in a good world.

Despite the philosophical challenges, in each case we have an innate ability to conceptualize a domain of our control in which we can identify things not done by God, even though we affirm that, at the deepest level, God has done all things well. Within our domain of control, we can do good and evil, and we can create designed and undesigned things.

The ID proponent can thus affirm, with Augustine, that all things are good to some degree, but some are more gifted than others. In my domain of observation, there are some things, like rocks, which are well designed in one sense, in that they obey well-designed laws of nature, but there are other things, such as living systems, which have an additional level of design that cannot be derived from the lower-level design alone. It is therefore improper to say that the ID view sees God only in the miraculous and not in the commonplace.

There is no common agreement within the ID community of how the extra level of design came to be inserted into the world, and it is unlikely that such a story will be forthcoming. ID rules out certain histories, but it provides only statements about appearances, not complete histories. It fundamentally addresses only the simple question of how to make objective the apparently subjective impression that some things look designed and others do not.

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Notes

[1]William Paley, *Natural Theology*, ed. M. D. Eddy and D. Knight (New York: Oxford University Press, 2006).

[2]See, e.g., W. A. Dembski, "The Design Argument," in G. B. Ferngren, gen. ed., *The History of Science and Religion in the Western Tradition: An Encyclopedia* (New York: Garland, 2000), 65.

[3]W. A. Dembski, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (Lantham, MD: Rowman and Littlefield, 2006).

[4]M. J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996).

[5]A. Flew and G. Habermas, "My Pilgrimage from Atheism to Theism," *Philosophica Christi* (Winter 2005); A. Flew and R. A. Varghese, *There Is a God: How the World's Most Notorious Atheist Changed His Mind* (New York: HarperOne, 2007).

[6]Paul Davies, *Mind of God: The Scientific Basis for a Rational World* (New York: Simon and Schuster, 1993).

[7]Michael Denton, *Evolution: A Theory in Crisis* (Chevy Chase, MD: Adler and Adler, 1986).

[8]J. D. Barrow and F. Tipler, *The Anthropic Cosmological Principle* (New York: Oxford University Press, 1987).

[9]G.L. Schroeder, *The Science of God* (New York: Broadway Books, 1997).

[10]See, e.g., "In the Beginning," *The Economist* (April 19, 2007).

[11]D. Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid* (New York: Basic Books, 1979).

[12]D. M. MacKay, *Brains, Machines, and Persons* (Grand Rapids, MI: Eerdmans, 1980).

[13]Some passages of Scripture seem to blur this distinction, such as Amos 3:6, "If evil comes to a city, has not the Lord done it?" (or, "made" it.) The lower-level causation by God of all things is often in view. Yet the Bible also clearly states that it is wrong to say that God does all things directly, e.g., Jer. 7:31, "They have built high places … to burn their sons and daughters, which I did not command, nor did it enter my mind," and James 1:13–14 "When tempted, no one should say 'God is tempting me' … but each person is tempted when he is lured and enticed by his own desire." The entire concept of judgment implies a distinction between the actions of the Creator and the creature at some level.

[14]Arminius and Calvin were Protestants, and Protestant movements have been named after them, but similar positions on this issue have been taken throughout church history, not only in Protestantism.

[15]J. Edwards, *Freedom of the Will* (New Haven, CT: Yale University Press, 1957).

[16]For a discussion of coarse graining, see G. E. Uhlenbeck, "Problems of Statistical Physics," in J. Mehra, ed., *The Physicist's Conception of Nature* (Dordrecht, Holland: D. Reidel, 1973), 501. As discussed by Peierls in comments at the end of this article, the coarse graining view is equivalent to excluding "crazy" initial microscopic states.

[17]I. Prigogine, *From Being to Becoming* (San Francisco, CA: W. H. Freeman, 1980).

[18]Augustine of Hippo, *Confessions*, trans. Rex Warner (New York: Signet Classics, 2001). Several chapters deal with this issue, since the problem of evil was a burning question for Augustine in his conversion.

[19]E.g., R. Pennock, "DNA by Design? Stephen Meyer and the Return of the God Hypothesis," in W. A. Dembski and M. Ruse, eds., *Debating Design: From Darwin to DNA* (New York: Cambridge University Press, 2004), 130.

[20]M. J. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007).

[21]Ibid.