CHAPTER 11

GOD, SCIENCE, AND NATURALISM

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The history of Science is not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side, and the compression arising from traditionary faith and human interests on the other.

—John William Draper, 1875

Scientific truth and the truth of faith do not belong to the same dimension of meaning . . . [Thus,] science which remains science cannot conflict with faith which remains faith.

—Paul Tillich, 1957

Science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes. Each can draw the other into a wider world, a world in which both can flourish.

For the truth of the matter is that the Church and the scientific community will inevitably interact; their options do not include isolation.

—Pope John Paul II, 1988

Science and Theology

Warfare

How is science related to theology or, more broadly, to religion? According to one view, religion has made war on science by trying to stop or limit or control scientific progress. Further, this war is inevitable, both because the questions addressed by science and religion overlap and because scientific and religious modes of thought stand in fundamental opposition to each other. Scientists are disinterested investigators who make objective and demonstrable claims based on known facts, theologians are biased apologists who make subjective and speculative claims based on unsupported opinion. This portrayal of the relationship between science and theology reached the height of its popularity at the end of the nineteenth and the beginning of the twentieth century, in part because of two very influential books: John William Draper's *History of the Conflict between Religion and Science* (1875) and Andrew Dickson White's *History of the Warfare of Science with Theology in Christendom* (1896).

The antireligious nature of this "warfare view" is quite striking. It is hard to find anyone who holds a parallel position that is equally antiscientific. Indeed, even contemporary defenders of "creation science," who oppose much of evolutionary biology, do so not because it is science, but because it is, in their opinion, based on unscientific and unsupported antireligious assumptions such as metaphysical naturalism and thus should be rejected because it is *bad* science. Of course, not all defenders of the warfare view are opposed to all religious belief. White, for example, believed that "Religion, as seen in the recognition of 'a Power in the Universe, not ourselves, which makes for righteousness' . . . will steadily grow stronger and stronger" (1896, 1: xii). For him, the warfare is, as the title of his book suggests, between science and (traditional dogmatic) theology, not between science and religion generally (Drees 1996, 68).

The warfare view is seriously flawed, both philosophically and historically. To begin with, its characterizations of science and theology are philosophically naïve. All sorts of biases influence scientific research; scientific inferences are obviously not demonstrative; and what scientists take to be the "facts" often depends in part on the theories they hold. And while much of theology (like a significant portion of science) is highly speculative, it hardly follows that theology is completely "subjective" or based only on unsupported opinion. Indeed, it is not even clear that the methods used in theology could not in crucial respects approximate those used in science (see, for example, Schlesinger 1977; Murphy 1990). The warfare view has also been criticized for ignoring the contribution of Christianity to the rise of modern science[1] and for distorting cases of alleged conflict. The first

of these two historical criticisms is itself open to challenge, but the second is supported by a great deal of evidence. For example, by portraying the Galileo affair as a conflict between scientifically established truth and religious irrationality instead of (more accurately) as a conflict between two different views about the authority of science and theology, proponents of the warfare view ignore both the fact that Galileo's arguments in favor of the Copernican theory contained serious flaws and that there was disagreement both outside and inside the Catholic Church about which theory is correct (Harris 1992, 19–20; Drees 1996, 55–63).

Another example of such distortion concerns the celebrated confrontation between Samuel Wilberforce and Thomas Henry Huxley concerning Darwin's theory. The exchange occurred in 1860 at the annual meeting of the British Society for the Advancement of Science. In the discussion following the reading of a paper by, ironically, John William Draper, Wilberforce is said to have made a joke about Huxley's descent from apes. Huxley allegedly responded that he would prefer an ape for a grandfather over a man who would introduce ridicule into a grave scientific discussion. It is remarkable that so much emphasis is placed on this trivial exchange, while the bulk of Wilberforce's half-hour-long response to Draper's paper—the part that was actually recorded—is typically ignored. No doubt it is ignored because Wilberforce, who, in addition to being a serious scientist, was bishop of Oxford, is portrayed by proponents of the warfare view (e.g., White 1896, 1: 70–71) as the representative of "religion," clinging to a biblical doctrine proven false by science. But nothing could be further from the truth. In fact, Wilberforce explicitly asserted that one's scientific positions should be based on empirical evidence, not scripture. And the bulk of what he said in the discussion following Draper's paper consisted of serious scientific objections to Darwin's theory, objections that can now be answered, but which at the time cast serious doubt on the theory's viability. In fact, Darwin himself immediately began experimental work in an effort to answer those objections. Furthermore, not only is the Wilberforce legend historically inaccurate, but the broader characterization of the Victorian dispute over Darwin's theory as a battle between scientific truth and theological error is at best highly misleading, inasmuch as the evidence for Darwin's theory at that time was far from overwhelming, his most serious opponents were part of the scientific establishment of his day, and many of his defenders were clergy (Midgley 1985, 10–12).

Isolation

A second position, extremely popular among theologians and scientists for much of the twentieth century, conceives of the proper (if not actual) relationship of science to religion as one of isolation. According to this view, science and religion

never conflict *so long as each is properly conducted* (Midgley 1985, 13). Of course, any conception of science and religion that effectively makes conflict impossible will in all likelihood preclude fruitful interaction as well, hence the appropriateness of the term "isolation" as a name for this view.

Arguments in support of this view are diverse, but they all involve an attempt to carve out separate domains for science and religion within which each has authority. For example, according to the well-known geneticist Theodosius Dobzhansky, "Science and religion deal with different aspects of existence. If one dares to overschematize for the sake of clarity, one may say that these are the aspect of fact and the aspect of meaning" (1971, 96). Of course, this raises the question of the meaning of "meaning." Mary Midgley, interpreting Dobzhansky, associates it with the way facts connect to form "world pictures" (1985, 13–14). Stephen Jay Gould, an advocate of the isolation view, narrows Dobzhansky's "aspect of fact" to facts about "the empirical constitution of the universe" and includes "ethical values" in the domain of religion (2001, 500). Others who would want to explicitly allow for theological *facts* recognize the expertise of scientists on factual questions concerning the natural world while deferring to theologians on factual questions concerning God or the supernatural. None of these suggestions, however, successfully drives an absolute wedge between science and theology. World pictures will inevitably influence what one takes the facts to be. Values, even if they cannot simply be "read off" nature, nevertheless depend on natural facts. And by definition a supernatural and theistic God can and does affect nature.

This is not to say that no conception of religion or science effectively isolates the two activities. For example, if Paul Tillich is right that God is not a supreme being or any other kind of being (and so is not limited by the condition of existence!) but rather is being-itself, then he may also be right that science can neither confirm nor disconfirm "the truth of faith" because "scientific truth and the truth of faith do not belong to the same dimension of meaning" (1957, 81). But others will insist that Tillich distorts religion or that he takes the idea of God's transcendence to an absurd extreme. Another way to isolate both science and religion is to defend an extreme antirealist position about science. Most scientists and many others will, however, reject such a portrayal of science, and most religious believers will see a wolf in sheep's clothing if such a portrayal implies an equally extreme antirealist position about theology. (For another conception of religion that could be used to support isolationism, see "Wittgensteinianism: Logic, Reality, and God" in this volume.)

Symbiosis

An increasingly popular position in recent years is the view that mutually beneficial interaction between science and religion is possible. Attempts have been

made to establish a dialogue between science and theology, or, more ambitiously, to integrate the two (Barbour 1990, 16–30). Such attempts include (a) new strategies in natural theology, such as design arguments based on anthropic coincidences; (b) theologies of nature, which reinterpret traditional theological doctrines making use of the latest information about nature provided by science (e.g., Polkinghorne 1989; Peacocke 1993); (c) process theology, which attempts a synthesis of science and religion by reinterpreting both in terms of a broad metaphysical system (e.g., Hartshorne 1967); and (d) naturalistic religion, which attempts to find a place for religion within a naturalistic metaphysics based on science (e.g., Drees 1996).

Conflict

Though such efforts are worthwhile, they are often accompanied by an almost naïve optimism. Talk of consonance is commonplace, of conflict (except to dismiss it) quite rare. It seems that, in (correctly) rejecting the warfare view, many contemporary writers on science and religion assume that real conflict is impossible or at least that it never occurs. There is a tendency to equate "conflict" with "logical incompatibility" and for that reason not to take it seriously. (It is no accident, for example, that the only views Ian Barbour [1990, 4–10] classifies under "conflict" are scientific materialism and biblical literalism.) But logical incompatibility is not the only nor is it the most likely form that conflict can take. The results of science might provide evidence against a theological claim even if they are compatible with it. Similarly, no one would want to restrict the use of science in natural theology to cases in which science *entails* the truth of some religious doctrine. The results of science might provide evidence for a theological claim even if they are compatible with its falsity. The key point here is that, once one gives up the safety of total isolation, one cannot assume that all interaction will be harmonious. Accordingly, one should not hide the very real possibility of conflict by arbitrarily excluding it from one's classification schemes or by including it but then interpreting it so narrowly that almost no one will believe it occurs.

Chapter 5 in this volume on cosmological and design arguments addresses some of the areas in which science is believed to support theistic religions. This chapter investigates areas of potential conflict. The goal is to show that science and metaphysical naturalism, though not inseparable, may be sufficiently close to cause trouble in the marriage of theistic supernaturalism to science, and such trouble may support a decision to divorce even if it does not logically require it. One should be warned, however, that the road to accomplishing this goal is long and winding. To complete the journey, the traveler must confront a number of very thorny issues in science and religion, issues like the problem of divine action

and the foundations of methodological naturalism. To avoid getting lost on the way, some preliminary remarks about terminology are needed.

Terminology

> Let us call the domain of the natural sciences—a domain that includes stars and planets, living beings and nonliving objects, stable entities—and ephemeral events, physical objects and embodied mental and cultural entities—the natural world.
>
> —Willem B. Drees, 1996

Nature and the Supernatural

We can define the supernatural in terms of the natural as follows:

x is supernatural =df. x is not a part of nature and x can affect nature.[2]

This definition is adequate, however, only if a tolerably clear definition of "nature" can be provided. It is not easy to find such a definition. "Nature" or "the natural world" is sometimes defined circularly as "the domain of the natural sciences." But while the circularity of this definition can be eliminated by replacing "natural sciences" with something like "biology, chemistry, and physics," the definition remains obscure, in part because it is far from clear what exactly the domains of those sciences are. Indeed, some entities, like conscious states and political systems, are thought by many to be a part of nature though not the proper object of study of any of the natural sciences.

Let us start by assuming that many of the entities currently studied by physicists and chemists are real, and let us call these entities "physical" entities. Notice that this is a very narrow, technical sense of "physical," one that separates the physical from the biological, the mental, the political, the social, the religious, the economic, and so on. If we assume that whatever else nature includes, it includes atoms, molecules, gravitational fields, and any other entities that are physical in this narrow sense, then the problem of how to define "nature" boils down to the problem of how an entity that is not physical must be related to physical entities in order to count as natural. Perhaps this problem can be solved by noting that many of the nonphysical entities that we would want to count as natural (e.g.,

bacteria) are causally reducible to physical entities in the sense that their causal powers are *entirely* explainable in terms of the causal powers of those entities. This suggests that an entity can be classified as natural just in case it is a physical entity or is causally reducible to physical entities.

Philosophers like Nancey Murphy (1998, 128–31), however, will regard this as overly restrictive on the grounds that some entities are part of nature by virtue of being ontologically reducible to physical entities even though they are not causally reducible to those entities. To say that a complex system is ontologically reducible to lower-level entities is to say that it is nothing but a collection of those entities organized in a certain way. No new "metaphysical ingredients" such as a substantial soul or an élan vital need to be added to the lower-level entities to produce the higher-level entity. To accept ontological reductionism without also accepting causal reductionism is, not surprisingly, highly controversial. For it commits one to believing in "downward" or "top-down" or "whole-part" causation, where these terms are taken to imply that the system or "whole" has, because of the way its parts are organized, causal powers that cannot be explained by the causal interactions of its parts with each other or with the environment. And not everyone will accept that the organization of a system's parts can do that much metaphysical work (e.g., Searle 1992, 111–12).

Suppose, however, there is such a thing as top-down causation. Perhaps, then, we should classify as natural any entity that is physical or is ontologically reducible to physical entities. Unfortunately, not everyone will accept this definition either, because, just as ontological reducibility may not entail causal reducibility, causal reducibility may not entail ontological reducibility. Thus, there may be entities (e.g., conscious states, perhaps) that are natural by virtue of being causally reducible to the entities studied by the physical sciences even though they are not composed of those entities. Again, it is far from clear that there really are such entities, but, like the issue of top-down causation, this is not an issue that can be resolved here. Thus, to remain neutral on these issues, we can define "nature" or "the natural world" as follows:

> Nature =df. the spatiotemporal universe of physical entities together with any entities that are ontologically or causally reducible to those entities.

Of course, not everyone (e.g., epiphenomenalists) will agree with this definition either, but even if it needs refinement,[3] it does suffice to sharpen the distinction between the natural and the supernatural, and thus should be adequate for the purposes of this chapter.

Notice that, on this definition, Cartesian minds would be not only nonnatural since they are neither ontologically nor causally reducible to anything physical, but also supernatural since they can by definition affect nature. This implication is not, however, a defect in the definition. Rather, it simply highlights the truly

radical nature of Cartesian dualism and its deep connection to a whole host of venerable if no longer tenable ideas, such as the idea that we human beings have a "rational nature" distinct from our "animal nature" and that this rational nature separates us (and our "artificial" contrivances) from the natural world of "beasts" and bee hives and even our own bodies. Notice also that various evolutionary philosophies, by appealing to entities like an élan vital or psychic energy, which seem to be neither causally nor ontologically reducible to the entities studied by the physical sciences, count as supernaturalistic for that reason, even though the supernatural here in some sense emerges from the natural. (For a brief discussion of some of these evolutionary philosophies, see McMullin 1985, 38–43.) Finally, notice that this definition assumes there is only one spatiotemporal universe. If there is more than one, then, although one could define the natural world as the entire collection of such universes, it would be better to adopt the position that there is more than one natural world. In this way, metaphysical claims about nature or *the* natural world could be restated as claims about *our* natural world and so would have a better chance of being justified.

Varieties of Naturalism

If to be natural is to be a part of nature as defined above, then what is naturalism? Here, of course, there is more than one answer because one can be naturalistic methodologically or metaphysically or epistemologically. It is often claimed by those who embrace both science as currently practiced and some form of supernaturalistic religion that science is naturalistic methodologically but not metaphysically. "Methodological naturalism" is defined as follows:

> Methodological naturalism =df. Scientists should not appeal to supernatural entities when they explain natural phenomena.

Notice that one can be a methodological naturalist on this definition even if one believes that it is permissible for scientific explanations to refer to nonnatural entities. One advantage of this is that some of the abstract entities (e.g., numbers) to which scientific explanations routinely appeal may very well be nonnatural.

"Metaphysical naturalism" is defined as follows:

> Metaphysical naturalism =df. Supernatural entities do not exist.

Notice that, on this definition, one can be a metaphysical naturalist without rejecting the reality of nonnatural entities. This is important, because, while our knowledge of nature may provide reason to believe that nothing is supernatural,

it provides little basis for the further conclusion that nature is all there is. Notice also that one can be a metaphysical naturalist without being a materialist or even a physicalist about the natural world. (This is not to deny, however, that physicalism is very likely given metaphysical naturalism.) Finally, notice that metaphysical naturalists can accept the position of philosophers like Thomas Nagel (1986, 25–27) and John Searle (1992, ch. 5) that consciousness is irreducibly subjective, even if, contrary to what Searle (116–24) contends, this forces them to reject the position that a unified scientific understanding of nature is possible.

Both metaphysical and methodological naturalism must be distinguished from the various theses to which philosophers sometimes apply the label "epistemological naturalism" or, more pejoratively, "scientism," such as the view that all knowledge is scientific knowledge; the view that, although nonscientific knowledge is possible, it has a lower epistemic status than scientific knowledge; and the view that knowledge is attainable only by methods that at least approximate those used in the (physical) sciences.

God's Action in the World

> The way of understanding miracle that appeals to breaks in the natural order and to supernatural interventions belongs to the mythological outlook and cannot commend itself in a post-mythological climate of thought.
>
> —John Macquarrie, 1977

Theism versus Deism

Both theism and deism, as traditionally understood, posit the existence of a supernatural God. But while they agree that God is the creator of nature, they differ concerning the degree to which God is active in nature:

> Theistic supernaturalism (theism) =df. There exists a supernatural person who (timelessly or temporally) creates and sustains the natural world, acts in it, and is omnipotent, omniscient, and morally perfect.
>
> Deistic supernaturalism (deism) =df. There exists a supernatural person who created the natural world but does not act in it.

To claim that God acts "in the natural world" is to claim that, *in addition to creating and/or sustaining the natural world*, God intentionally brings about particular natural effects involving her creatures or other parts of nature (Alston 1985, 197). For example, God is traditionally thought to provide for her creatures and, in the case of human beings, to speak to them, forgive them, punish them, guide them, and answer their prayers.

Divine acts could be either direct or indirect. A direct divine act is one in which God acts "outside of the ordinary course of nature" in the sense that he brings about a certain effect without using natural causes to do so. An indirect divine act is one in which God uses natural causes to bring about an effect. Of course, there cannot be indirect acts without direct ones. But God might limit her direct action to an initial creative act, in which case all of her acts *in the natural world* would be indirect. Thus, four sorts of personal creators are conceivable: (1) ones that do not act in the natural world, either directly or indirectly; (2) ones that act indirectly in the world but not directly; (3) ones that act directly in the world but not indirectly; and (4) ones that act both directly and indirectly in the world.

Of these four possibilities, the second and fourth seem to be the most plausible. For to believe in the third sort of creator requires one either to reject the reality of natural causes or to somehow make sense of the idea of a God who creates natural causes but never uses them to bring about any effect. And concerning the first possibility, it would be quite a challenge for a being who creates the world never to act in it at all. For if even a single effect of that being's initial creative act is intended by that being (and occurs in the circumstances and for the reasons envisioned by that being), then that being has acted indirectly in the world by virtue of intentionally bringing about that effect. Thus, a thoroughly deistic creator would have to be so limited in knowledge or goodness or rationality (or else the universe he creates would have to be so thoroughly indeterministic) that every single consequence of his act of creation would be either unforeseen or foreseen but unintended.

It is often claimed that deism fits better with a scientific view of the world than theism because it does not require God to act in the world. This position is defended on the grounds that, in order to act in the world, God would have to violate the laws of nature. Thus, because the natural sciences have established that the nomic regularities we call the laws of nature operate, not just here and now, but everywhere and always, it follows that the claim that God acts in the world, though not absolutely ruled out by science since it is possible that violations of laws of nature occur undetected by science, is nevertheless strongly disconfirmed. The next two sections show that this argument is based on at least two highly questionable assumptions. The first is that, in order to act in the world, God would have to do so directly. And the second is that, in order to act directly in the world, God would have to violate the laws of nature.

Indirect Divine Acts

It is widely believed (e.g. Polkinghorne 1989, 1–2; Clayton 1997, 206) that the mechanical world of pre–twentieth-century science is not an appropriate world for a theistic God to create, not just because it excludes the possibility of free will, but also because divine action in such a world would be impossible or at least implausible. William Alston (1985, 200–201) argues, however, that exactly the opposite is true. Everything in a mechanical world that results from God's initial creative act would be an indirect act of God in the world, so long as God intends to bring about all that he brings about, which is at least possible assuming that God is omniscient and that a mechanical world is completely deterministic. For example, if God creates a deterministic universe, intending that this initial creative act result in a thirsty rabbit finding water 12 billion years later, then it is correct to say that God quenches that rabbit's thirst (even though it is also correct to say that the water quenches that rabbit's thirst). The difficult question, then, is not how a theistic God could act in a mechanical world, but how a deistic God could fail to do so.

Of course, we may not live in a completely deterministic world. But surely it is sufficiently deterministic to allow for a great deal of indirect divine action, even if some events in the world, such as human choices that are free in the libertarian sense, are not acts of God. Thus, when a theist claims, for example, that God provides for his creatures or even speaks to, guides, or punishes them, this need not imply that God acts directly in nature. Therefore, divine action in the world does not entail the violation of laws of nature.

Direct Divine Acts

One might object, however, that a God who acts indirectly but who, with the exception of an initial act of creation, never acts directly is a quasi-deistic God, not the God of any robust theistic religion. For the God of Judaism, Christianity, and Islam is a God of miracles and answered prayer, of special rather than merely general providence and revelation, and divine activity of this sort is possible only if God bypasses the natural order and brings about an effect simply by willing that it be so. Thus, it is this sort of direct divine activity that involves the violation of laws of nature and so brings theistic religions into conflict with a scientific understanding of the world. But even if direct divine action is essential to theistic religions (which is by no means obvious), the assumption that it would *violate* established laws of nature—that its occurrence would entail that a nomic regularity established by science does not actually hold—has been challenged. Some of the most popular of these challenges appeal to quantum mechanics (e.g., Pollard 1958) or chaos theory (e.g., Polkinghorne 1989, 26–35) or both (e.g., Murphy 1995) in an attempt to find room for a law-abiding God to be actively and directly involved in the world.

A much more fundamental challenge, however, a challenge that, if successful, makes such attempts to exploit the "openness" of post–nineteenth-century science unnecessary, is made by C. S. Lewis (1947) and more recently by Alston (1985, 209–10). Alston presents the challenge as follows. He points out that whether God's direct action in the world is a violation of the laws of nature depends on the form those laws take. If those laws specify *unqualified* sufficient conditions, then direct divine action will involve a violation. If, on the other hand, they specify only what will (or must) occur in the absence of relevant conditions not specified in the law, then direct divine action will not involve a violation. Laws that specify what will happen in a closed system are not violated if the system turns out not to be closed. Alston's next premise is that, in fact, we never are justified in accepting laws of the first sort. He concludes that the only laws supported by science are of the second sort and hence that direct divine acts need not violate any laws of nature supported by science.

Divine Action and Methodological Naturalism

Even if Alston is correct, however, that does not settle the question of whether or not a belief in divine action conflicts with a belief in methodological naturalism. Indeed, it would seem that a scientist who believes in direct divine action in the world must also believe that some natural phenomena cannot be correctly explained without appealing to supernatural entities. And even a scientist who believes that God's actions in the world are all indirect must believe that a correct *ultimate* explanation of natural phenomena is impossible without appeal to supernatural entities. So there would seem to be considerable tension between a belief in divine action and a belief in methodological naturalism, even if there is no tension between divine action and the laws of nature.

Let us first examine the apparent tension between methodological naturalism and the belief that God acts directly in creating the natural world, but never acts directly in that world. A belief that God is the ultimate cause of the universe will come into conflict with methodological naturalism only when scientists begin to offer ultimate naturalistic explanations of nature as a whole. But despite the pretensions of some theoretical physicists, this is hardly imminent. Still, the belief in a divine creator, even one who never acts directly in the world, is not scientifically neutral (Plantinga 1991, 82–84). On the assumption that God is the ultimate cause of nature, some scientific explanations that would be plausible on metaphysical naturalism are implausible and some that would be implausible are plausible. For example, no one who believes that God exists and is objectively morally perfect will accept attempts by sociobiologists like E. O. Wilson (1998, ch. 11) to provide reductive naturalistic explanations of religion or morality. Nor will the typical

theist be sympathetic to theories in neuroscience that deny the existence of a single subject of consciousness in order to account for the bizarre results of various experiments on people with severed corpora callosa. Or consider the reaction of scientists to models of the big bang theory according to which the universe is both temporally finite and bounded. Scientists who are metaphysical naturalists have worked very hard to find alternatives, in some cases clinging to a particular alternative like steady state theory far longer than was warranted by the evidence.

A more interesting though imaginary example concerns origin of life research. Suppose a scientist were able to create conditions in the laboratory that result in the formation of a living cell, but while it is physically possible for these conditions to occur naturally, it is so unlikely that most scientists deny that the process in question produced the first life on earth. A theist, however, might reject the probability judgment in question on the grounds that even a God who never acts directly in the world could have performed a direct act of creation that ensured from the outset that the conditions in question would occur on earth at the right time. Thus, scientists who believe in God may quite understandably accept the explanation in question, while those who are metaphysical naturalists may quite understandably reject it.

Do these examples prove that methodological naturalism is incompatible with belief in a God who creates nature but acts only indirectly in it? That depends on how, exactly, one interprets methodological naturalism. For the appeal to supernatural entities (or to metaphysical naturalism) occurs in these examples, not in the scientific explanations themselves, but rather in their evaluation or in a meta-explanation of why a certain scientific explanation is or is not considered plausible. Thus, as long as methodological naturalism is interpreted narrowly, we need not conclude that indirect divine action conflicts with methodological naturalism.

But what about direct divine action in the world? If such action is theologically necessary, then must we conclude that a commitment to theism precludes a commitment to methodological naturalism, even interpreted narrowly? The answer to this question depends on how frequently God is thought to act directly in nature. We saw earlier that most (indeed, maybe even all) of the ways God is thought to act in the world can be accounted for by indirect divine action. Thus, a belief in the very rare occurrence of direct divine acts (e.g., for the purposes of authenticating a divine messenger) would not commit a scientist to looking for supernaturalistic explanations of natural events like the origin of life, especially if Alston is right that direct divine action in nature need not violate any laws of nature supported by science.

Many theists will want to conclude, then, that there is no real conflict between methodological naturalism and theistic religions, including those religions whose doctrines imply (a limited amount of) direct divine activity in nature. Some philosophers and theologians, however, want to go beyond this conclusion. They

hold that theistic supernaturalism actually provides strong positive support for methodological naturalism. On this view, theistic science and naturalistic science are methodologically equivalent. An examination of some of the arguments offered for this position is undertaken next.

God's Power, Wisdom, and Goodness

> Sir Isaac Newton, and his followers, also have a very odd opinion concerning the work of God. According to their doctrine, God Almighty wants to wind up his watch from time to time: otherwise it would cease to move. He had not, it seems, sufficient foresight to make it a perpetual motion. 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; who must consequently be so much the more unskilled a workman, as he is more often obliged to mend his work and set it right. According to my opinion, the same force and vigor remains always in the world, and only passes from one part of matter to another, agreeably to the laws of nature, and the beautiful pre-established order. And I hold, that when God works miracles, he does not do it in order to supply the wants of nature, but those of grace. Whoever thinks otherwise must needs have a very mean notion of the wisdom and power of God.
>
> —Leibniz, 1715, in Leibniz and Clarke 1956

Divine Competence

In the fourth section of Leibniz's first letter to Samuel Clarke, Leibniz responds to Newton's view that God occasionally acts directly in nature to keep the planets in their proper orbits. He dismisses this view because it implies, he thinks, that God is an incompetent creator—certainly not the omnipotent and omniscient creator of traditional theism. If Leibniz is right about this, then it seems to follow that a theistic God would produce a world in which the workings of nature can be explained naturalistically and hence that theism provides a justification for methodological naturalism (at least within the natural sciences). Remarkably, variations of this argument remain very popular today. It is, however, based on two

questionable assumptions. The first is that an omnipotent and omniscient God could accomplish her purposes without acting directly in nature. The second is that a perfectly good God would prefer to accomplish her purposes without acting directly in nature.

Like the view that God could accomplish his purposes without allowing evil in the world, the first assumption—that God could accomplish his purposes without acting directly in nature—does not follow deductively from the view that God is omnipotent and omniscient. For not even an omnipotent being can do what is logically impossible and not even an omniscient being can know what it is logically impossible to know. Thus, for example, it might be the case both that God has good reason to create an indeterministic world and that God necessarily lacks knowledge of conditionals like "If this indeterministic universe were to be created, then these undetermined events would occur." If so, then God might very well need to engage in the sort of divine tinkering that Leibniz found so unimaginable.

Leibniz's second assumption—that a perfectly good God would prefer not to act in the world if at all possible—is even less compelling than the first. Leibniz's (frequently echoed) analogy to human clockmakers is particularly weak. A clockmaker's skill may be judged by how often his clocks need repair because it can be assumed that the clockmaker does not want to spend valuable time and effort repairing his clocks. But an omnipotent and omniscient clockmaker has no such concerns. Such a being would not be forced to forgo some other valuable project in order to act directly in nature (Alston 1985, 219, n. 14). One might object that God would prefer to create a "maintenance-free" universe simply because a universe in which God must act directly to achieve his goals is to that extent flawed or at least less perfect, no matter how well it serves God's purposes. But this objection takes the popular Enlightenment comparison of nature to a machine way too seriously. Surely the value of a theistic universe will not depend on its mechanical elegance. And even if one takes such categories of value seriously, they do not properly apply here because (unlike some of its parts) the evolving universe described by contemporary science is nothing like a machine.

Divine Faithfulness

Can Leibniz's argument be repaired? Is there any good reason to believe that a theistic God would prefer not to act directly in nature? Several philosophers and theologians appeal to God's "faithfulness" (or "reliability" or "consistency"; e.g., Polkinghorne 1989, 6; Peacocke 1993, 142) in an effort to establish that God would never "intervene" in nature. They claim that a morally perfect and hence faithful God would not establish laws of nature and then turn around and break (or

suspend) them. But it is hard to see why intervention of the sort in question strikes so many thinkers as abhorrent. After all, the laws of nature do not tell us how anything or anyone *ought* to behave.

Perhaps the following argument is intended. Because of the nomic regularities in nature, human beings form reasonable expectations about the future. Thus, for those of us who believe in a God who has the power to violate those regularities, forming those expectations amounts to trusting God not to exercise that power. Hence, if God does violate them, he also violates our trust. Therefore, because the God of theism is morally perfect, it follows that the God of theism would not violate the laws of nature. This argument is far from persuasive. God's acting in an unexpected way would hardly constitute a violation of our trust in her in the absence of any implicit or explicit agreement on her part to behave in a completely predictable way. Of course, if God acted directly in nature so frequently that what is probable by our inductive standards usually turned out to be false, then, assuming that God is responsible to some extent for those standards, he could justly be accused of a reprehensible sort of unreliability. But that would require far more direct divine activity than is theologically necessary. Further, one would hope that God would faithfully and consistently pursue the good of her creatures, even if this involves the occasional direct act in nature and even if this involves making the world slightly less predictable. Therefore, it is hard to see what reason there is to believe that God's acting directly and providentially in nature does anything but faithfully fulfill a promise to do what is best for his creatures. Of course, we know that God does not in fact intervene to prevent horrific evils like the Nazi Holocaust. But that would be relevant only if we knew that, if God would intervene in any case, then she would intervene in those cases. And surely that is not something human beings can know.

Divine Generosity

Howard Van Till (1999) defends something like Leibniz's position by appealing to God's generosity instead of to her faithfulness. The central idea here is that creation is a gift from God, an act of generosity. In creating, God gives the universe and its contents being, a being partly defined by capabilities to act in various ways. These capabilities include formational ones; abilities to actualize various physical structures like molecules, stars, galaxies, and life forms (to mention a few). The greater the number of capabilities God bestows on the universe and its contents, the more generous his gift is. Thus, any direct divine act in the formational history of the universe (e.g., directly bringing into existence the first living organism on earth) would imply a less capable creation and hence less generosity on God's part. Therefore, because God is morally perfect, one would

expect that she never acts directly in the formational history of the universe, that all of the causes in that history (except, of course, the ultimate cause) are natural ones, and hence that methodological naturalism, at least in the scientific investigation of that history, is justified (170–71).

But God cannot be generous to the universe unless God can benefit the universe. Thus, Van Till's argument presupposes that possessing formational capabilities actually benefits the universe. The universe, however, is not conscious. Thus (*pace* deep ecologists), the claim that it can literally be benefited (or harmed) is highly dubious at best. And even if nonconscious things can be benefited, the specific claim that possessing fully robust formational capabilities benefits the universe more than being directly cared for by God is entirely unsupported. So this attempt to provide a theological reason for denying direct divine action in the formational history of the universe is at best incomplete.[4]

The Nature of Science

> Miracles lie outside of science, which by definition deals only with the natural, the repeatable, that which is governed by law.
>
> —Michael Ruse, 1982

> But, of course, methodological naturalism does not restrict our study of nature; it just lays down which sort of study qualifies as scientific. If someone wants to pursue another approach to nature—and there are many others—the methodological naturalist has no reason to object. Scientists have to proceed in this way; the methodology of natural science gives no purchase on the claim that a particular event or type of event is to be explained by invoking God's creative action directly.
>
> —Ernan McMullin, 1991

Defining "Science"

According to Michael Ruse (1982, 322), science by definition deals only with the natural, which implies that no explanation that makes reference to the supernatural is scientific. But even if Ruse is right about this, it does not follow that methodological naturalism is true. For the issue here is not a verbal one: the issue is not how the word "science" is properly used (Plantinga 1997, 146). Rather, the

issue is whether or not people who investigate the causes of natural events should look only for naturalistic causes or also for supernaturalistic ones. Whether one interprets this issue as the question of whether scientists should broaden their *scientific* investigations or as the question of whether scientists should broaden their investigations beyond the boundaries of science will depend, of course, on the definition of "science." But the answer to the question will not depend on that definition. Notice, however, that attempts to demarcate science from other human activities or scientific explanation from other sorts of explanation need not involve any appeal to the definition of "science." So a consideration of such attempts must come next.

Demarcationist Dreams

Attempts to solve the "demarcation problem" and to use the solution to defend methodological naturalism frequently focus on method. Science is said to differ from other human activities because it employs a certain method, a method that is superior to the methods of other disciplines and that accounts for the great success of science. Further, this method cannot be applied to supernatural entities. Why not? Because supernatural entities are unobservable or because claims about them cannot be falsified or because supernaturalistic hypotheses cannot be tested by experiment—the exact reason given depends on how scientific method is characterized. A more direct demarcationist approach to justifying methodological naturalism focuses on scientific explanation rather than on science in general. All scientific explanations, it is claimed, explain natural events in terms of natural laws, and by definition supernatural entities are not governed by those laws. Thus, scientific explanations cannot properly make reference to supernatural entities (see, e.g., Pennock 1999, 195).

Demarcationist proposals have not fared well under close scrutiny (see Meyer 1994; Lauden 1996; Quinn 1996), which is not surprising since science is a human invention whose goals are determined by its participants and whose methods must ultimately be justified by reference to those goals, methods being, after all, means of achieving one's goals (O'Connor 1997, 25). Further, because science has more than one goal, it would be surprising if it had only a single method. Consider, for example, the distinction between nomological or inductive science and historical science. The main goal of the former is to determine how nature normally operates or functions: to discover, classify, or explain unchanging laws or properties of nature. The main goals of the latter are to reconstruct sequences of historical events and to explain particular features of nature by reference to the past (Meyer 1994, 89–90; Sober 2000, 14–18).[5] Not surprisingly, the methods used to achieve the goals of nomological science can be very different from those used

to achieve the goals of historical science. On the one hand, scientists engaged in nomological science formulate laws, models, and other interesting if-then generalizations, often testing them by experiment and prediction, and making inductive generalizations based on observable data. In historical science, on the other hand, not all causal explanations fit the covering law model (Meyer 1994, 78), and many hypotheses about the past cannot be falsified and cannot be tested by prediction or experiment. Instead, they are judged on the basis of their simplicity, their fit with general background knowledge about the world, and their ability to explain specific known facts. What all this shows is that methodological naturalism cannot be adequately defended by describing something called *the* scientific method and then arguing that it cannot be applied to the supernatural. For more likely than not, the method described will be characteristic of nomological science, while appeals to the supernatural would naturally be used to answer historical questions.

More generally, it is unlikely that the demarcation problem has a solution, in which case demarcationist justifications of methodological naturalism are doomed to failure. This does not, however, entail that no justification of methodological naturalism can be based on the goals of science. For, as Robert C. O'Connor (1997, 25) has pointed out, the claim that science is a human invention does not imply that its goals are arbitrary or purely conventional. Certain goals of science are (at least on a realist construal of science) both enduring and of great importance (and justified retrospectively by the fact that they have to some extent been achieved). Understanding nature, for instance, is such a goal. Because these goals are shared by other disciplines, they cannot be used to demarcate science from all other human activities. But if restricting one's explanations to the natural helps scientists to achieve those goals, then that provides at least a prima facie justification for such a restriction.

The Goals of Science

> Methodological Naturalism is not so much irreligious as irrational. Hyperbole aside, strict naturalism functions . . . to close off legitimate lines of inquiry and avenues of potential explanation.
>
> —Stephen Meyer, 1994

> Permitting direct reference to divine agency in natural science severely undermines the overall quest for truth. Thus, if there is a distinctively

> "Christian way of doing science," it does not come by repudiating MN [methodological naturalism].
>
> —Robert C. O'Connor, 1997

Truth

One goal of science is to understand nature, that is, to find true explanations of natural phenomena. At first glance, this seems to provide the opponents of methodological naturalism with their strongest argument. For if a scientist takes theistic supernaturalism seriously rather than simply assuming the truth of metaphysical naturalism, then why should that scientist look only for naturalistic explanations of natural phenomena? Why not look for true explanations, whatever those might be? If God has acted directly in nature to produce, for example, the first life on earth, then to commit science to methodological naturalism is to preclude the possibility of scientists finding the truth. Moreover, scientists often appeal to factors outside of a system to account for properties of the system that they have good reason to believe cannot be explained on the assumption that the system is closed. Yet, according to methodological naturalism, such an appeal is prohibited if the system in question is nature as a whole. And it is hard to see what could justify treating this system differently other than an assumption that metaphysical naturalism is true—that there is nothing outside of nature that can affect it.

Despite the apparent strength of considerations like these, some philosophers have argued for the opposite position. For example, O'Connor (1997, 26–27) claims that methodological naturalism promotes the quest for truth for two reasons. First, by making appeals to the supernatural off-limits, it forces scientists to persist in their search for naturalistic explanations, even when the prospects for such explanations seem very dim. And such persistence has in the past borne fruit. In short, methodological naturalism is valuable because it promotes the goal of understanding reality *as far as possible in natural terms*. Second, methodological naturalism enables theologians and others offering nonnatural accounts of natural phenomena to be sure that any such account is forced to face its strongest competitor. Underlying these two reasons is the idea that a division of labor between science and theology is desirable. Both disciplines attempt to understand natural events, but science seeks natural explanations, while theology pursues supernatural explanations. In this way, our chances of discovering the truth are, according to O'Connor, maximized. A third reason for believing that methodological naturalism promotes the goal of understanding nature is offered by Alvin Plantinga (1997, 150–52), an opponent of methodological naturalism. Following Duhem, he suggests that science makes progress because of its universality—because scientists

manage to cooperate. But such universality is possible only if scientists avoid employing or presupposing in their theories metaphysical claims that are not shared by other scientists.

None of these three reasons is conclusive. To begin with, surely the most they show is that appeals to the supernatural should be a last resort, or that some science but not necessarily all science should be constrained by methodological naturalism (Plantinga 1997, 152). Either way, sufficient cooperation among scientists would take place and sufficient effort would be made to find naturalistic explanations. Thus, the worry that, without an absolute prohibition on appeals to the supernatural in scientific explanations, proponents of supernaturalistic explanations would not confront their strongest competitors is unrealistic. It is also unrealistic to claim, as O'Connor does (compare McMullin 1991, 57–58), that there is nothing wrong with restricting science to the natural because others can pursue supernaturalist theories. Such a division of labor lowers the chances of anyone having the interdisciplinary expertise that would be necessary to pursue certain lines of inquiry. For example, it is unlikely that theologians without extensive training in science would be able to assess the promise of any serious supernaturalistic explanation of the origin of life. For presumably, such an explanation would be a great deal more complicated than "God made it so," and evaluating any such explanation, no matter how simple, will require the ability to evaluate the best competing naturalistic explanations.

Justification

Perhaps the most powerful argument for methodological naturalism based on the goals of science proceeds as follows. One of the central goals of all scientists is to justify their claims in such a way that most reasonable persons with sufficient expertise will accept them. But it is impossible to justify beliefs about supernatural entities in this way: no public evidence can establish their (probable) truth or falsity. Thus, even though supernaturalistic explanations might be true (and might even be justified for particular individuals), scientists should not give them, for there is nothing scientists could do to prove to other members of the scientific community that one such explanation should be accepted and another rejected.

Clearly, the key premise of this argument is that the intersubjective justification of a belief about supernatural entities is impossible. At least two reasons might be offered in support of this premise. The first is that such a belief cannot be tested by evidence; that is, it can neither be confirmed nor be disconfirmed either by new information or by what we already know (cf. Pennock 1998, 206; Sober 2000, 46–57). Let us call this the "testability problem." Notice that a very broad sense of the verb "to test" is intended here. It includes, of course, testing

by experiment, but it also includes the sort of testing a historian might do: carefully comparing the ability of some hypothesis to explain various known facts to the ability of serious alternative hypotheses to explain those facts. A second reason for doubting that supernaturalistic hypotheses can be intersubjectively justified is that their probability prior to testing cannot be assessed. In other words, it is impossible to determine their (initial) degree of plausibility or implausibility, and so impossible to make a rational decision about which of them to test and impossible to determine the significance of any testing that is done. Let us call this the "plausibility problem." To refute this new argument for methodological naturalism, both the testability problem and the plausibility problem must be solved.

Of course, some scientists deny that plausibility judgments play any role in science. But philosophers have shown that scientists presuppose such judgments all the time. Indeed, even the claim that a fact is strong evidence for a hypothesis in the sense that it significantly raises the ratio of the probability of its truth to the probability of its falsehood presupposes a number of plausibility judgments. For a fact can significantly raise this ratio only if it is antecedently more probable given that theory than it is given its denial, and any precise assessment of a fact's antecedent probability given the denial of a theory is impossible unless one can assess the relative plausibility of various alternatives to that theory.[6] Furthermore, methods like statistical significance testing, which are actually employed by scientists and which ignore prior probabilities (and thus allegedly make science more "objective"), have been shown to be flawed for that very reason (e.g., Edwards, Lindman, and Savage 1963).

One response to the plausibility problem grants that plausibility judgments about supernaturalistic hypotheses are subjective, but denies that plausibility judgments about naturalistic hypotheses are any less subjective. The claim here is that, in science and in every other discipline, we just find ourselves taking certain hypotheses seriously and disregarding others. And so we test some hypotheses and not others. This is our only way of coming to any conclusions at all, since there are always infinitely many alternative hypotheses that can explain any given set of facts. Of course, if this is the correct response to the plausibility problem, then the correct conclusion to draw is that science cannot objectively justify any of its theories (which in turn suggests that truth is not an appropriate goal of science and that scientific realism should be rejected).

A different approach to the plausibility problem claims that plausibility judgments about both supernaturalistic and naturalistic hypotheses are objective, grounded in both cases on objective judgments of simplicity or content or scope. According to this view, the tendency of contemporary analytic philosophers of religion to focus on theism as opposed to other supernaturalistic hypotheses could be justified if theism and metaphysical naturalism are both plausible and so worthy of being tested, while nontheistic supernaturalistic hypotheses are not. To defend the antecedent of this conditional is not easy, but perhaps it is not im-

possible. One might start with the admittedly controversial conviction that idealism and (hard) materialism are false. Reality has (at least) two fundamentally different parts: the (ontologically) objective (often called the "physical") and the (ontologically) subjective (often called the "mental"). If this is right, then it would seem very likely that either the subjective world ultimately explains the objective or vice versa: one world is very probably a product of the other. Further, prior to testing these two options, there is no reason to prefer one of them to the other. They are precisely parallel, equal in content and simplicity, and thus equally probable initially. Therefore, prior to testing, each has a probability of close to 0.5.[7]

What does this tell us about the prior probabilities of metaphysical naturalism and theism? First, on the assumption that the objective world provides an ultimate explanation of the subjective, the prior probability of metaphysical naturalism is high. For the view that the subjective world is ultimately a product of the objective makes supernaturalism very unlikely. Second, on the assumption that the subjective world provides an ultimate explanation of the objective, the prior probability of theism is not very low. For antirealist views, according to which human minds create the objective world, are very implausible. And, as Swinburne (1979, ch. 5) has argued, atheistic or deistic or quasi-theistic hypotheses entailing the existence of supernatural minds are much less simple than theism and for that reason much less probable intrinsically. To suppose that a person who provides the ultimate explanation of all there is has unlimited power and knowledge is simpler and hence intrinsically more probable than to suppose that such a being can create some things but not others or has knowledge of some facts but not others. And a being of unlimited power and knowledge is likely to be morally perfect as well because such a being is unlikely to be influenced by nonrational desires and hence is likely to do whatever she knows to be best overall, that is, morally best. It follows, then, both that theism and metaphysical naturalism are much more plausible than any alternative hypothesis and that neither is overwhelmingly more plausible than the other. Prior to testing, each has a probability of less than 0.5, but neither has a probability that is negligibly low. Therefore, if they can be tested, then they ought to be.

Obviously, this argument contains many highly questionable premises and inferences. But assume for the sake of argument that plausibility judgments are objective and that they can be made in the case of supernaturalistic hypotheses. There remains the issue of whether supernaturalistic hypotheses can be tested. This testability problem could be solved if one could show that certain facts have a higher or lower antecedent probability given theism than they do given the denial of theism (or given some serious hypothesis like metaphysical naturalism that entails the denial of theism). For that would mean that our knowledge of those facts raises or lowers the (epistemic) probability of theism (or raises or lowers the ratio of the probability of theism to the probability of one of its serious alternatives). But what would make a fact antecedently more or less likely on

theism? Are we really in a position to judge how likely it is that God would want some fact to obtain? The simplest response to these questions is to point out that moral perfection is built into the theistic hypothesis. Because we are not entirely in the dark about the preferences of such a being (at least, other considerations held equal), some facts about nature are more probable on theism than on, for example, metaphysical naturalism, and others are less probable on theism than on metaphysical naturalism. (This is why various facts about the suffering in the world present an evidential problem for theists.) Furthermore, building moral perfection into the theistic hypothesis does not make that hypothesis ad hoc if, as was suggested above, God's moral perfection is made likely by other attributes that are plausibly attributed to a personal ground of being.

The Presumption of Naturalism

> Perhaps more than anything else, the discussion between theology and science today is concerned with the presumption of naturalism; where it is not, it perhaps ought to be. By the presumption of naturalism I mean the assumption, for any event in the natural world, that its cause is a natural one rather than a supernatural one.
>
> —Philip Clayton, 1997

Prescientific Naturalism

If (as will henceforth be assumed) the testability and plausibility problems can be solved and, more generally, there are no good arguments for methodological naturalism based either on the nature of God or on the nature or methods or goals of science, then many conservative Christian thinkers (e.g., Johnson 1995) will conclude that the commitment of contemporary science to methodological naturalism has no justification—that it reflects an unsupported metaphysical bias against supernaturalistic religions. But while scientists no doubt have all sorts of biases, including religious and metaphysical ones, we shall see in the remainder of this chapter that, instead of some antireligious bias leading scientists to accept metaphysical naturalism, which in turn grounds their acceptance of methodological naturalism, it may be that metaphysical naturalism and at least a modest methodological naturalism are supported by the same evidence.

Let us approach the question of the nature of this evidence indirectly, by

examining the position, common among conservative Christian thinkers, that a commitment to methodological naturalism is a recent addition to scientific practice, becoming dominant only after metaphysical naturalism became popular among scientists. This position is at best misleading because the tendency to favor naturalistic explanations emerged gradually over a long period of time. As Philip Clayton (1997, 172) points out, the presumption that natural events have natural causes existed long before the rise of modern science. Indeed, even in the Bible, explanations appealing to God, even if they are not the last resort, are often not the first (e.g., 1 Samuel 3).

Because it is unlikely that the authors of the Bible are guilty of some antireligious metaphysical bias or that they believe that a faithful or generous God would never act directly in the world, what is the source of this prescientific presumption in favor of naturalistic explanations? No doubt it is a simple induction from past experiences. In very many cases, a little investigation reveals natural causes for natural events, even unusual ones. Thus, it follows inductively that, prior to investigation, the probability that the immediate cause of any given natural event is itself natural is high. We did not need science to teach us this.[8]

The Success of Science

Science, however, has added greatly to the strength of this presumption of naturalism (Clayton 1997, 172–74). In many cases in which no naturalistic explanation seemed particularly promising, sufficient effort in searching for one turned out to bear fruit. This is presumably why even William Dembski (1994, 132), a leading critic of methodological naturalism, claims that one should appeal to the supernatural only when one has good reason to believe that what he calls one's "empirical resources" are exhausted. Thus, although Dembski attacks the view that naturalistic explanations are *better* than nonnaturalistic ones, he does not deny that, prior to investigation or even after considerable investigation, they remain *more likely* to be true. On this point almost everyone will agree. For example, what philosopher or scientist, no matter how deeply religious, believed or even took seriously the sincere claim of some members of the Cuban community in Miami that God miraculously prevented Elian Gonzalez from getting a sunburn while at sea (rather than that his fellow survivors lied when they claimed he had been in the water for three days after his boat sank)? It is beyond dispute that, at a minimum, *almost* all natural events have other natural events as their immediate causes.

Conclusions

> For centuries the writ of empiricism has been spreading into the ancient domain of transcendentalist belief, slowly at the start but quickening in the scientific age. The spirits our ancestors knew intimately first fled the rocks and trees, then the distant mountains. Now they are in the stars, where their final extinction is possible.
>
> —Edward O. Wilson, 1998

A Modest Methodological Naturalism

A strong presumption of naturalism based on everyday experience and the success of naturalistic science justifies a modest methodological naturalism: the reason scientists should not look for supernatural causes is that natural causes are much more likely to be found. A methodological naturalism justified in this way is "modest" because it implies that scientists should look *first* for naturalistic explanations, and (depending on how strong the presumption of naturalism is) maybe second, third, and fourth too, but it does not absolutely rule out appeals to the supernatural. It allows that, in cases like Cleanthes' example of the voice from the clouds in part 3 of Hume's *Dialogues Concerning Natural Religion*, an absolute prohibition on appeals to the supernatural would arbitrarily block a possible path to truth. We can state this more modest methodological naturalism as follows: scientific explanations may appeal to the supernatural only as a last resort. Both Meyer (1994, 97) and Dembski (1994, 132), two leading opponents of methodological naturalism understood as an absolute prohibition, seem to agree with this principle, which does not depend on any metaphysical or antireligious bias.

It should be emphasized, however, that even this modest form of methodological naturalism does not sanction a god-of-the-gaps theology. It does not imply that an appeal to the supernatural is justified simply because scientists fail after much effort to find a naturalistic explanation for some phenomenon. Very strong reasons to believe there is no *hidden* naturalistic explanation would be required as well. In other words, the search for natural causes should continue until the best explanation of the failure to find one is that there is none. And if the presumption of naturalism is very strong, then that may not yet have occurred in any current area of scientific research, which means that this modest methodological naturalism may have at the present time the same practical implications as an absolute prohibition on appeals to the supernatural in science.

One might object that this form of methodological naturalism is only falsely modest. A situation in which the best explanation of our failure to find a natu-

ralistic explanation is that there is none is, one might claim, inconceivable. Dembski (1994, 122–29), however, provides a convincing counterexample to this claim (more convincing than Cleanthes' example of the voice from the clouds). He asks us to suppose that astronomers discover a pulsar billions of light years from earth, the pulses of which signal English messages in Morse code. Further, these messages invite us to ask it questions, including problems that can be shown mathematically to require for their solution far more computational resources than are, according to our best estimates, available in the universe. We then receive verifiable answers to these questions in ten minutes. Would astronomers in these circumstances remain methodological naturalists? Would they conclude that either reverse causality or messages traveling at superluminal speeds account for the pulsar's ability to answer our questions in ten minutes despite being billions of light years away? And that our estimates of either the age of the universe or of the smallest physically meaningful unit of time or of the number of elementary particles in the universe are wildly off the mark and hence we are mistaken in thinking that the universe lacks the computational resources for solving the problems we pose to the pulsar? Not likely. The vast majority of open-minded astronomers would admit that we have good reason in these circumstances to believe that no empirical resources within nature can account for the events in question and that an appeal to a supernatural intelligence will be a part of the best explanation of these events.

But even if Dembski's pulsar example proves that supernaturalistic explanations could possibly be permitted by our modest methodological naturalism, there remains the question of whether any such explanations actually are permitted. Dembski (1994, 131–32) defends an affirmative answer to this question. He maintains that attempts to explain the cosmos and living systems naturalistically face huge obstacles and that an appeal to supernatural intelligence to account for these phenomena is justified. Of course, he admits that these phenomena are not close to as impressive as his imaginary pulsar. But he believes the evidence for a supernatural intelligence in the pulsar case is far greater than what would be needed to justify positing such an intelligence (129). Many who would agree with Dembski's analysis of the pulsar example will disagree with him about his real-life examples. The source of this disagreement may be a disagreement about the viability of naturalistic explanations of, for example, the origin of life. Or, more interesting, it may be a disagreement about how strong the presumption of naturalism is and hence how soon one should begin considering supernaturalistic explanations in a given case. Either way, many will hold that, as things stand now, there is every reason to believe that what some call "theistic science" is not at this point in time warranted. Even our modest methodological naturalism prohibits it.

Metaphysical Naturalism

We have seen that the success of science in providing naturalistic explanations of natural phenomena strengthens the presumption of naturalism and so helps to support a modest methodological naturalism. More important, though, it strongly supports metaphysical naturalism over both supernaturalism in general and theism in particular. To see why, recall that the attempts discussed earlier to provide a theological justification for methodological naturalism fail. It is at this point in the argument that the true significance of that failure is revealed. For if we lack any antecedent reason to believe that God would not want to act directly in nature, then we lack any antecedent reason on theism to expect science to be as successful in its quest for naturalistic explanations as it has been. By contrast, we have a very strong antecedent reason to expect such success on metaphysical naturalism, because there is strong antecedent reason to believe that most natural events have causes, and metaphysical naturalism *entails* that such causes must be natural ones. To put the point crudely, metaphysical naturalism "predicts" that science will succeed in discovering natural causes for natural phenomena, while supernaturalism and theism, though certainly consistent with such success, do not predict it. To put the point more precisely, such success is antecedently much more probable given metaphysical naturalism than it is given supernaturalism or given theism. Therefore, it strongly supports metaphysical naturalism over both supernaturalism and theism: it significantly raises the ratio of the probability of metaphysical naturalism to the probability of each of these other hypotheses. This argument represents an often ignored version of the problem of divine hiddenness. The problem here is not the problem of why, if God exists, she would allow reasonable nonbelief (Schellenberg 1993), but rather, the more fundamental problem of why, if God or other supernatural beings exist, science can completely ignore them and still explain so much.

One might object that, on naturalism, one would not expect natural phenomena to have explanations of any sort, while on theism, one would expect explanations of some sort, naturalistic or supernaturalistic, and so the fact that explanations of any kind are available is evidence favoring theism over naturalism. But even if this argument is sound (which is hardly a given) and so relevant to one's final assessment of the relative probabilities of theism and naturalism, it is beside the point here. Here we are interested in the evidential significance of the success of science, *given that there are explanations of one sort or another for natural phenomena*. If the scarcity of brute facts in nature can somehow be shown to support theism over naturalism, so be it. But given that scarcity—given that natural phenomena typically do have explanations—the fact that so much in nature is known to have a naturalistic explanation (and no part of nature that could have a naturalistic explanation is known not to have one) strongly supports metaphysical naturalism over theism. After all, things could have turned out dif-

ferently. It might have turned out, for example, that macroevolution never occurs and hence that living organisms are not related by descent, in which case a naturalistic explanation of the living world would have been all but impossible. If things had turned out this way (and we knew it), then that would support theism over metaphysical naturalism. But then our knowledge that things did not turn out this way must support metaphysical naturalism over theism.[9]

One might object that some natural phenomena now present intractable problems for a thoroughly naturalistic science (e.g., Craig and Moreland 2000). If this is right, then, according to our modest methodological naturalism, the time has come to consider supernaturalistic explanations. But surely this is premature. It remains to be seen whether or not science will be able to provide convincing and correct naturalistic explanations of phenomena like consciousness, free will, and religion itself. Yet it is equally premature to accept current naturalistic explanations of such phenomena. As scientists continue to investigate and better understand such phenomena, the evidence against theism and other forms of supernaturalism may eventually become overwhelming. But while we have traveled a considerable distance toward that destination, it is still a significant way off, and only time will tell if it will ever be reached.

NOTES

1. The view that Christianity is at least partly responsible for the rise of modern science in Europe was briefly defended by Whitehead (1925, ch. 1). Since then, numerous authors have either defended or attacked this position. For a brief critical discussion of this literature, see Drees (1996, 77–86).

2. "=df." is short for "means by definition."

3. One limitation of this definition is that it assumes that the current word of the physical sciences on which lower-level entities exist is the last. History has shown that this is a very dangerous assumption. For example, when physics was forced to accommodate electromagnetic phenomena, it could not do so with the repertoire of entities that made up Newton's universe. Thus, radically new entities were posited, specifically electromagnetic fields, which could not be given a mechanical explanation (Nagel 1986, 52–53). Similarly, there may be one or more revolutions yet in store for physics, in which case new sorts of entities may be discovered that, because of their nomological and historical connections to atoms, fields, and so on, we will want to call physical and natural. (Notice that if physicists were to begin appealing to God in their theories, there would be no temptation to call God a physical entity because God would not be subject to laws relating him to atoms, fields, and the like, nor would he share any common origin with such entities.) If such revolutions will indeed occur, then our definition of nature in reality only captures nature *as currently understood*.

4. In the absence of philosophical argument, one can always appeal (illegitimately) to authority. And so the position that methodological naturalism can be supported the-

ologically is often defended by appealing to Saint Augustine's position on creation, which includes the view that all life forms were present in the world from the beginning, not as fully formed plants or animals, but as potencies or seed-principles that would in due time be actualized as fully formed organisms. This suggests that Augustine favors the view that God would not act directly in nature to bring forth life. But it is far from clear that Augustine regarded direct acts in the world as in any way contrary to God's nature. As Ernan McMullin (1985, 11–16) points out, the main reason why Augustine appealed to seed-principles was exegetical, not philosophical. He wanted to reconcile the claim in Genesis that God created all things together with the view, also authorized by Genesis, that natural kinds appeared gradually over time. Thus, there is no good reason to believe that Augustine was opposed philosophically to the idea of a "special creation." In fact, Augustine even allowed for the possibility that, in addition to the direct divine act that created the seed-principles, additional direct acts by God were required to actualize these potencies! Thus, were it not for his exegetical worries, Augustine might very well have favored a robust doctrine of special creationism. He almost certainly did not hold that anything about God's nature rules it out.

5. Of course, those engaged in nomological science may try to discover facts about particular objects as a means to the end of discovering laws. And historical scientists may try to discover laws as a means to the end of discovering facts about particular objects. But such overlap will not invariably occur.

6. The "antecedent" probability of a fact that is known to obtain on the basis of observation or testimony is the probability that it obtains, independent of that observation or testimony. Often, the probability of some fact given the denial of a theory is equated with its probability, given some specific alternative to that theory. But this assumes that all other alternatives are so implausible that they can be ignored.

7. One might object that the argument here relies on the notorious "principle of indifference." For a defense of that principle properly understood, see Schlesinger (1991, ch. 9).

8. Of course, the existence of a natural cause for some event is, strictly speaking, compatible, not just with an ultimate divine cause, but also with some simultaneous direct divine cause. But this would be to multiply causes far beyond what is necessary or warranted by the evidence.

9. Some fact F supports (in the sense intended here) theism (T) over metaphysical naturalism (N) if and only if $Pr(F/T) > Pr(F/N)$. But $Pr(\sim F/T) = 1 - Pr(F/T)$ and $Pr(\sim F/N) = 1 - Pr(F/N)$. Thus, $Pr(F/T) > Pr(F/N)$ if and only if $Pr(\sim F/N) > Pr(\sim F/T)$. Therefore, F supports theism over metaphysical naturalism if and only if the fact that F does not obtain supports metaphysical naturalism over theism.

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