God and The Light of Reason: A Philosophical Case for Theism

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Précis

In the media and the academy, belief in God has fallen on hard times. Theolog has been banished from the realm of serious scientific inquiry. Ironically, the philosophical and scientific case for the reality of God is stronger than ever. There has been a resurgence of the traditional arguments for the existence of God in the philosophical community, and a number of hard-nosed scientists have become increasingly dissatisfied with the materialistic picture of nature. Both believers and non-believers often assume that there is some inherent conflict between reason and belief in God. I argue that, contrary to popular belief, not only does belief in God present no inherent incompatibilities with reason, but, in fact, the very idea of a light of reason in which we can discern the truth only makes complete sense if the existence of God is presupposed. Moreover, if that light be developed to its fullest it terminates in the existence of God as its logical end. Theology is the alpha and omega of science and reason. When we carry the underlying principles of science and reason to their natural culmination, the path of reason returns to its origin, with an even stronger affirmation of theological truth.

Theism is a Presupposition (the "Alpha") of Modern Science

All of the pioneers of science in the West during its formative period from the 11th through the 18th centuries operated entirely within the intellectual milieu of the three Abrahamic faiths. And this was no accident, since the enterprise of science seems to presuppose a kind of beautiful and intelligible rational order behind the messy and confusing phenomena of life; the kind of rational order and beauty that would emerge from a supremely logical and tasteful mind. In addition, the early scientists believed that God's freedom of will injects an element of contingency into nature, which led naturally to an emphasis on the need for observation and experimentation. Speculating about nature from the armchair was not sufficient, since God's creativity is always surprising in the details. Finally, the doctrine of the creation of the material world as an expression of spirit meant that the world of the senses and bodily action were never devalued, an essential

foundation for empiricism. In short, the conceptual backdrop of Western monotheism provided an especially conducive environment for the emergence of modern science.

The pioneers of science, in late antiquity, the Middle Ages, and the Baroque era, believed that Nature, as a coherent creation of a single God, would consistently reflect God's laws—it was a Christian theologian, Basil of Caesarea, who first used the term 'law of nature' in its modern sense, as a predictable and consistent regularity in Nature. However, as science matured in the 19th and 20th centuries, it began to depart from its theological moorings and many philosophers reasoned in this way:

1. Science proceeds best when it focuses on the regularities inherent in Nature itself, disregarding any "supernatural" interventions by God or other agencies.
2. The best philosophical account of this regularity is Naturalism: positing that Nature (the spatial and temporal entities studied by science) is the whole of reality.
3. Hence, science supports Naturalism.

Theists of many stripes can happily accept premise 1, with the understanding that any miraculous interventions by God or other supernatural agencies will be rare, and that God has created the world and created our minds with the intention that the world be intelligible to us. Meaningful human action is only possible against a background of natural regularities that we can understand. However, as George, Berkeley, David Hume, and Immanuel recognized, the second premise is false. There is no reason to expect an autonomous and sub-rational Nature to be regular or intelligible at all.

The scientific revolution as we know it seemed to have been dependent on the tenets of a creation-laden theology, or at least no other religious inclination or worldview was as hospitable to its emergence. Many scholars of the period agree on this point. Other periods and ideologies had the resources and the intelligence to unlock Nature's secrets (the ancient Chinese, Indians, Mayans, and others) but failed to do so to the degree achieved within Christendom. This is likely because they lacked the confidence of medieval Christians in the rationality of a personal God and of His creation. Despite this fact, the scientifically informed world of the late 18th and 19th centuries began to turn back to the very errors of the past that were so sterile scientifically,

especially the materialism of the Epicureans. This return to Epicurus accompanied a wholesale rebellion against Aristotle, based on the myth of the superstition and blind faith of the so-called "Dark Ages" (a concept invented in the 18th century Enlightenment). What we call the Dark Ages (from 1000 AD on) is simply the first half of the history of our own modern civilization. Much of the progress we've made in science, technology, and political arrangements had its roots in this period (as documented by the French physicist Pierre Duhem, Stanley Jaki, Rodney Stark, and many others).

The 19th and 20th centuries have formed the period of what we might call the "Great Oversimplification". In place of the complex and well-balanced perspective of scholastic and early modern philosophers, popular philosophy has turned to a reductionist project, reducing the whole of the natural world to fundamentally physical fields, forces, and motion of microscopic entities. This culminated in what the partisans of the Vienna Circle proclaimed as the "Unity of Science". The world consists entirely of physical entities obeying rigorous physical laws. All of the other sciences, including biology and the human sciences, comprise merely the study of how physical laws express themselves in special circumstances. As Rutherford is reported to have said, "All of science is either fundamental physics or stamp collecting." Life and consciousness were relegated to the status of mere "epiphenomena", the flotsam and jetsam floating on the surface of an uncompromisingly and totally physical world. This picture has been challenged over the last half century. Compare the titles of two paradigmatic philosophical essays: "The Unity of Science as a Working Hypothesis" by Paul Oppenheim and Hilary Putnam (1958) and "The Special Sciences, or The Disunity of Science" by Jerry Fodor (1974). Both biology and the human sciences have stubbornly resisted collapsing into an all-encompassing physics.

There are three chief difficulties that challenge materialism: the laws of nature, the qualitative dimension of consciousness, and the place of human reason in the natural world. I have already discussed the theological roots of the concept of the *laws of nature*. George Bealer and I collected some of the best arguments against materialism based on the second and third difficulties ten years ago, in *The Waning of Materialism*. Even as determined a materialist as Jaegwon Kim had to concede (in *Physicalism, or Something Near Enough*) that there is no hope of explaining the qualitative dimension of sensory experience by means of the merely quantitative tools of theoretical physics.

In the seventeenth century, scientists like Galileo and Descartes followed the lead of Democritus in banishing the so-called "secondary qualities" from the material world, locating them instead entirely "within the mind". Twentieth century philosophy of mind has revealed the futility of that strategy. Once confined to the mind, the qualities become incomprehensible and inexplicable mysteries (see Colin McGinn's "mysterianism"). The human mind is scientifically and philosophically intelligible only if its internal states can be seen as mirroring or "representing" ordinary facts. This requires the enriching of our natural sciences by returning to the Nature endowed with both qualities and quantities, Nature as it was understood by scholastic, Aristotelian philosophers. Ironically, this return to Aristotle was prefigured in Bertrand Russell's neutral monism, since Russell recognized that, despite the quantitative and mathematical form of physical science, Nature as it is in itself must go beyond what can be described merely in terms of quantitative laws of motion. Russell proposed that there was something proto-mental in the physical world, while Aristotle instead pictured human senses as reflecting the real qualitative richness of extra-mental nature.

In addition to the qualitative aspect of experience, materialism's other great failure has been to make sense of the related phenomena of intentionality and normativity. Merely physical states cannot be "about" other physical states in the way that mental states can be "about" things. The mind can conceive of things very remote in space and time—even things that never have and never will exist. In fact, we can think about things that couldn't possibly exist, including self-contradictions like round squares, if only to reject them as impossible. We find intentionality in human language: words and sentences have meanings. We also find it in sensory experiences and in the testimony of memory. Our ideas and thoughts have objects, objects that can be very remote or even non-existent. We also find intentionality in desires, intentions, and actions. When we do something intentionally, there is always a point or object to which we are directed.

Materialists have only one viable strategy for explaining intentionality: the program of *functionalism* that was developed by Frank Ramsey and David Lewis after the collapse of logical behaviorism. According to functionalism, mental properties are to be identified with the causal profile of brain states: with those states' dispositions to be *affected by* events in the environment and by other brain states, and their dispositions in turn *to cause* both behavioral responses and changes in other brain states. As Alexander Pruss and I have argued, this functionalist program

requires a prior notion of *normativity*: a notion of how the brain states are *supposed* to function, how they function normally, when not injured or frustrated. This fact was recognized by Ruth Garrett Millikan, Fred Dretske, and others in the teleosemantics movement, also known as *Wisconsin semantics*. The teleosemanticists attempted to use natural selection as the basis for teleosemantics, but Pruss and I have tried to show that this attempt ultimately fails (confirming Jerry Fodor's early critique).

Norms are rules or requirements that things impose upon us. A moral norm imposes on us certain ways of acting and reacting—requiring us to keep our promises or to help others in need. Grammatical norms prescribe the use of words, requiring in English that adjectives appear before a noun, and in Spanish that they appear afterward. There are also rational and intellectual norms, such as avoiding inconsistency, looking for good explanations, testing one's convictions against the widest possible body of data, resisting wishful thinking and biased judgment, etc. To explain normativity, it is not enough to find natural counterparts to normative properties like "good" or "reasonable": we must explain the relation between those facts and the actions or practices that they favor. We must explain what makes the properties normative for us.

Many more recent materialists (such as Hartry Field or Bart Streumer) have embraced the outright denial of any true normativity. This view holds that, at best, norms and standards of correctness or reasonableness are mere projections of our own preferences or contingent cultural practices. However, this "anti-realism" about norms is self-defeating, since the very existence of intentionality depends on real, pre-human normativity. If all normativity is a projection of human attitudes, then it must depend on the prior reality of human intentionality. Our attitudes have to be *about* something if they are to project standards upon something. But such aboutness or intentionality is only possible on the basis of prior normativity. Roughly, a human thought is about a fact just in case we are *supposed to* have that thought only when the fact is actual. The anti-realist theory of projection founders on this vicious circularity.

This point is closely related to the argument from reason, an objection to materialism developed by Arthur Balfour, G. K. Chesterton, and C. S. Lewis. If the "natural" world, as understood by post-Aristotelian materialists, exhausts reality, then there is no room in it for any sort of norms or standards. This is true not only of moral standards but also of intellectual, rational, or scientific

norms---like the law of non-contradiction, the principle of total evidence, or the rejection of wishful thinking and tendentious bias. The failure to see that moral and intellectual norms stand and fall together was the great blind spot of many twentieth century materialists, like Jean-Paul Sartre and J. L. Mackie, who happily rejected universal moral norms while maintaining universal norms of thought and reasoning.

Even if we allow the materialists to supplement their worldview view with the "queer" entities of objective norms and standards (as Mackie called them), materialists are far from getting out of the morass. For materialists, every functional aspect of the human brain must be explained ultimately in terms of random mutations and natural selection (neo-Darwinian evolution). Darwinian evolution is completely indifferent to whether we can reliably survey the nature-transcending domain of objective standards. Evolution's scope is strictly limited to behavioral concerns that affect reproductive success and physical fitness. This leads to the problem of the "evolutionary debunking" of our normative beliefs and ideas. Even if there were a real domain of objective norms, materialists cannot reasonably believe that we could have any intellectual access to that domain. Any normative belief that we happen to stumble upon via the chancy process of evolution will be mere opinion, with little likelihood of being correct.

This dilemma appeared when the British philosopher G. E. Moore introduced his theory of value as a "non-natural quality" in the early 20th century. There was no way of shoehorning these evaluative qualities into the causal network of the world. If they existed at all, they had to lie in some wholly separate or transcendent domain, where they were forever quiescent and inert. But if they are quiescent and inert, how could we hope to learn anything about them? They couldn't have made a difference to our evolutionary pre-history, nor could they have revealed themselves in scientific experiments or in our best theories about how the world functions causally.

In a chapter in the recent collection, *Two Dozen or So Arguments for God*, I developed a three-fold argument from reason against naturalism and in favor of theism. I assumed that humans do have reliable access to both rational and moral norms. We can know what good reasons for beliefs or for actions are. This requires both the real existence of norms independent of the human mind and human society and our ability to bring our beliefs into some sort of reliable conformity with those facts. This capacity comprises one aspect of what philosophers' call

'intuition'. Intuition occurs when some truth appears compellingly to the mind, despite the fact that we cannot perceive this truth through the senses.

My first argument for theism was an inference to the best explanation. Theism can explain why we have a reliable faculty of intuition, while materialism cannot. If there is a God who created the human mind, and that God is benevolent and aware of the value of knowledge, then God's creation of the human mind can provide an explanation of how we come to know normative and other nature-transcending facts, like the foundational facts of mathematics, pure metaphysics, and logic.

Second, knowledge requires some non-accidental connection between the act of knowledge and the fact that is known. This necessary condition of a real connection between the knower and the thing known was most notably brought out in Edmund Gettier's famous 1963 paper, "Is Knowledge Justified True Belief?" Gettier convincingly showed that knowledge seems to require more than having a belief that is both reasonable and true. There must be an explanation connecting the truth of the belief with our reasons for holding it as true (as Tomas Bogardus has recently argued). If materialism is true, then any true beliefs we might have about any nature-transcending facts would be a matter of dumb luck, such dumb luck that should be excluded from instances of bona fide knowledge. In contrast, if theism is true, God's knowledge of all of reality can provide the needed connection between our created capacities and those transcendent truths. In this case God would be responsible for endowing us with reliable epistemic faculties that give us the ability to reliably grasp these transcendent facts.

Finally, knowledge is possible only when it is not *defeated*. This aspect of the theory of knowledge is largely due to work by Alvin Plantinga, Michael Bergmann, John Pollock, and others. A bit of prospective knowledge is defeated if there is some fact which, if known, would give us good grounds for doubting the reliability of the process producing the opinion in question. Such defeaters can themselves be defeated by other facts, facts that undermine the doubt created by the original defeater. An opinion suffers *ultimate defeat* if there is some fact that defeats it and that cannot be defeated by any other fact. If materialism is true, all of our intuitive beliefs are subject to ultimate defeat by two facts: (i) our brain functions were entirely shaped by chance and natural selection, and (ii) natural selection was entirely indifferent to the

reliability of our capacities to form true beliefs on the basis of intuition. In contrast, in a theistic world, there are no such defeaters for our intuitive knowledge.

In the world of materialism, the evolutionary defeater cannot itself be defeated, because all of our scientific knowledge depends on intuitive knowledge. Without knowledge about the proper norms of scientific investigation and reasoning, we cannot claim to know the results that science yields to be really true. It would be viciously circular to use scientific investigation to confirm the reliability of our intuitive knowledge: it would be like fact-checking a newspaper by comparing one copy of the paper to another. Moreover, natural science is in any case impotent when it comes to revealing normative facts, and so it cannot confirm that our intuition of normative truths is reliable.

Plantinga's Evolutionary Argument against Naturalism (EAAN) is a generalization of this argument against intuitive knowledge, an argument that all of our knowledge, including knowledge based simply on the senses or memory, is subject to ultimate defeat in a purely material world. Even in the case of our beliefs about food and predators in our immediate environment based on our senses, evolution doesn't care whether any of these beliefs are *true necessarily*, so long as they are useful, reliably producing adaptive behavior. We tend to think that the truth of individual beliefs is adaptive, but only because we tacitly assume that most of our other beliefs are true and that most of our desires are desires for reproduction-enhancing states. However, Plantinga's argument calls into question the truth and object-appropriateness of all of our beliefs and desires at once, and he points out that there are many belief-desire systems that can produce adaptive behaviors in a reliable way without ever attaining truth. For example, if I wrongly believe the predator is behind me when it is in fact in front of me, then this false belief will be useful if I also wrongly believe that I can escape the predator by running toward it, or if I have the perverse desire to be eaten as soon as possible. Only when my other beliefs are correct, and my desires rightly aligned with survival and reproduction will the truth of an individual belief correspond with its usefulness. But Plantinga's argument against Naturalism throws into doubt the truthfulness of the whole system of beliefs.

The best rejoinder to Plantinga's more general argument is one based on the Wisconsin-style teleosemantics. Teleosemanticists can claim that our sensory beliefs are reliably true because

their content or meaning is fixed precisely by the fact that they reliably and fruitfully correlate with certain biologically relevant conditions. My capacity to recognize that a predator is in front of me is reliably true because: (i) it is obviously advantageous for me to be in some internal state whenever a predator is in front of me, so that state can cause appropriate flight behavior, and (ii) that state acquires the content, there is a predator in front of me, simply because of the advantageous correlation mentioned in (i). However, as I argued above, teleosemantics requires an account of pre-human normativity, which does not work under the assumption of materialism (as Fodor, Pruss, and I have argued). In any case, the answer given by the Wisconsin teleosemanticists is of no use against the more specialized argument about intuitive knowledge. Evolution cannot explain any correlation between brain states and nature-transcending facts, including normative truths.

Theism is the Ultimate Culmination (the "Omega") of Modern Science

Not only does science and reason presuppose theism, it also points in the direction of theism as the ultimate destination of scientific inquiry and reason at its best. This happens in two ways, which correspond to what Kant called the 'cosmological' and 'teleological' arguments for God's existence. The cosmological argument is the argument to the conclusion that there exists a necessary, uncuased and supernatural First Cause of the cosmos. The teleological argument examines features of the cosmos, looking for telltale signs of wisdom and intelligence in its apparent design.

Science is based on the search for explanations. Scientific inquiry depends on a principle of causality: the presumption that every "ordinary fact" (to be defined later) has an ordinary and intelligible explanation. Philosophers since the Enlightenment have called this presumption The Principle of Sufficient Reason (hereafter just PSR). It is impossible to prove a principle as fundamental as the PSR. Instead, it must be defended dialectically, by demonstrating the unacceptable consequences of its denial. Alexander Pruss and I have recently argued in *Philosophical Studies* that denying the PSR leads to complete empirical skepticism, undermining any definitive claim that we could make to scientific knowledge.

If we had to take seriously the possibility that "ordinary facts" obtain reality in the absence of any cause, we would have to take seriously the possibility that all of our sense data and memory impressions have just now *popped* into existence, with no cause at all. The mere possibility of such an anomaly would undermine any claim we could make to any knowledge that is based on observation or memory. The possibility of uncaused experiences would be a defeater of knowledge based on those experiences, since uncaused experiences (even if veridical) would lack any reliable connection to features in our environment. The consequence of uncaused ordinary facts would provide the grounds for a crippling global skepticism, something we must try to avoid at all cost.

I defend my basic principles by appeal to the threat of skepticism. I am not claiming that we must first refute skepticism before we can claim to know anything. Refuting the skeptic is a hopeless task, since any refutation will have to depend on some assumptions, and the skeptic can always challenge those assumptions. The best anti- skeptical strategy is to resist the skeptic at the very first step: refusing to take seriously the kind of pessimistic scenarios that the skeptic presents. *Are we just brains in vats? Is there a powerful demon deceiving me?* We don't have to prove that these suppositions are false. We can merely refuse to count them as reasonable conjectures. Although we don't have to refute the skeptic absolutely, we must avoid giving hostages to skepticism. If we are to maintain a reasonable claim to knowledge, we must not concede to the skeptic the real possibility of a pessimistic scenario. The threat of skepticism is real, and avoiding it requires substantial commitments to the nature of the world and our place in it.

Why not simply embrace global skepticism? The cost of doing so is high. First, one can hardly make reasonable decisions or engage in conversations with others without making, at least implicitly, some claim to having empirical knowledge about the world about one. Second, global skepticism is self-defeating, since to be a global skeptic is to make a significant claim about the world, namely, that empirical knowledge is completely unavailable. How can the skeptic know this? Of course, one can just give up thinking philosophically altogether, but our human nature seems to press these questions on us willy-nilly.

What form must the PSR take in order to avoid such skepticism? There are two salient issues. First, what is the nature of an explanation? If one fact explains another, is it possible for the first to be real without being followed by the second? Do causes *necessitate* their effects? I argue that the answer is No. The opposite view is based on a confusion between causal explanation and strict determination, a confusion identified by Elizabeth Anscombe in her inaugural Cambridge lecture "Causality and Determination". There are two sorts of counterexamples to the necessitation thesis. First, acts of free will, taken for sufficient but not necessitating reasons, can have an adequate explanation without being pre-determined by the person's mental state. Second, probabilistic or stochastic causes can explain without necessitating their effects. If an electron has a 50% propensity to go left when confronting a two-slit screen, then if it goes left, its doing so is adequately explained by that propensity, even if the propensity was consistent with its going right instead.

Second, what is the scope of the PSR? Does absolutely every fact have an explanation? In order to avoid skepticism, the PSR must cover all *ordinary* facts. The ordinary facts must be a broad enough category to include all of our sense experience and scientific data. We must avoid the arbitrary inclusion of some ordinary facts within the scope of the PSR while excluding others. Moreover, we must employ a criterion of "ordinariness" that can be applied without relying on any empirical knowledge whatsoever, since applying the PSR to our data is a precondition of empirical knowledge. It must be immediately obvious that my sense data and scientific observations are ordinary facts.

Traditionally, philosophers have identified the ordinary facts with the facts that are contingent: that could have failed to be the case. However, this is problematic, since it raises the question: how do I know that my sense data are contingent? Some philosophers, like Spinoza, have supposed that all facts are necessary, free from contingency. Other philosophers, like John Duns Scotus, have identified the ordinary facts with the facts that are intrinsically causable or explainable. For Scotus, the PSR requires that every fact that could conceivably have an explanation does have an explanation. This is on the right track—it does seem obvious that our sense data and scientific results could have explanations. But why? What is it about them that make them obviously explainable?

Graham Oppy has recently proposed that we should identify ordinary, explainable facts with those that are *preceded in time* by other facts. This means that the Big Bang would be extraordinary or unexplainable, if it occurs the first moment of time. Oppy's proposal, however, will not enable us to escape total skepticism, however, since we cannot know immediately (without empirical evidence) that our current sense experiences or memory impressions are preceded in time by other facts. How could I know, apart from knowledge based on memory (which will not help if all the memoires I have occurred to me at this moment), that the present moment is not the first moment of time? Even when armed with Oppy's version of the PSR, I would still have to take seriously the possibility that the present contents of my mind, along with everything else existing now, have just popped into existence, without a cause and without a real past. The mere possibility of such a thing is a defeater of all my empirical knowledge.

We must also include all *natural* facts within the scope of the PSR, where a natural fact is a fact entirely about natural entities. A natural entity is something that is either complex (composed of smaller parts) or bounded in space, time, or intensity, or both. A supernatural entity, in contrast, would be something that is absolutely simple (no parts) and absolutely unbounded or infinite in all respects. It is follows from the above definition that all of my mental states, including my sensory experiences and apparent memories, are natural facts, and so we can apply the PSR to them without vicious circularity. If all natural facts have a cause, we can prove that there is at least one supernatural entity.

There are two ways to prove that there exists a supernatural entity: the path of causal finitism, and the path of causal aggregation. The path of causal finitism requires that there can be no infinite regresses and no vicious cycles of causation or explanation. Every chain of causes must have a first member. If all natural facts have causes, then this first member of the chain must be a supernatural fact. And any supernatural fact entails the existence of a supernatural entity, something both simple and unbounded.

Many philosophers, including David Hume and Bertrand Russell, have insisted that there is nothing wrong with infinite regresses. Alexander Pruss and I have developed new arguments, based in part on some work on paradoxes of infinity in the 1960s by José Benardete, to show that infinite causal regresses are impossible. Here are two of those arguments. The first is the

argument from the impossibility of bottomless note passing. Suppose that an infinite regress was possible. Then it should also be possible to set up the following sort of scenario. In the scenario, there are an infinite number of students, each of which receives a note passed to him by his predecessor. There is a last note passer, but no first one. Each student has a unique positive integer, from 1 (the last note passer) up to infinity (as we move back in time). The note passers all follow this rule: if they receive a note containing the number of an earlier student (a number greater than his own), then the student passes the note unchanged to his successor. If the note does not contain such a number, then the student writes his own number on the note and passes it on.

We can prove that this scenario is impossible by asking a simple question: when the last student gets the note, does it have a number on it, and, if so, what number? Clearly it will have a number, since if it had no number when the last student received it, he would have written a 1 on it. So, suppose it has some number n. But this is impossible, since in order for student n to have written on it, it must have had no larger number when it reached him. And that means it would have had no such number on it when student n + 1 received it, so he should have written n + 1 on the note. Therefore, we derive a contradiction from the supposition that regresses are possible.

Secondly, Alexander Pruss has shown that if infinite regresses are possible, it is possible to complete an infinite fair lottery, a lottery in which every natural number, no matter how large, has an equal chance of being chosen. One way to run the lottery is to flip a fair coin infinitely often, and then use a fixed scheme for generating a number from the infinite number of results. Suppose we run two such lotteries, one for you and one for me. We each look at the number produced by our own lottery. The situation will force us to violate some fundamental rule of rationality. No matter how big my number is, there will be infinitely many bigger ones and only finitely many smaller ones. So, I will have to judge that the probability of getting a number so low was infinitesimal. I will be certain that your number is larger than mine. But you will be equally certain that my number is larger than yours! If we assume that the principles of rationality hold up under all possible circumstances, we must judge that such an infinite lottery is impossible. And if such lotteries are impossible, so are infinite regresses of any kind.

Why can't the skeptic admit that the two scenarios (the bottomless note passing and the infinite fair lottery) are logically impossible, while insisting that our own cosmos arises from a logically consistent infinite regress? Once again, I will appeal to the necessity of avoiding skepticism, in this case skepticism about our knowledge of what is possible and impossible. American philosopher David Lewis proposed that we know what is possible by using what he called the Patchwork Principle. If a particular event is possible, and it is possible to have a spatiotemporal structure large enough to contain a certain number of copies of that event, then it is possible for the event to be copied in that way. We tacitly use this principle all the time, for example in business planning or engineering. I sketch out a plan. If I know that there is enough available space and time, and if I am confident that I can carry out each element of the plan, then I know that the plan is feasible. Suppose, for example, that I'm planning a seven-day road trip across North America. So long as I'm confident that each leg of the journey is possible, and so long as there is enough time to execute the plan, I can reasonably conclude that the entire plan is feasible. Impossibility must be anchored in some localized absurdity—it cannot simply "emerge" at the global level with no explanation.

Let's return to the note passing paradox. It is clear that each event described in the story is possible: one student can certainly receive and pass a note, while carrying out the simple instructions. The Patchwork Principle tells us that it must be possible for the note-passing events to fill the spaces in an infinitely regressing series, if regresses are possible at all. Since we know that the story yields a contradiction, we can infer that any argument showing that the story is possible must have a false premise. This is a form of argumentation called the *reductio ad absurdum (*used by philosophers since the time of the ancient Greeks), where we assume the truth of the conclusion and carry that assumption to its logical end to show that it produces an absurd consequence. In this case, three premises are involved: the possibility of an individual note-passing event, the Patchwork Principle, and the possibility of an infinite regress. We know that the individual events are possible, and we must accept the Patchwork Principle or collapse into skepticism about the future. So, we should reject the last premise, denying the possibility of infinite regresses.

Graham Oppy has suggested the following rejoinder: suppose that infinite regresses are possible, but they necessarily take the form of an infinite series of cycles of Big Crunches and Big Bangs,

where the universe periodically collapses to a state of infinite density (the Big Crunch), followed by the emergence of a new cosmos in a Big Bang. On Oppy's hypothesis, the Big Crunch/Bang episodes block the forward transmission of any information from early cycles, rendering the note-passing paradox impossible. In response, I would argue that if Oppy's scenario were possible, so would be a scenario in which we have an infinite cycle of Almost Big Crunches, with just enough information leaking through each cycle to make successive stages of the note-passing story possible. Since we know that the infinite regress of Almost Big Crunches is metaphysically impossible, we should say the same thing about Oppy's regress of Maximally Big Crunches. This involves an application of a principle of modal uniformity (as defended recently by Josh Rasmussen). There should be no arbitrary boundaries between the possible and the impossible, but Oppy's scenario requires just such an ad hoc postulation of a boundary.

The case of Pruss's infinite fair lottery is different. In this case, we cannot prove that the lottery is impossible. Instead, we can show that deep principles of rationality in the face of uncertainty would completely break down in that case. I must be certain that those principles have not broken down in fact, or else I would again be thrust into a form of skepticism. So, I must be certain that no such lottery has actually taken place. However, if the history of the cosmos includes an infinite regress, and if that regress includes an infinite number of chancy events, then it does in fact contain the makings of an infinite fair lottery. So, I must be certain that there have not been an infinite number of chance events in the past. In order to be certain that there are no such possible infinite lotteries that would threaten the reliability of my rationality we would have to rule out the possibility of all infinite lotteries on principle.

The second strategy for proving the existence of an uncaused first cause is the way of aggregation, developed by Avicenna (ibn Sina) and Gottfried Leibniz. Suppose, despite the arguments above, that infinite causal regresses are possible. Take any such regress. The infinite series of causes is itself a large, very complex but still natural, ordinary fact. Therefore, the whole series must have a cause. Now the PSR entails that, for any collection of natural facts, the plurality of natural facts has one or more causes, causes that do not belong to the collection itself (to avoid vicious circularity). For, suppose that some collection of natural facts did not have a cause that is external to that collection— that is, suppose that there can be circular causation. Then I would have to take seriously the possibility that my own sensory experiences form just

such a collection, in which case they would have collectively popped into existence without external cause. Once again, I would fall back into global skepticism. Consider the collection of all natural facts. This totality of facts must have a cause that is supernatural. And a supernatural fact cannot be caused, so there is an uncaused cause of the collection of all natural facts.

If we apply our scientific principles consistently and without arbitrary restrictions, we are forced at the ultimate limit of our inquiry to accept a fact that lies beyond the scope of science, a supernatural fact. Science inevitably points beyond itself, to its natural omega point, which is God. What does this cosmological argument tell us about God? We can infer that God is absolutely simple and unbounded in every way. God cannot have any temporal or spatial location, and God cannot have any parts. All of God's intrinsic attributes must also be unbounded: unmeasurable and infinite in intensity and scope. God must have causal power, since God is the ultimate cause of the existence of all natural things, so God must have infinite, unbounded power. Could there be more than one god? There are strong arguments against the possibility of two beings with unlimited power. One must always be bounded or restricted by the other. In addition, if both gods were equally simple and unbounded, it is difficult to see what fact could explain their being mutually distinct.

How could a simple and timeless God act? Such a being could not act in anything like a physical or mechanical process. There could be no laws of nature (or of super-nature) that could dictate what such a being does or does not do. There is only one viable model of divine activity available to us: that of a perfect, omniscient intellect freely *choosing* what to do, with a will that is automatically and immediately effective. That is, God must be free, omniscient, and omnipotent. The world of space and time results from God's creative intentions, much as a work of fiction emerges from the mind of an author.

Unlike human intellects, God's mind is perfectly simple and unchangeable. God does not have any internal representations by which He thinks. God needs no such representations: the mere existence of any fact is sufficient for God to know it. All facts are immediately present to God's mind, without the requirement of an internal duplication. An infinite mind does not need to remember, to calculate, to infer, or to deliberate. Let's call God so conceived the God of classical theism. As a supernatural being, God is uncausable. An actual and concrete but uncausable being

must exist with absolute necessity. If it had been possible for God not to have existed, then His existence would have been impossible, since something is possible only when it could have been caused to exist. But if God could have been impossible, He would have been necessarily impossible, since what is absolutely impossible cannot vary from one situation to the next. Since God actually exists, He is clearly not impossible. So, His existence must be absolutely necessary, contingent on nothing else.

Classical theism enables its proponents to avoid a dilemma proposed by Plato in the Socratic dialogue *Euthyphro*. In the dialogue, Socrates poses this dilemma: do the gods love what they do because those things are good or pious, or are the things good because the gods love them? Either answer is unsatisfying. If God loves things because they are independently good, then God is not the ultimate explanation of everything else. If things are good simply because God loves them, then God's love is unmotivated and arbitrary. For classical theists, there is a third option: God loves things because they are good, and they are good because their value is grounded in the necessity of God's own nature. God knows Himself, and in knowing Himself He knows all values and normativity. So, God is the ultimate explanation for the existence of the world (the totality of natural entities). But is there an explanation for why God created this world rather than another? If so, doesn't that make our world itself absolutely necessary, contradicting the obvious contingency of the affairs around us? There is an explanation, in terms of God's having good reason to create this world, but this explanation is not a necessitating one. God also had good reason to create other worlds instead, and the reasons God had for creating for this one did not prohibit Him from alternative courses of action.

So much for the cosmological argument. The second argument for God's reality is the teleological argument, based on our best scientific understanding of the cosmos. The teleological argument supplements the cosmological, given us confirming reasons to believe that the necessary first cause of the cosmos is both wise and benevolent (i.e., very intelligent and responsive to good reasons). At this point, we can return again to the laws of nature. The laws of nature are simple, universal, and elegant. In fact, without the consistent beauty of the world's laws of nature, science likely would never have discovered them, as argued by the atheist Nobel Prize winner Steven Weinberg in *Dreams of a Final Theory*. We could have knowledge of those laws of nature (as opposed to true opinion via dumb luck) only if the connection between truth

and beauty was non-accidental, and this requires a creator who was aware of and valued beauty for its own sake. Arthur Prior pointed out that the possibility of physics depended on the fact that the number of basic kinds of physical particles (30 or so) is so much smaller than the total number of particles (something like 10 to the 80th power). Why did Nature restrict itself to so small a number of basic kinds? This too bespeaks of intentional design for both order and for the possibility of creaturely knowledge. Recent investigation of the fundamental constants of Nature (like the ratio between the strengths of gravitational force and electromagnetic force, or between the mass of the electron and the proton) reveals dozens of examples of "fine-tuning," values that lay within very narrow ranges outside of which the universe would have been a very boring, lifeless place. Without fine-tuning, stars and galaxies could never have formed and heavier elements (like carbon) could never have been created or would have been too unstable for life. The kinds of beautiful structures we see through the Hubble telescope or in a casual walk through a garden all depend on these ratios having exactly the right values. Design by God offers a compelling explanation of natural fine-tuning.

In many cases, the analysis of fine-tuning and design takes place through probabilistic reasoning, using something called Bayes's Theorem. The Reverend Thomas Bayes was a pioneer of the theory of probability, whose theorem explains how new evidence should lead to a consistent updating of our degrees of belief. Philosopher Robin Collins points out that we must take into account that we are talking here about subjective or rational probabilities, not some sort of objective chance or physical propensities. If the subjective expectation of some result is very low on one hypothesis but much higher on a second, then the observation of that result greatly increases the subjective probability that the second hypothesis is true. The probability of the fine-tuning of the universe for stars, chemistry, and life is astronomically low on the hypothesis that the constants are matter of brute chance, while much higher on the hypothesis that they are the result of intentional choice by a God that preferred a beautiful and interesting world to a dull and lifeless one. Some philosophical critics have objected that there is no way to determine precisely what these subjective probabilities must be. That is true but irrelevant. The use of Bayes's theorem is simply an illustrative tool, helping us to appreciate how powerful an argument for design we have. When we observe something so well- adjusted for a simple and obviously desirable result, then we have excellent grounds for inferring the existence of design.

The case for design is further strengthened by considering what we know about the Earth and its place in the solar system and the Milky Way. Life appeared on the Earth within about 10 million years of the condensation of liquid water, a mere blink in the eye of cosmic time. Robin Collins has shown mathematically that if life were the product of a series of lucky coincidences, then the probability is incredibly close to 1 that life would first appear near the end of a planet's period of habitability. The odds that it should appear by chance so early in the Earth's history is virtually zero. Given what we know about the nature of life, especially its dependency on the complex system of DNA-RNA-protein replication and the delicate maintenance of far-from-equilibrium condition within cell membranes, the first living thing had to be either the result of design or of a long series of extremely unlikely coincidences. Guillermo Gonzalez and Jay Wesley Richards have shown (in *The Privileged Planet*) how ideally arranged and situated the Earth is, both for the evolution of biological intelligence and for the possibility of astronomical discovery. Robin Collins has also uncovered many examples of fine-tuning of the fundamental constants of physics for the sake of scientific discovery. What emerges is a consistent picture of a world created by a God who was aiming at the natural development of creatures with advanced scientific understanding.

The most common objection to the argument from design is the "Who Created God?" problem. If the world's designer required a complex brain within which to concoct the design, then the explanation merely magnifies the mysteries in need of further explanation. However, if we combine the evidence for design with the cosmological argument and classical theism, the objection collapses. God is the first cause and so cannot be explained. Even more importantly, God's mind is simple and unbounded and so requires no explanation. God's design is first concocted in His actual creating of the world, and so there is no infinite regress of concoction.

Physicists generally prefer some version of the multiverse hypothesis, combined with observer selection, as an explanation for the fine-tuning of both the constants and the initial conditions of the Big Bang. The response roughly goes as follows: If there is a very large number of parallel universes out there, and if the initial conditions and fundamental parameters vary randomly from universe to universe, then there is a good chance that at least one universe will be fine-tuned for intelligent life. We have to be in such a universe, since otherwise we wouldn't be here to ask about the fine-tuning.

There are several things to note about this response. First, it offers an explanation that is by no means clearly superior to divine design. The battlefield between atheism and theism has become, at the very least, much more level. Atheists can no longer complain that it is only the theists who insist on positing unobservable, universe-transcending causes. Second, the multiverse hypotheses that have been offered all depend on cosmic reality's having an absolute beginning in time (being "past-complete," as physicists put it), supporting the cosmological argument. Third, the multiverse hypothesis does not explain the fine-tuning for scientific discovery that Robin Collins has discovered. There's no reason for us to expect to be located in a universe that is above average in its fitness for scientific knowledge. Fourth, the multiverse hypothesis cannot explain the surprising fact that we live in the sort of universe that would require extraordinary fine-tuning for the sake of life. We can imagine worlds in which life could have arisen without fine-tuning. This gives us reason to infer that the Creator deliberately set about creating a world in which life was possible, but only on conditions that required great foresight and skill to realize. God was like an athlete who picks a difficult rock face to climb, or an artist who picks out a difficult medium to work with. Theologians have long explained God's actions in terms of the promotion of God's "glory". God intended to do good things so that His creatures could appreciate both His wisdom and His skill. Given such a hypothesis, fine-tuning is unsurprising.

Finally, the multiverse hypothesis throws us back into the arms of radical skepticism, this time through the problem of the Boltzmann brains. Ludwig Boltzmann was an Austrian physicist who first devised a statistical or probabilistic account of entropy. Boltzmann identified conditions of low entropy with states of low probability, and high entropy with high probability. Our own universe began in a state of extraordinarily low probability—Roger Penrose has calculated the improbability involved as 1 in 10 to the 10 to the 134^{th} power (an unimaginably huge number). Boltzmann explained how this happened by hypothesizing and infinitely old universe. Over an infinite period of time, everything will happen at least once, no matter how unlikely it is. We find ourselves in a period emerging from an extremely low probability event, because such low entropy was a condition for the appearance of life.

However, Ernst Zermelo, Richard Feynman, and others quickly pointed to a disastrous consequence of Boltzmann's hypothesis: it is much more likely that a brain duplicating my own should spontaneously form immediately from some high-entropy chaos. Such "Boltzmann

brains" will far outnumber normal brains in a Boltzmann universe, with each Boltzmann brain falsely believing that it evolved over millions of years on a planet surrounded by other living things. If the Boltzmann hypothesis is true, we should each judge it almost certain that we are among the deluded Boltzmann brains. Similarly, if the multiverse hypothesis is true, the sheer scale of cosmic reality is so great that Boltzmann-like brains will abound. Whether or not they outnumber normal brains depends on the details, but there will always be an abundance of the deluded brains just like us, enough to give any of us a defeater for our empirical knowledge.

So much for the teleological argument. David Hume, the great Scottish skeptic, conceded that the argument from design was strong, but he thought that it was almost perfectly counter-balanced by the problem of evil. If evidence of good design is evidence for God, evidence for faulty design should be evidence against Him. This is in fact wrong. The classical theism that emerges from the cosmological argument posits a God that is absolutely infinite in power and understanding. It is unreasonable to expect such a God to "do His best": there is no such thing as the best God can do, because he could always do better. Any world God could create is a world that God could improve on. If God were very intelligent and powerful but finite, then we could expect Him to do His best: to marshal His limited resources in order to produce an optimal design. Ironically, it is because God is infinite that we should expect much less. God is not the sort of being to act upon every good reason, for the simple reason that it would be impossible for Him to do so. God acts only for good reasons, but He does not act for *every* good reason. There are an infinite number of good things that God could have done that He failed to do *for no reason whatsoever*. In a certain sense, the God of classical theism is an "indolent" God. We cannot expect God to design things absolutely optimally, but only just good enough for some good purpose. A good but imperfect creation, such as we see arounds us, is exactly what we should expect. The world is just the sort of good but imperfect world that an infinite God should be expected to create.

The Emergence of Reason in a Physical World

Given the theological background of classical theism, how should we return to the task of understanding the natural world? We should be pro-physics but anti-physicalism. That is, we should be confident about our ability to gain great and sound knowledge of the physical aspects

of the world. At the same time, we should resist the blandishments of reduction. We should expect to find real and fundamental entities at a variety of scales—molecules, solids and liquids, living organisms, rational persons. Some of these fundamental entities will be wholly composed of physical stuff without being reducible to physical laws and processes. How is this possible? How can we avoid a stultifying or obscuring dualism or even pluralism? Can we think of nature as a whole forming a coherent and intelligible unity?

To begin with, we must note the distinction that American philosopher Wilfred Sellars drew our attention to the distinction between the manifest image of the world and the modern scientific image. The first includes people as rational and intentional agents, accountable to norms and reasons. It also includes a world of rich qualities, corresponding to human experience of macroscopic objects of stable appearance and disposition. The second corresponds to the purely quantitative and functional theories of modern physics. We must not forget that science, including physics itself, needs the manifest image. Physicists must navigate the everyday lifeworld just as any human being does. They must find their way to their laboratories, pick up and manipulate their instruments, and observe results with their senses, including their perception of "secondary" qualities. They must communicate meaningfully with other physicists and hold themselves accountable to norms of thought and practice. They must do all of this, even though none of it finds an explicit place in the theoretical structure of physical reality that they discover. Without the reality of the manifest world and our reliable knowledge of it, all of theoretical physics would be a mere fantasy in the clouds, without an empirical foundation. Without folk knowledge of the manifest world, there can be no experimental knowledge. Without experimental knowledge, there can be no knowledge of theory. Hence, if physical theory undermines the manifest world or our knowledge of it, it undermines itself, like the man who cuts off a tree limb while sitting on it. To succeed, scientific theory must "close the epistemological circle", to use Abner Shimony's insightful phrase, returning with natural piety to the world of the manifest image.

The circle began to be broken at the time of the Scientific Revolution, when Galileo and Descartes banished the second qualities from the scientific image, relegating them to the internal world of the mind. As George Berkeley pointed out, this already posed a serious epistemic problem, since our experimental knowledge depends on knowledge of real colors, sounds, and

smells. The quantum revolution, if taken in the wrong way, threatens to unravel the epistemological circle even farther. In the quantum world, the primary qualities of location, motion, shape, and even number threaten to disappear, leaving behind nothing but waves of probability in an abstract state space. On many accounts, our familiar space and time disappear as well, relegated like Galileo's secondary qualities to a merely subjective status within the mind.

The most extreme case of such unraveling is also one of the most popular interpretations of quantum theory: Everett's many-worlds interpretation. As developed by a group of philosophers and physicists in Oxford, the scientific image of the world consists entirely of a single, undivided cosmic wave. According to them, the manifest image of ordinary, perceptible objects with definite locations in space is merely a subjective projection of this wave upon our experience, something *functionally* realized by it. Since the Everettians are materialists, these experiences are also some kind of subjective projection—but upon what, it is impossible for them to say, for they deny the objective existence of consciousness as the screen upon which subjective projections can be shown.

As I have argued in a chapter in *Neo-Aristotelian Perspectives on Contemporary Science*, the Oxford Everettians have so demoted the manifest image that it stands on a par with any logically consistent fiction, like the world of Homer's *Odyssey* or *The Lord of the Rings*. Using a paradox proposed by Max Newman and Hilary Putnam, I showed that any consistent story whatsoever, so long as it has the right number of entities, can be functionally realized by the quantum wave in exactly the same sense as is the manifest image of experimental physics. Therefore, Shimony's epistemological circle is completely and irreparably broken. My collaborators and I propose a revival of Aristotelian natural philosophy. For Aristotelians, the world's *substances* are the bedrock of reality, and *accidents*, like qualities, locations, and powers of interaction, are dependent entities. Following the work of quantum physicists Ilya Prigogine, Hans Primas, George Ellis, and Elizabeth Drossel, I argue that we should think of quantum particles as simply aspects or "accidents" (to use Aristotle's term) of complex substances. The entities studied by chemistry, solid-state physics, and thermodynamics have primary reality— those studied by particle physics are only secondary and dependent. An algebraic approach to quantum mechanics (of the kind championed by Hans Primas) recognizes irreducible, fundamental properties at the chemical and thermodynamic level, properties like temperature, entropy, and chemical structure.

These are not merely the result of crude descriptions of the locations and movements of microscopic particles—they are fundamental conditions that shape and structure the particles' quantum behaviors.

Ellis and Drossel have developed a theory of *contextual emergence*, which fits beautifully with this neo-Aristotelian program. In their program, there is real top-down causation, causation of a form that Aristotle would recognize as "formal" (one of Aristotle's four "causes"). Life in particular is autonomous, with its own characteristic powers and potentialities. Living organisms are not mere heaps of particles but have a holistic form or soul that determines their powers and potentialities. Alexander Pruss and I have argued that Aristotle's conception of powers is exactly what is needed to find an adequate foundation for normativity and intentionality in the natural world. A thing is supposed to do whatever would perfectly manifest its characteristic and fundamental dispositions or potentialities. Thus, normativity suffuses throughout nature and is not limited to human thought and action. Moral and intellectual norms arise from the specialized powers of deliberation and thought that are characteristic of human beings. This Neo-Aristotelian version of nature coheres well with theism but badly with atheism. The evolution of life and consciousness at a fundamental level requires the unfolding of an actively creative plan. It is impossible to imagine it all happening by chance.

The Light of Faith

Religious experience confirms the reality of God. This includes the sort of experience that is common to most members of all known cultures—an experience of the world as created by a superior being, and an experience of the moral demands placed upon us by some kind of ultimate reality. In addition, there are both striking incidents of divine providence (for example, the fulfillment of prophecies in the history of Israel, the life of Jesus, and the Christian church) and credible reports of remarkable miracles (including the resurrection of Jesus). These events include discourses that purport to come to us from God himself, providing us with a second source of information, the light of faith. The light of faith both builds upon and confirms what we can know of God from the light of reason.