The *Kalam* Cosmological Argument
and the Anthropic Principle

WILLIAM LANE CRAIG

William Lane Craig is a research professor of philosophy at Talbot School of Theology in La Mirada, California. He received his Ph.D. in philosophy from the University of Birmingham (England) and a Th.D. from the University of Munich (Germany). He is the author of several works in philosophy of religion, including *The Kalam Cosmological Argument* (1979) and *Reasonable Faith* (1994), from which the following selection is taken. The *kalam* argument refers to a version of the cosmological argument developed by Arab Islamic scholars al-Kindi and al-Ghazali in the Middle Ages. The Arabic word *kalam* means “argument.” In the first part of this essay Craig develops two versions of the *kalam* argument, both aiming to prove that the universe must have a cause of its existence. In the second part of this essay Craig describes the evidence from astronomy for the *kalam* cosmological argument for the existence of God. He argues that evidence for the Big Bang confirms the thesis that the universe began to exist and so must have had a cause. Toward the end of the article Craig introduces “the anthropic principle,” which states that “if the universe were in fact different in any significant way from the way it is, we wouldn’t be here to wonder why it is” (a definition given by Dewey Schwatzenburg). Finally, Craig argues that there is good reason to believe, on the basis of the anthropic principle, that the First Cause is the Personal Creator of Theism.

**Study Questions**

1. What are the premises of the *kalam* argument?
2. What do atheists like Quentin Smith say about our origins?
3. What does Hume say about causality? How do Mackie and Craig differ on their interpretations of Hume’s theory?
4. What is Craig’s first argument for the thesis that the universe began to exist?
5. What is the Hilbert’s Hotel analogy?
6. What is the scientific evidence confirming the idea that the universe must have had a beginning?
7. What did Edwin Hubble discover in the 1920s?
8. What is a singularity?
9. When, according to some scientists, did the Big Bang take place?
10. Where did the Big Bang take place?
11. What are the alternative models to the Big Bang?
12. What is Stephen Hawking’s view of the origins of the universe?
13. What is the anthropic principle?
I. DEFENSE OF THE KALAM ARGUMENT

I find quite a number of proffered theistic arguments to be sound and persuasive and together to constitute a powerful cumulative case for the existence of God. In particular, I find the kalam cosmological argument for a temporal first cause of the universe to be one of the most plausible arguments for God’s existence. The argument shows that the universe began to exist. Anything that begins to exist must have a cause that brings it into being. So the universe must have a cause. Philosophical analysis reveals that such a cause must have several of the principal theistic attributes.

The argument may be formulated in three simple steps.

1. Whatever begins to exist has a cause.
2. The universe began to exist.
3. Therefore, the universe has a cause.

The logic of the argument is valid and very simple; the argument has the same logical structure as the argument: “All men are mortal; Socrates is a man; therefore, Socrates is mortal.” So the question is, are there good reasons to believe that each of the steps is true? I think there are.

Whatever Begins to Exist Has a Cause

The first step is so intuitively obvious that I think scarcely anyone could sincerely believe it to be false. I therefore think it somewhat unwise to argue in favor of it, for any proof of the principle is likely to be less obvious than the principle itself. And as Aristotle remarked, one ought not to try to prove the obvious via the less obvious. The old axiom “out of nothing, nothing comes” remains as obvious today as ever. When I first wrote The Kalam Cosmological Argument, I remarked that I found it an attractive feature of this argument that it allows the atheist a way of escape: he can always deny the first premise and assert that the universe sprang into existence uncaused out of nothing. I figured that few would take this option, since I believed they would thereby expose themselves as persons interested only in an academic refutation of the argument and not in really discovering the truth about the universe. To my surprise, however, atheists seem to be increasingly taking this route. For example, Quentin Smith, commenting that philosophers are too often adversely affected by Heidegger’s dread of “the nothing,” concludes that “the most reasonable belief is that we came from nothing, by nothing, and for nothing”—a nice ending of a sort of Gettysburg Address of atheism, perhaps.

Similarly, the late J. L. Mackie, in refuting the kalam cosmological argument, turns his main guns on this first step: “there is a priori no good reason why a sheer origination of things, not determined by anything, should be unacceptable, whereas the existence of a god [sic] with the power to create something out of nothing is acceptable.” Indeed, he believes creatio ex nihilo raises problems: (i) If God began to exist at a point in time, then this is as great a puzzle as the beginning of the universe. (ii) Or if God existed for infinite time, then the same arguments would apply to his existence as would apply to the infinite duration of the universe. (iii) If it be said that God is timeless, then this, says Mackie, is a complete mystery.

Now notice that Mackie never refutes the principle that whatever begins to exist has a cause. Rather, he simply demands what good reason there is a priori to accept it. He writes, “As Hume pointed out, we can certainly conceive an uncaused beginning-to-be of an object; if what we can thus conceive is nevertheless in some way impossible, this still requires to be shown.” But, as many philosophers have pointed out, Hume’s argument in no way makes it plausible to think that something could really come into being without a cause. Just because I can imagine an object, say a horse,
coming into existence from nothing, that in no way proves that a horse really could come into existence that way. The defender of the *kalam* argument is claiming that it is really impossible for something to come uncaused from nothing. Does Mackie sincerely believe that things can pop into existence uncaused, out of nothing? Does anyone in his right mind really believe that, say, a raging tiger could suddenly come into existence uncaused, out of nothing, in this room right now? The same applies to the universe: if prior to the existence of the universe, there was absolutely nothing—no God, no space, no time—how could the universe possibly have come to exist?

In fact, Mackie’s appeal to Hume at this point is counterproductive. For Hume himself clearly believed in the causal principle. In 1754 he wrote to John Stewart, “But allow me to tell you that I never asserted so absurd a Proposition as that anything might arise without a cause. I only maintain’d, that our Certainty of the Falsehood of that Proposition proceeded neither from Intuition nor Demonstration, but from another source.” Even Mackie confesses, “Still this [causal] principle has some plausibility, in that it is constantly confirmed in our experience (and also used, reasonably, in interpreting our experience).” So why not accept the truth of the causal principle as plausible and reasonable—at the very least more so than its denial?

Because, Mackie thinks, in this particular case the theism implied by affirming the principle is even more unintelligible than the denial of the principle. It makes more sense to believe that the universe came into being uncaused out of nothing than to believe that God created the universe out of nothing.

But is this really the case? Consider the three problems Mackie raises with *creatio ex nihilo*. Certainly, the proponent of the *kalam* argument would not hold (i) that God began to exist or (ii) that God has existed for an infinite number of, say, hours, or any other unit of time. But what is wrong with (iii), that God is, without creation, timeless? I would argue that God exists timelessly without creation and in time subsequent to creation. This may be “mysterious” in the sense of “wonderful” or “awe-inspiring,” but it is not, so far as I can see, unintelligible; and Mackie gives us no reason to think that it is. Moreover, there is also an alternative which Mackie failed to consider: (iv) prior to creation God existed in an undifferentiated time in which hours, seconds, days, and so forth simply do not exist. Because this time is undifferentiated, it is not incompatible with the *kalam* argument that an infinite regress of events cannot exist. It seems to me, therefore, that Mackie is entirely unjustified in rejecting the first step of the argument as not being intuitively obvious, plausible, and reasonable.

The Universe Began to Exist

If we agree that whatever begins to exist has a cause, what evidence is there to support the crucial second step in the argument, that the universe began to exist? I think that this step is supported by both philosophical arguments and scientific confirmation of those arguments.

**Philosophical Arguments:** (1) **Argument from the Impossibility of an Actually Infinite Number of Things**

An actually infinite number of things cannot exist because this would involve all sorts of absurdities, which I’ll illustrate in a moment. And if the universe never had a beginning, then the series of all past events is actually infinite. That is to say, an actually infinite number of past events exists. Because an actually infinite number of things cannot exist, then an actually infinite number of past events cannot exist. The number of past events is finite; therefore, the series of past events had a beginning. Since the history of the universe is identical to the series of all past events, the universe must have begun to exist. This argument can also be formulated in three steps:

1. An actually infinite number of things cannot exist.
2. A beginningless series of events in time entails an actually infinite number of things.
3. Therefore, a beginningless series of events in time cannot exist.

Let's examine each step individually.

1. An actually infinite number of things cannot exist. In order to understand this first step, we need to understand what an actual infinite is. There is a difference between a potential infinite and an actual infinite. A potential infinite is a collection that is increasing toward infinity as a limit but never gets there. Such a collection is really indefinite, not infinite. For example, any finite distance can be subdivided into potentially infinitely many parts. You can just keep on dividing parts in half forever, but you will never arrive at an actual “infinitieth” division or come up with an actually infinite number of parts. By contrast, an actual infinite is a collection in which the number of members really is infinite. The collection is not growing toward infinity; it is infinite, it is “complete.” This sort of infinity is used in set theory to designate sets that have an infinite number of members, such as \{1, 2, 3 \ldots\}. Now I am arguing, not that a potentially infinite number of things cannot exist, but that an actually infinite number of things cannot exist. For if an actually infinite number of things could exist, this would spawn all sorts of absurdities.

Perhaps the best way to bring this home is by means of an illustration. Let me use one of my favorites, Hilbert's Hotel, a product of the mind of the great German mathematician David Hilbert. Let's imagine a hotel with a finite number of rooms. Suppose, furthermore, that all the rooms are full. When a new guest arrives asking for a room, the proprietor apologizes, “Sorry, all the rooms are full.” But now let us imagine a hotel with an infinite number of rooms and suppose once more that all the rooms are full. There is not a single vacant room throughout the entire infinite hotel. Now suppose a new guest shows up, asking for a room. “But of course!” says the proprietor, and he immediately shifts the person in room \#1 into room \#2, the person in room \#2 into room \#3, the person in room \#3 into room \#4, and so on, out to infinity. As a result of these room changes, room \#1 now becomes vacant and the new guest gratefully checks in. But remember, before he arrived, all the rooms were full!

Equally curious, according to the mathematicians, there are now no more persons in the hotel than there were before: the number is just infinite. But how can this be? The proprietor just added the new guest's name to the register and gave him his keys—how can there not be one more person in the hotel than before? But the situation becomes even stranger. For suppose an infinity of new guests show up at the desk, asking for a room. “Of course, of course!” says the proprietor, and he proceeds to shift the person in room \#1 into room \#2, the person in room \#2 into room \#4, the person in room \#3 into room \#6, and so on out to infinity, always putting each former occupant into the room number twice his own. Because any natural number multiplied by two always equals an even number, all the guests wind up in even-numbered rooms. As a result, all the odd-numbered rooms become vacant, and the infinity of new guests is easily accommodated. And yet, before they came, all the rooms were full! And again, strangely enough, the number of guests in the hotel is the same after the infinity of new guests check in as before, even though there were as many new guests as old guests. In fact, the proprietor could repeat this process infinitely many times and yet there would never be one single person more in the hotel than before.

But Hilbert's Hotel is even stranger than the German mathematician made it out to be. For suppose some of the guests start to check out. Suppose the guest in room \#1 departs. Is there not now one less person in the hotel? Not according to the mathematicians—but just ask the woman who makes the beds! Suppose the guests in rooms \#1, 3, 5 \ldots check out. In this case an infinite number of people have left the hotel, but according to the mathematicians, there are no less people in the hotel—but don't talk to that laundry woman! In fact, we could have every other guest check out of the hotel and repeat this process infinitely many times, and yet there would never be any less people in the hotel.
Now suppose the proprietor doesn’t like having a half-empty hotel (it looks bad for business). No matter! By shifting occupants as before, but in reverse order, he transforms his half-vacant hotel into one that is jammed to the gills. You might think that by these manoeuvres the proprietor could always keep this strange hotel fully occupied. But you would be wrong. For suppose that the persons in rooms #4, 5, 6... checked out. At a single stroke the hotel would be virtually emptied, the guest register would be reduced to three names, and the infinite would be converted to finitude. And yet it would remain true that the same number of guests checked out this time as when the guests in rooms #1, 3, 5... checked out! Can anyone believe that such a hotel could exist in reality?

Hilbert’s Hotel is absurd. As one person remarked, if Hilbert’s Hotel could exist, it would have to have a sign posted outside: NO VACANCY GUESTS WELCOME. The above sorts of absurdities show that it is impossible for an actually infinite number of things to exist. There is simply no way to avoid these absurdities once we admit the possibility of the existence of an actual infinite. Students sometimes react to such absurdities as Hilbert’s Hotel by saying that we really don’t understand the nature of infinity and, hence, these absurdities result. But this attitude is simply mistaken. Infinite set theory is a highly developed and well-understood branch of mathematics, so that these absurdities result precisely because we do understand the notion of a collection with an actually infinite number of members.

But does the possibility of an actual infinite really entail that such absurdities are possible, or could an actual infinite be possible, as Wainwright suggests, without thereby implying that such absurdities are possible? The answer to that question is simple: the possibility of the existence of an actual infinite entails, that is, necessarily implies, that such absurdities could exist. Hilbert’s illustration merely serves to bring out in a practical and vivid way what the mathematics necessarily implies; for if an actually infinite number of things is possible, then a hotel with an actually infinite number of rooms must be possible. Hence, it logically follows that if such a hotel is impossible, then so is the real existence of an actual infinite.

These considerations also show how superficial Mackie’s analysis of this point is. He thinks that the absurdities are resolved by noting that for infinite groups the axiom that the whole is greater than its part does not hold, as it does for finite groups. But far from being the solution, this is precisely the problem. Because in infinite set theory this axiom is denied, one gets all sorts of absurdities, like Hilbert’s Hotel, when one tries to translate that theory into reality. And the contradictions that result when guests check out of the hotel are not even prima facie resolved by Mackie’s analysis. (In trans-finite arithmetic, subtraction is against the rules because it leads to contradictions; but in reality, you can’t stop people from checking out of the hotel if they want to!) Hence, I conclude that an actually infinite number of things cannot exist.

2. A beginningless series of events in time entails an actually infinite number of things. This second point is pretty obvious. If the universe never began to exist, then the series of events would be infinite. If the universe never began to exist, then prior to the present there have existed an actually infinite number of previous events. Thus, a beginningless series of events in time entails an actually infinite number of things, namely, events.

3. Therefore, a beginningless series of events in time cannot exist. If the above two premises are true, then the conclusion follows logically. The series of past events must be finite and have a beginning. Since, as I said, the universe is not distinct from the series of events, the universe therefore began to exist.

Philosophical Arguments: (2) Argument from the Impossibility of Forming an Actually Infinite Collection of Things by Adding One Member after Another

It is very important to note that this argument is distinct from the foregoing argument, for it does not deny that an actually infinite number of things can exist. It denies that a collection con-
aining an actually infinite number of things can be formed by adding one member after another. Basically, the argument goes like this: you cannot form an actually infinite collection of things by adding one member after another, because it would be impossible to get to infinity. The series of past events is a collection that has been formed by adding one event after another. Therefore, the series of past events up till now can only be finite, not infinite. Otherwise, it would be an actually infinite collection formed by adding one member after another. This argument, too, can be formulated in three steps:

1. The series of events in time is a collection formed by adding one member after another.
2. A collection formed by adding one member after another cannot be actually infinite.
3. Therefore, the series of events in time cannot be actually infinite.

Let’s take a look at each step.

1. **The series of events in time is a collection formed by adding one member after another.** This is rather obvious. The past did not spring into being whole and entire but was formed sequentially, one event occurring after another. Notice, too, that the direction of this formation is “forward,” in the sense that the collection grows with time. Although we sometimes speak of an “infinite regress” of events, in reality an infinite past would be an “infinite progress” of events with no beginning and its end in the present.

2. **A collection formed by adding one member after another cannot be actually infinite.** This is the crucial step. It’s important to realize that this impossibility has nothing to do with the amount of time available: no matter how much time one has available, an actual infinite cannot be formed. No matter how many numbers you count, you can always add one more before arriving at infinity.

Now someone might say that while an infinite collection cannot be formed by beginning at a point and adding members, nevertheless an infinite collection could be formed by never beginning but ending at a point, that is to say, ending at a point after having added one member after another from eternity. But this method seems even more unbelievable than the first method. If one cannot count to infinity, how can one count down from infinity? If one cannot traverse the infinite by moving in one direction, how can one traverse it by moving in the opposite direction?

Indeed, the idea of a beginningless series ending in the present seems absurd. To give just one illustration: suppose we meet a man who claims to have been counting from eternity and who is now finishing: ..., -3, -2, -1, 0. We could ask, why didn’t he finish counting yesterday or the day before or the year before? By then an infinite time had already elapsed, so that he should already have finished. Thus, at no point in the infinite past could we ever find the man finishing his countdown, for by that point he should already be done! In fact, no matter how far back into the past we go, we can never find the man counting at all, for at any point we reach he will already have finished. But if at no point in the past do we find him counting, this contradicts the hypothesis that he has been counting from eternity. This illustrates that the formation of an actual infinite by never beginning but reaching an end is as impossible as beginning at a point and trying to reach infinity.

Hence, set theory has been purged of all temporal concepts; as Russell says, “classes which are infinite are given all at once by the defining properties of their members, so that there is no question of ‘completion’ or of ‘successive synthesis.’” The only way an actual infinite could come to exist in the real world would be by being created all at once, simply in a moment. It would be a hopeless undertaking to try to form it by adding one member after another.

Mackie’s objections to this step are off the target. He thinks that the argument illicitly assumes an infinitely distant starting point in the past and then pronounces it impossible to travel from that point to today. If we take the notion of infinity “seriously,” he says, we must say that in the infinite past there would be no starting point.
whatever, not even an infinitely distant one. Yet from any given point in the past, there is only a finite distance to the present.

Now I know of no proponent of the kalam argument who assumed that there was an infinitely distant starting point in the past. On the contrary, the beginningless character of the series of past events only serves to underscore the difficulty of its formation by adding one member after another. The fact that there is no beginning at all, not even an infinitely distant one, makes the problem worse, not better. It is not the proponent of the kalam argument who fails to take infinity seriously. To say the infinite past could have been formed by adding one member after another is like saying someone has just succeeded in writing down all the negative numbers, ending at \(-1\). And, we may ask, how is Mackie’s point that from any given moment in the past there is only a finite distance to the present even relevant to the issue? The defender of the kalam argument could agree to this without batting an eye. For the issue is how the whole series can be formed, not a finite portion of it. Does Mackie think that because every finite segment of the series can be formed by adding one member after another the whole infinite series can be so formed? That is as logically fallacious as saying because every part of an elephant is light in weight, the whole elephant is light in weight. Mackie’s point is therefore irrelevant. It seems that this step of the argument, that an actually infinite collection cannot be formed by adding one member after another, remains unrefuted.

3. Therefore, the series of events in time cannot be actually infinite. Given the truth of the premises, the conclusion logically follows. If the universe did not begin to exist a finite time ago, then the present moment would never arrive. But obviously it has arrived. Therefore, we know that the universe is finite in the past and began to exist.

We thus have two separate arguments to prove that the universe began to exist, one based on the impossibility of an actually infinite number of things and one on the impossibility of forming an actually infinite collection by successive addition. If one wishes to deny the beginning of the universe, he must refute, not one, but both of these arguments.

II. CONFIRMATION FROM THE BIG BANG MODEL OF THE UNIVERSE

Some people find philosophical arguments difficult to follow. They prefer empirical evidence. So I now turn to an examination of a remarkable scientific confirmation of the conclusion already reached by philosophical argument alone. This evidence comes from what is undoubtedly one of the most exciting and rapidly developing fields of science: astronomy and astrophysics.

Prior to the 1920s, scientists had always assumed that the universe was stationary. But in 1929 an alarming thing happened. An astronomer named Edwin Hubble discovered that the light from distant galaxies appears to be redder than it should. The startling conclusion to which Hubble was led was that the light is redder because the universe is growing apart; it is expanding! The light from the galaxies is affected because they are moving away from us. But this is the interesting part: Hubble not only showed that the universe is expanding, but that it is expanding the same in all directions.

To get a picture of this, imagine a balloon with buttons glued on its surface. As you blow up the balloon, the buttons get farther and farther apart. Now those buttons are just like the galaxies in space. Everything in the universe is expanding outward. The staggering implication of this is that at some point in the past the entire known universe was contracted down to a single mathematical point, from which it has been expanding ever since. The further back one goes in the past, the denser the universe becomes, so that one finally reaches a point of infinite density.
called the singularity from which the universe began to expand. That initial event has come to be known as the “Big Bang.”

How long ago did the Big Bang occur? In a very important series of nine articles published over the course of three decades, two scientists, Allan Sandage and G. A. Tammann, estimated that the Big Bang occurred about 15 billion years ago. Therefore, according to the Big Bang theory, the universe began to exist with a great explosion from a state of infinite density about 15 billion years ago. Four of the world’s most famous astronomers describe that event in these words:

The universe began from a state of infinite density. . . . Space and time were created in that event and so was all the matter in the universe. It is not meaningful to ask what happened before the Big Bang; it is like asking what is north of the North Pole. Similarly, it is not sensible to ask where the Big Bang took place. The point-universe was not an object isolated in space; it was the entire universe, and so the only answer can be that the Big Bang happened everywhere.

Thus, the term “Big Bang” and the terminology associated with an explosion can be misleading, because it is not correct to suppose that the expansion can be visualized from the outside. There is no external vantage point from which the expansion could be observed because what is expanding is the entire universe. Space itself is expanding in the sense that the separation between any two galaxies grows with time. The event that marked the beginning of the universe becomes all the more amazing when one reflects on the fact that it implies the origin of the universe out of nothing. As the British physicist P. C. W. Davies explains,

> If we extrapolate this prediction to its extreme, we reach a point when all distances in the universe have shrunk to zero. An initial cosmological singularity therefore forms a past temporal extremity to the universe. We cannot continue physical reasoning, or even the concept of space-time, through such an extremity. For this reason most cosmologists think of the initial singularity as the beginning of the universe. On this view the big bang represents the creation event; the creation not only of all the matter and energy in the universe, but also of space-time itself.

Similarly, another pair of physicists conclude, “At this singularity, space and time came into existence; literally nothing existed before the singularity, so, if the Universe originated in such a singularity, we would truly have a creation ex nihilo.” Thus, as astronomer Fred Hoyle points out, the Big Bang theory requires the creation of the universe from nothing. This is because as one goes back in time, one reaches a point at which, in Hoyle’s words, the universe was “shrunk down to nothing at all.” So what the Big Bang model implies is that the universe had a beginning and was created out of nothing.

Now some people are deeply disturbed with the idea that the universe begin from nothing. Einstein wrote privately, “This circumstance of an expanding universe irritates me. . . . To admit such possibilities seems senseless.” Another scientist, Arthur Eddington, wrote, “I have no axe to grind in this discussion, but the notion of a beginning is repugnant to me. . . . I simply do not believe that the present order of things started off with a bang. . . . The expanding universe is preposterous. . . . incredible. . . . It leaves me cold.” The German chemist Walter Nernst declared, “To deny the infinite duration of time would be to betray the very foundations of science.” Phillip Morrison of the Massachusetts Institute of Technology said, “I find it hard to accept the Big Bang theory; I would like to reject it, but I have to face the facts.”

**Alternative Models**

But if one rejects the Big Bang model, the alternatives are not very convincing. Let’s examine the major kinds of competing theories.

The steady state model holds that the universe never had a beginning, but has always existed in
the same state. As the galaxies mutually recede, new matter comes into existence in the voids left by the retreating galaxies, so that the overall state of the universe remains the same. Ever since this model was first proposed in 1948, it has never been very convincing. According to S. L. Jaki, this theory never secured "a single piece of experimental verification." It always seemed to be trying to explain away the facts rather than explain them. According to Jaki, the proponents of this model were actually motivated by "openly anti-theological, or rather anti-Christian motivations."

Against this theory is the fact that a count of galaxies emitting radio waves indicates that there were once more radio sources than there are today. Therefore, the universe is not in a steady state after all. But the theory was decisively discredited when in 1965 two scientists working for the Bell Telephone Laboratory, A. A. Penzias and R. W. Wilson, discovered that the entire universe is bathed with a background of microwave radiation. This radiation background shows that the universe was once in a very hot and very dense state. In the steady state model no such state could have existed, since the universe is supposed to have been the same from eternity. Therefore, the steady state model has been abandoned by virtually everyone. According to Ivan King, "The steady-state theory has now been laid to rest, as a result of clear-cut observations of how things have changed with time."

A second alternative model is the oscillating model. John Gribbin describes this model:

The biggest problem with the Big Bang theory of the origin of the universe is philosophical—perhaps even theological—what was there before the bang? This problem alone was sufficient to give a great initial impetus to the steady state theory, but with that theory now sadly in conflict with the observations, the best way round this initial difficulty is provided by a model in which the universe expands, collapses back again, and repeats the cycle indefinitely.

According to this model, the universe is sort of like a spring, expanding and contracting from eternity. This model became a sort of "Great White Hope" for atheistic scientists, who terribly wanted it to be true so as to avoid an absolute beginning of the universe. You may have seen Carl Sagan, for example, in his popular Cosmos program on public television propounding this model and reading from the Hindu scriptures about cyclical Brahman years in order to illustrate the oscillating universe.

There are, however, at least two very well known difficulties with the oscillating model, which Sagan did not mention. First, the oscillating model is physically impossible. That is to say, for all the talk about such a model, the fact remains that it is only a theoretical possibility, not a real possibility. You can draft such models on paper, but they cannot be descriptive of the real universe, because they contradict the known laws of physics. As the late Professor Tinsley of Yale explains, in oscillating models "even though the mathematics says that the universe oscillates, there is no known physics to reverse the collapse and bounce back to a new expansion. The physics seems to say that those models start from the Big Bang, expand, collapse, then end." More recently, four other scientists, themselves obviously in sympathy with the oscillating model, admitted, in describing the contraction of the universe, "there is no understanding of how a bounce can take place. . . . We have nothing to contribute to the question of whether and/or how the universe bounces." In order for the oscillating model to be correct, the known laws of physics would have to be revised.

Second, the observational evidence is contrary to the oscillating model. Let me explain two respects in which the observational evidence does not support the oscillating model. The first is that there is no way to account for the observed even distribution of matter in the universe on the basis of an oscillating model. This is because as the universe contracts, black holes begin to suck everything up, so that matter becomes very unevenly distributed. But when the universe (supposedly) rebounds from its contracting phase, there is no mechanism to
“iron out” these lumps and make the distribution smooth. Hence, the scientists cited above confess that even if there is some unknown mechanism that could cause the universe to bounce back to a new expansion, it is still not clear that it would prevent the uneveness that would result from the black holes formed during the contraction phase. The present evenness of matter distribution simply cannot be explained by using models in which the universe begins with matter unevenly distributed. The oscillating model therefore cannot satisfactorily account for the presently observed evenness of the distribution of matter in the universe.

The observational evidence thus supports a low density universe destined to indefinite expansion. Sandage and Tamann conclude: “Hence, we are forced to decide that . . . it seems inevitable that the Universe will expand forever.” This conclusion may be strengthened. For Sandage and Tamann in a later discussion go on to point out that in order to fit the observational evidence, even high density universes (which are typically thought to re-contract) may also have to expand forever. They conclude, “Hence, the one certain conclusion is that in all models of either high or low density, . . . the Universe will not stop its expansion. This means it has happened only once. The creation event was unique.”

The oscillating model, therefore, is seriously flawed. It contradicts both the known laws of physics and the current observational evidence. It therefore provides no plausible escape from the beginning of the universe.

In recent years theoretical cosmology has become increasingly speculative, obscuring the boundary between physics and metaphysics. The marriage of the General Theory of Relativity (upon which the Big Bang model is based) to Quantum Theory (subatomic physics) has resulted in the conception of a third alternative to the standard Big Bang model: quantum models of the universe. One should say the “would be marriage,” for the fact is that these two great theories of modern physics are mutually inconsistent, and nobody knows how to reconcile them. Quantum models grow out of the attempt at one such reconciliation. Prior to $10^{-43}$ seconds after the Big Bang (that’s .0000000000000000000000000000000000001 of a second) quantum physics must be employed to describe the universe, and the goal of the union of Relativity Theory and Quantum Theory is to describe this brief moment. Unfortunately, this period is so poorly understood that one commentator has compared it with the regions on the maps of ancient cartographers marked “Here there be dragons!”—it can be filled with all sorts of fantasies. The fact is that these theories are as much speculation as science.

The first class of models appealing to quantum effects to explain the origin of the universe were vacuum fluctuation models. These theories hold that what we have thus far taken to be the expansion of the whole universe is really only the expansion of a part of it, or, in other words, that our observable universe is just a tiny part of a wider universe-as-a-whole. The Universe-as-a-whole is itself a vacuum in a steady state. But throughout this vacuum subatomic energy fluctuations are conceived to be occurring, by means of which material particles are created out of the energy contained in the vacuum. These then grow into separate mini-universes within the whole. All we can observe is the expansion of our mini-universe, and we have no knowledge whatsoever of what is going on in other similar mini-universes.

Our universe thus never went back to an initial singularity, but emerged by an uncaused fluctuation from the vacuum of a wider background space—a view that is often expressed by saying that the universe is a “free lunch” because in this case we got something for nothing.

Such a congenial way of talking is, however, completely misleading. In popular presentations of these models it is often not explained that they require the postulation of some sort of specially fine-tuned, background space on the analogy of a quantum mechanical vacuum from which the universe emerges via a fluctuation. Thus, the origin of the observable universe out of this wider
space-time is not at all a free lunch, but requires an elaborately set table in advance.

Such models face formidable theoretical difficulties which are so severe that even some of the original proponents of these models have now abandoned them. Brout and Spindel, for example, have moved beyond such models, commenting that the theoretical foundations of the particle production mechanisms as well as the instability of the background space to fluctuations “are flimsy at best.”

In any case such models have been shown to be incompatible with observational cosmology. On such scenarios, there is no way to specify exactly when and where a fluctuation in the primordial vacuum will occur which will grow into a universe. Within any finite interval of time there is a positive probability of such a fluctuation occurring at any point in space. It follows that given infinite past time, universes will spring into being at every point in the vacuum and, as they expand, will begin to collide and coalesce with one another. But we do not observe anything of this sort happening in nature.

Isham comments that this problem is “fairly lethal” to vacuum fluctuation models and that they therefore “have not found wide acceptance.” About the only way to avoid the difficulty of colliding universes is to postulate that the background vacuum space is itself expanding—but then we’re forced to posit some origin of the wider Universe itself, and we’re right back where we started from.

I mentioned that vacuum fluctuation models have been abandoned as plausible accounts of the origin of the universe by some of their original expositors and to that extent are already somewhat passé. Brout and Spindel now contend that an explanation of the origin of the universe “must await the yet-to-come quantum theory of gravity.” That brings us to the second class of quantum models.

In addition to vacuum fluctuation models, there are also quantum gravity models. The particular quantum gravity model of the origin of the universe which has drawn the most attention in recent years is the Hartle-Hawking model, popularized by Stephen Hawking, the brilliant mathematical theorist of Cambridge University, who has received wide publicity of his views in the popular press. One of the most interesting features of Hawking’s best-selling Brief History of Time, in which he expounds his views, is its overtly theological orientation. Although Hawking does not deny the existence of God, he does deny that there is a Creator in the sense of a temporal First Cause of the origin of the universe.

In discussing whether a Creator exists, Hawking admits that if the universe began to exist, then one could identify the Big Bang as the instant at which God created the universe. In fact, he thinks that a number of attempts to avoid the Big Bang were probably motivated by the feeling that a beginning of time “smacks of divine intervention.” Although it is not clear if Hawking shares this same motivation, he does tout his model as preferable to the Big Bang, because there would be no edge of space-time at which one “would have to appeal to God.”

Hawking’s theory is perhaps most easily understood by contrasting it to the standard Big Bang model. In the standard model, the universe sprang from an initial singularity which marked the origin of all matter and energy, indeed, of physical space and time themselves. Nothing existed before this point; hence, the singularity cannot have any natural cause.

Hawking hopes that by introducing quantum physics into the description of the earliest stage of the universe, prior to $10^{-43}$ seconds after the Big Bang, one can eliminate the singularity. In order to accomplish this, however, Hawking must introduce imaginary numbers for the time variable in his equations, that is to say, numbers like $\sqrt{-1}$. Since any real number squared always equals a positive number, it is evident that there can be no real number which is the square root of $-1$. Therefore, mathematicians call such numbers “imaginary.”

By using imaginary numbers for the time variable, one eliminates the singularity all right, but one also thereby eliminates the difference
between time and space in the equations describing the universe. As Hawking says, “the distinction between time and space disappears completely.” This is a very peculiar feature of the model, since in both the Special and General Theories of Relativity, time and space are distinct in virtue of their variables’ having different mathematical signs (+ or −) in the equations. But in Hawking’s model, this difference in sign disappears, because he is using imaginary numbers for the time variable. By means of this device, Hawking proposes a model in which time becomes imaginary prior to \(10^{-43}\) seconds, so that the singularity is rounded off. Space-time in this early region is geometrically the four-dimensional analogue of the two-dimensional surface of a sphere. Any point on a sphere which one chooses to be an “initial” or “beginning” point, such as the North Pole, is really just like every other point on the sphere’s surface. In particular, it does not constitute an edge or boundary to that surface. Thus, on Hawking’s model, the past is finite, but boundaryless. Moreover, since imaginary time is not distinguishable from space, it would be improper to regard any point on this sphere-like surface as actually earlier than any other point on that surface, just as it would be improper to think of any point on the surface of a ball as earlier than any other similar point. Hawking comments,

“There would be no singularities at which the laws of science broke down and no edge of space-time at which one would have to appeal to God or some new law to set the boundary conditions for space-time. . . . The universe would be completely self-contained and not affected by anything outside itself. It would be neither created nor destroyed. But would BE.

In saying that the universe on his theory would not begin to exist, but would just BE, Hawking expresses the timeless existence of this four-dimensional space-time in which time is imaginary. He is not at all reluctant to draw theological conclusions from his model:

The idea that space and time may form a closed surface without boundary . . . has profound implications for the role of God in the affairs of the universe . . . So long as the universe had a beginning, we could suppose it had a creator. But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end. What place, then, for a creator?

In assessing Hawking’s proposed model, one could criticize it effectively merely on the physical level alone. It is on the face of it highly speculative, and, according to Isham, it is most unlikely that it is even mathematically consistent. Moreover, it is now generally recognized that the Hartle-Hawking approach fails to predict uniquely our universe; consequently, why this universe exists rather than one of an infinite number of alternatives cannot be explained.

But I prefer to leave such criticisms aside; perhaps better, more consistent models can be devised. Rather my objections strike much deeper, at the philosophical or metaphysical foundations of such theories. Hawking’s quantum cosmology is rife with unexamined philosophical assumptions which are, at best, unproven and, at worst, false. Given his claim to have eliminated the need for a Creator, it’s evident that Hawking does not take his theory to be merely some mathematical model which is useful for facilitating scientific predictions but which makes no pretense to be a realistic description of the world. Such a non-realist (or instrumentalist) understanding of the theory would not be incompatible with the claim that in actual fact the universe began to exist in real time and was created. Hawking’s model would in that case be a sort of symbolic description of the real origin of the universe using the mathematical formalism of quantum physics. The fact that there is no beginning of the universe in the model would do nothing to eliminate the beginning of the universe in reality. Since Hawking wants to avoid a beginning of the universe and the attendant need for a Creator, he must (and does) take his model to be a realistic description of the early universe. But this is precisely where the problems arise. It seems quite evident that
Hawking faces acute difficulties in commending his theory as a realistic account of the origin of the universe.

Take just one example: his use of so-called "imaginary time." Two problems arise in connection with this notion. First, it is physically unintelligible. If he is to commend his theory as a realistic description of the universe, then Hawking has the burden to explain what "imaginary time" means. Otherwise it is a meaningless combination of words. But it is no more evident what an imaginary interval of time is any more than, say, the imaginary volume of a box or the imaginary area of a field or the imaginary number of people in a room. Hawking insists that imaginary time is "a well-defined mathematical concept." But that's not the question; rather the question is whether that mathematical concept corresponds to any physical reality. The fact that something can be defined mathematically is no guarantee that any physical reality corresponds to it, as the late Sir Herbert Dingle so vividly illustrated.

Suppose we want to find the number of men required for a certain job under certain conditions. Every schoolboy knows such problems, and he knows that he must begin by saying: "Let x = the number of men required." But that substitution introduces a whole range of possibilities that the nature of the original problem excludes. The mathematical symbol x can be positive, negative, integral, fractional, irrational, imaginary, complex, zero, infinite, and whatever else the fertile brain of the mathematician may devise. The number of men, however, must be simply positive and integral. Consequently, when you say, "Let x = the number of men required" you are making a quite invalid substitution, and the result of the calculation, though entirely possible for the symbol, might be quite impossible for the men.

Every elementary algebra book contains such problems that lead to quadratic equations, and these have two solutions, which might be 8 and -3 say. We accept 8 as the answer and ignore -3 because we know from experience that there are no such things as negative men, and the only alternative interpretation—that we could get the work done by subtracting three men from our gang—is obviously absurd. . . .

So we just ignore [one] of the mathematical solutions, and quite overlook the significance of that fact—namely, that in the language of mathematics we can "tell lies as well as truths, and within the scope of mathematics itself there is no possible way of telling one from the other. We can distinguish them only by experience or by reasoning outside the mathematics, applied to the possible relation between the mathematical solution and its supposed physical correlate.

The point is that a "well-defined mathematical concept" may in fact be a metaphysical impossibility and that the only way to determine this is by getting outside the mathematics to consult what experience or extra-mathematical reasoning tells us reality is like. Time is one of those aspects of reality with which we are most intimately acquainted by experience and which has received extensive philosophical analysis as well. We simply have no comprehension of what it would be for time to be "imaginary" in the mathematical sense. Putting in imaginary numbers for the time variable appears to make no more sense than using negative numbers for the number of men required to do a job. It is a mere mathematical artifact.

Such a use of imaginary numbers for the time coordinate is nothing new. Already in 1920, Sir Arthur Eddington said that readers who found it difficult to understand curved space-time could evade the difficulty by using the "dodge" of imaginary numbers. But, he said, it is "not very profitable" to speculate on the implications of this, because "it can scarcely be regarded as anything more than an analytical device." Imaginary time was only an illustrative tool, "which certainly does not correspond to any physical reality."

Imaginary numbers are useful as mathematical devices which help in the computation of certain equations; but one always converts back to real numbers at the end in order to have some physically meaningful result. Hawking himself
admits, “As far as everyday quantum mechanics is concerned, we may regard our use of imaginary time... as a merely mathematical device (or trick) to calculate answers about real space-time.”

But Hawking in his model simply declines to take the final step of reconverting to real numbers. When you do that, the singularity suddenly reappears. Hawking states,

> Only if we could picture the universe in terms of imaginary time would there be no singularities. ... When one goes back to the real time in which we live, however, there will still appear to be singularities.

Thus, Hawking does not really eliminate the singularity; he only conceals it behind the physically unintelligible artifice of imaginary time.

Secondly, the use of imaginary numbers for the time variable makes time a spatial dimension, which is just bad metaphysics. Space and time are essentially different. Space is ordered by a relation of betweenness: for three points x, y, and z on a spatial line, y is between x and z. But time is ordered in addition by a unique relation of earlier/later than: for two moments t1 and t2 in time, t1 is earlier than t2, and t2 is later than t1. Spatial points are not related by any such relation; but this relation is essential to the nature of time, as the philosopher George Schlesinger points out: “The relations ‘before’ and ‘after’ have generally been acknowledged as being the most fundamental temporal relations, which means that time deprived of these relations would cease to be time.” Thus, it is impossible for time to be a dimension of space. Moreover, time is also ordered by the relations past/future with respect to the present. For example, my eating breakfast this morning was once present; but now it is past. There is nothing even remotely similar to this relation among points in space. Thus, space and time are essentially distinct.

But perhaps Hawking can be interpreted as holding, not that time in the earliest stage of the universe is a dimension of space, but that as one goes back in time, time ceases to exist and is replaced by a spatial dimension. But such an interpretation makes no sense. It would mean that the early history of the universe was timeless. But this assertion is contradictory to the claim that this era existed before the point that time began. For before/after is precisely a temporal relation, as we have seen. Thus, to say that this timeless segment existed before time is to presuppose a time before time, which is self-contradictory.

Hawking seems to realize the impossibility of having two successive stages of the universe, one timeless and the other temporal, and so he is driven to the position that our universe’s existing in real time is just an illusion! He asserts,

> This might suggest that the so-called imaginary time is really the real time, and that what we call real time is just a figment of our imaginations. In real time, the universe has a beginning and an end at singularities that form a boundary to space-time and at which the laws of science break down. But in imaginary time, there are no singularities or boundaries. So maybe what we call imaginary time is really more basic, and what we call real is just an idea that we invent to help us describe what we think the universe is like.

But as Smith points out, such an interpretation is “preposterous... at least observationally, since it is perfectly obvious that the universe in which we exist lapses in real rather than imaginary time.” If Hawking were right, we could not even correctly say, for example, that Lincoln’s assassination occurred after his birth, since this is to assert a temporal relation between these two events.

Significantly, this philosophical critique applies not to the Hartle-Hawking model alone, but to all quantum gravitational models, since they all share the common feature of having real space-time originate in a quantum mechanical region which is a four-dimensional space involving imaginary time. The metaphysical inadequacy of such scenarios is not a deficiency which can be solved through scientific advance precisely because the defect is metaphysical, not physical. Of course, if some such mode is interpreted non-realistically, then no metaphysical objection...
arises. On a non-realist interpretation, the real beginning of the universe at an initial singularity can be re-described in the language of quantum physics as a non-singular point existing in imaginary time. But the advance here is scientific (in the instrumental sense), not metaphysical. Such a model would not abrogate the fact the universe really began to exist.

It seems evident, therefore, that quantum models of the origin of the universe avoid the beginning of the universe only at the expense of making enormous and unjustified metaphysical assumptions about reality, assumptions which in the end deny the reality of time and temporal becoming and thus vitiate the models based on them as realistic descriptions of the universe. Thus, it appears that none of the alternatives to the Big Bang model of the origin of the universe is plausible. The best scientific evidence available confirms that the universe began to exist. Therefore, on the basis of both philosophical argument and scientific evidence, I think we are justified in accepting our second premise, that the universe began to exist.

Therefore, the Universe Has a Cause of Its Existence

From the first premise—that whatever begins to exist has a cause—and the second premise—that the universe began to exist—it follows logically that the universe has a cause. This conclusion ought to stagger us, to fill us with awe, for it means that the universe was brought into existence by something which is greater than and beyond it.

But what is the nature of this first cause of the universe? It seems to me quite plausible that it is a personal being who created the universe. This thesis is supported by both philosophical argument and scientific confirmation.

Philosophical Argument

Consider the following puzzle: we've concluded that the beginning of the universe was the effect of a first cause. By the nature of the case that cosmic cause cannot have any beginning of its existence nor any prior cause. Nor can there have been any changes in this cause, either in its nature or operations, prior to the beginning of the universe. It just exists changelessly without any beginning, and a finite time ago it brought the universe into existence. Now this is exceedingly odd. The cause is in some sense eternal and yet the effect which it produced is not eternal, but began to exist a finite time ago. How can this be? If the necessary and sufficient conditions for the production of the effect are eternal, then why isn't the effect eternal? How can all the causal conditions sufficient for the production of the effect be changelessly existent and yet the effect not also be existent along with the cause? How can the cause exist without the effect?

Let me illustrate what I mean: Let's say the cause of water's freezing is sub-zero temperatures. Whenever the temperature falls below zero degrees Centigrade, the water freezes. Once the cause is given, the effect must follow, and if the cause exists from eternity, the effect must also exist from eternity. If the temperature were to remain below zero degrees from eternity, then any water around would be frozen from eternity. But this seems to imply that if the cause of the universe existed eternally, the universe would also have existed eternally. And this we know to be false.

One might say that the cause came to exist or changed in some way just prior to the first event. But then the cause's beginning or changing would be the first event, and we must ask all over again for its cause. And this cannot go on forever, for we know that a beginningless series of events cannot exist. There must be an absolutely first event, before which there was no change, no previous event. We know that this first event must have been caused. The question is: How can a first event come to exist if the cause of that event exists changelessly and eternally? Why isn't the effect as co-eternal as the cause?

It seems that there is only one way out of this dilemma, and that is to infer that the cause of the universe is a personal agent who chooses to create a universe in time. Philosophers call this type of causation "agent causation," and because the
agent is free, he can initiate new effects by freely bringing about conditions which were not previously present. For example, a man sitting from eternity could will to stand up; thus, a temporal effect arises from an eternally existing agent. Similarly, a finite time ago a Creator endowed with free will could have willed to bring the world into being at that moment. In this way, God could exist changelessly and eternally but choose to create the world in time. By “choose” one need not mean that the Creator changes His mind about the decision to create, but that He freely and eternally intends to create a world with a beginning. By exercising his causal power, He therefore brings it about that a world with a beginning comes to exist. So the cause is eternal, but the effect is not. In this way, then, it is possible for the temporal universe to have come to exist from an eternal cause: through the free will of a personal Creator.

The Anthropic Principle

This purely philosophical argument for the personhood of the cause of the origin of the universe receives powerful scientific confirmation from the observed fine-tuning of the universe, which bespeaks intelligent design. Without wanting to go into a discussion of the teleological argument, let me simply say that in recent years the scientific community has been stunned by its discovery of how complex and sensitive a balance of initial conditions must be given in the Big Bang in order for the universe to permit the origin and evolution of intelligent life on Earth. The universe appears, in fact, to have been incredibly fine-tuned from the moment of its inception for the production of intelligent life on Earth at this point in cosmic history.

The incredibly complex and delicately balanced nexus of initial conditions necessary for intelligent life seems to be most plausibly explained if that nexus is the product of intelligent design, that is to say, if the cause of the beginning of the universe is a personal Creator. The scientific evidence thus serves to underscore the conclusion to which philosophical argument has led us. More than that, however: the evidence also suggests a special relationship between the Creator and human beings. For man truly is the crown of creation. Though diminutive in size in comparison with the cosmos, a human being is nonetheless the most complex structure in the universe. After listing a minimum of ten crucial steps in the evolution of Homo sapiens, each of which is so improbable that the sun would have ceased to be a main sequence star and so incinerated the Earth before it would occur, Barrow and Tipler estimate that the odds against the assembly of the human genome are between 4\times 10^{1800} (100,000) and 4\times 10^{360} (110,000)! They also point out that far from showing the unimportance of human life, the vast size of the universe is a prerequisite of the natural production of just those elements which are necessary to life: “for there to be enough time to construct the constituents of living beings, the Universe must be at least ten billion years old and therefore, as a consequence of its expansion, at least ten billion light years in extent.” That the entire universe should thus be so designed as to culminate in man as its most marvelous creation is highly suggestive of some special care of the Creator for human creatures in particular. Indeed, the Creator might be properly understood to be a Cosmic Parent of whom we are the children. The contemporary debate surrounding the Anthropic Principle thus not only confirms the personhood of the Creator, but is also quite suggestive theologically.

So we have both good philosophical and scientific reasons for regarding the cause of the universe as a personal Creator. What more can be known about his nature? On the basis of our philosophical arguments for the beginning of the universe, we know that He must be uncaused and changeless (since an infinite regress of events is impossible). Even if God was causally active prior to the creation of the universe in some sort of metaphysical time (say, creating spiritual realms), there must still be a beginning point to His activity and, hence to change; otherwise, one would have an infinite regress of events, which is
impossible. Since we know nothing about God’s having been active prior to physical creation, we may assume for simplicity’s sake that time (or at least differentiated time) begins at creation and that God without creation is changeless. Since He is changeless without creation, He must be either timeless without creation, or at least “relatively timeless,” to borrow the expression of one philosopher; that is, He exists in an undifferentiated time prior to creation. Since He is causally related to the world, He must be in time subsequent to creation (given that the “flow” of time is in some sense real). Since He is changeless without creation, He must be immaterial, since matter inherently involves change. Being immaterial, He must be spaceless as well as timeless. Since He created the universe from nothing, we know that He must be enormously powerful, if not omnipotent. Since He brought the universe into being without any antecedently determining conditions and fine-tuned it with a precision that literally defies comprehension, He must be both free and unimaginably intelligent, if not omniscient. Moreover, the fact that the entire known universe, from the smallest elementary particles to the most distant stars, was designed in such a way as to be a suitable environment for the existence of human life on Earth suggests the astounding conclusion that He may have some special concern for us. These properties constitute the central core of what theists mean by “God.”

The book of Genesis declares, “In the beginning God created the heavens and the earth.” For thousands of years, muses Robert Jastrow, people who have believed this statement have known the truth which scientists have discovered only within the last fifty years. For the rationalistic scientist (and, we may add, philosopher), the story ends, smiles Jastrow, like a bad dream:

He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries.

The beginning of the universe—declared by revelation, established by philosophy, and confirmed by science—thus points beyond itself to God, its Personal Creator.

Objections

Now certain thinkers have objected to the intelligibility of this conclusion. For example, Adolf Grunbaum, a prominent philosopher of space and time and a vociferous critic of theism, has marshaled a whole troop of objections against inferring God as the Creator of the universe. As these are very typical, a brief review of his objections should be quite helpful. Grunbaum’s objections fall into three groups. Group I seeks to cast doubt upon the concept of “cause” in the argument for a cause of the universe. (1) When we say that everything has a cause, we use the word “cause” to mean something that transforms previously existing materials from one state to another. But when we infer that the universe has a cause, we must mean by “cause” something that creates its effect out of nothing. Since these two meanings of “cause” are not the same, the argument is guilty of equivocation and is thus invalid. (2) It does not follow from the necessity of there being a cause that the cause of the universe is a conscious agent. (3) It is logically fallacious to infer that there is a single conscious agent who created the universe.

But these objections do not seem to present any insuperable difficulties: (1) The univocal concept of “cause” employed throughout the argument is the concept of something which brings about or produces its effects. Whether this production involves transformation of already existing materials or creation out of nothing is an incidental question. Thus, the charge of equivocation is groundless. (2) The personhood of the cause does not follow from the cosmological argument proper, but from an analysis of the notion of a first cause of the beginning of the universe, confirmed by Anthropic considerations. (3) The inference to a single cause of the origin of the universe seems justified in light of the
principle, commonly accepted in science, that one should not multiply causes beyond necessity. One is justified in inferring only causes such as are necessary to explain the effect in question; positing any more would be gratuitous. Since the universe is a single effect originating in the Big Bang event, we have no grounds for inferring a plurality of causes.

The objections of Group II relate the notion of causality to the temporal series of events: (1) Causality is logically compatible with an infinite, beginningless series of events. (2) If everything has a cause of its existence, then the cause of the universe must also have a cause of its existence.

Both of these objections, however, seem to be based on misunderstandings. (1) It is not the concept of causality which is incompatible with an infinite series of past events. Rather the incompatibility, as we have seen, is between the notion of an actually infinite number of things and the series of past events. That causality has nothing to do with it may be seen by reflecting on the fact that the philosophical arguments for the beginning of the universe would work even if the events were all spontaneous, causally non-connected events. (2) The argument does not presuppose that everything has a cause. Rather the operative causal principle is that whatever begins to exist has a cause. Something that exists eternally and, hence, without a beginning would not need to have a cause. This is not special pleading for God, since the atheist has always maintained the same thing about the universe: it is beginningless and uncaused. The difference between these two hypotheses is that the atheistic view has been shown to be untenable.

Group III objections are aimed at the alleged claim that creation from nothing surpasses all understanding: (1) If creation out of nothing is incomprehensible, then it is irrational to believe in such a doctrine. (2) An incomprehensible doctrine cannot explain anything.

But with regard to (1), creation from nothing is not incomprehensible in Grunbaum’s sense. By “incomprehensible” Grunbaum appears to mean “unintelligible” or “meaningless.” But the statement that a finite time ago a transcendent cause brought the universe into being out of nothing is clearly a meaningful statement, not mere gibberish, as is evident from the very fact that we are debating it. We may not understand how the cause brought the universe into being out of nothing, but then it is even more incomprehensible, in this sense, how the universe could have popped into being out of nothing without any cause, material or productive. One cannot avert the necessity of a cause by positing an absurdity. (2) The doctrine, being an intelligible statement, obviously does constitute a purported explanation of the origin of the universe. It may be a metaphysical rather than a scientific explanation, but it is no less an explanation for that.

Grunbaum has one final objection against inferring a cause of the origin of the universe: the cause of the Big Bang can be either after the Big Bang (since backward causation is impossible) or before the Big Bang (since time begins at or after the Big Bang). Therefore, the universe’s beginning to exist cannot have a cause. But this argument pretty clearly confronts us with a false dilemma. For why couldn’t God creating the universe be simultaneous (or coincident) with the Big Bang? On the view I’ve defended, God may be conceived to be timeless or relatively timeless without creation and in time at and subsequent to the first moment of creation.

None of Grunbaum’s objections, therefore, seems to undermine the credibility of our argument for God as the Personal Creator of the universe.

Hence, amazing as it may seem, the most plausible answer to the question of why something exists rather than nothing is that God exists.