
The Kalam Cosmological Argument for the Existence of God

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Why does the universe exist? Why is there anything at all? Why is there something rather than nothing? These are some of the most abstract questions we can ask about the nature of the universe. Richard Taylor (1983, p. 91) writes, "It is strange indeed, for example, that a world such as ours should exist; yet few people are very often struck by this strangeness but simply take it for granted." The cosmological argument for the existence of God claims that reflecting upon the question of why the universe exists should lead us to see that it must have been created by an all-powerful, all-knowing God. The kalam argument argues for this conclusion by making the case that the universe had to have a beginning and then arguing that the beginning of the universe had to have a supernatural cause.

The cosmological argument has a long and distinguished history. Some of the world's most famous philosophers have defended their own versions of it. The Greek philosopher Aristotle (384-322 B.C.) offered the first and perhaps the most well-known statement of the argument, which is also known as 'the First-Cause Argument.' St. Thomas Aquinas (1225-1274 A.D.), whose philosophy is—by papal decree—the official philosophy of the Catholic church, offered another version. Gottfried Wilhelm Leibniz (1646-1716 A.D.), who invented calculus in Germany at the same time that Sir Isaac Newton independently invented it in Britain, defended his own unique form of the argument.

In this essay I will explain a version of the cosmological argument that most closely resembles Aristotle's and has become known as the 'kalam cosmological argument.' The word 'kalam' refers to Arabic philosophy or theology. This form of the cosmological argument was popular among Arabic philosophers during the late Middle

Ages. As you read the essay below, keep referring back to the following diagram. It will help you understand the logical structure of the argument.

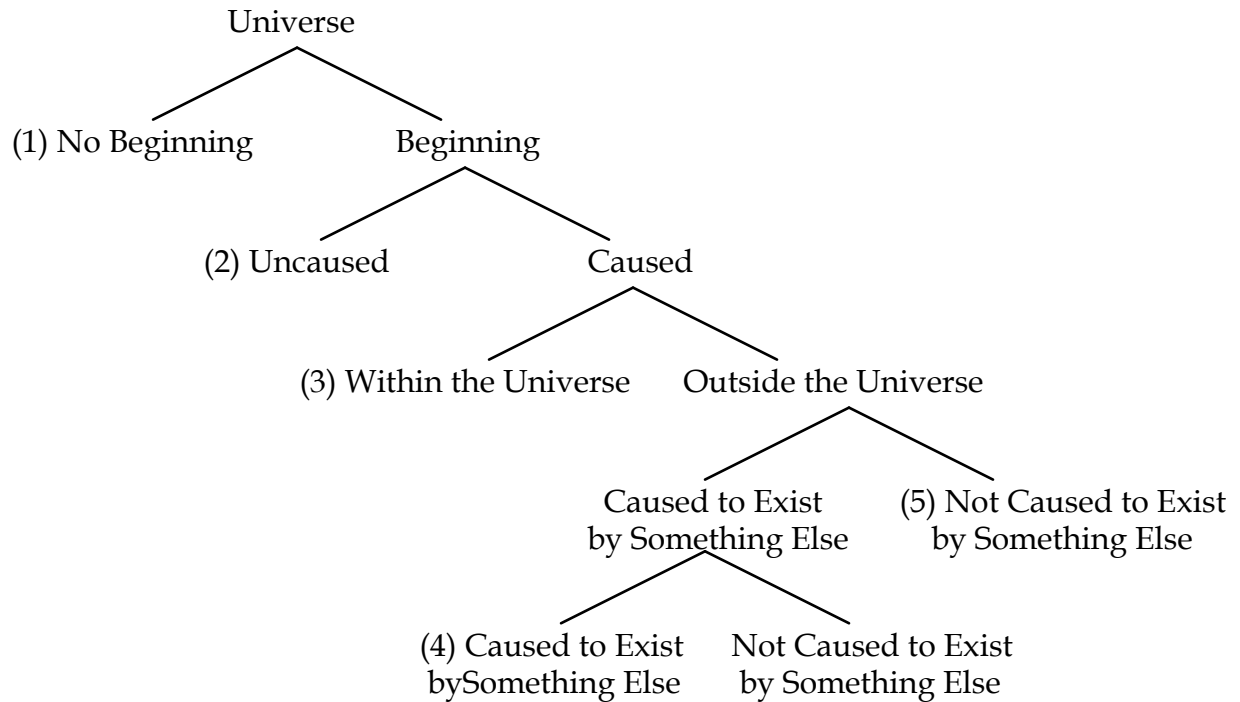


Figure 1

I. Did the Universe Have a Beginning?

Defenders of the kalam cosmological argument for the existence of God invite us to consider the following question: Did the universe have a beginning? There are obviously two possible answers to this question: either it did or it didn't. Theists (i.e., *people who believe in an all-powerful, all-knowing, perfectly good God*) believe that the universe had a beginning. Atheists typically believe that the universe did not have a beginning. If there was a point in time when the universe began to exist, then only a finite number of years have elapsed since this beginning. Let's call the view that the

universe had a beginning the ‘Finite Universe’ view. Although orthodox theists often disagree about how old the universe is, they all believe it is temporally finite.

The kalam argument argues indirectly for the claim that the universe had to have a beginning by showing that the assumption that it did not have a beginning leads to absurdity. This form of argument is known as a *reductio ad absurdum* (lit., “reduce to the absurd”). If you want to defend some option, *A*, one way to do this is by showing that not-*A* has obviously false logical consequences. This argument form is based on the undisputed logical truth that a true statement cannot logically imply a false one. So, to support the claim that the universe had to have a beginning, the kalam cosmological argument argues that the supposition that the universe had no beginning leads to absurdity.

Here’s how the argument goes: The universe exists in time. If there was no point in time when it began to exist, it must have existed forever. We’ll call this the ‘Infinite Universe’ view. It is represented as position (1) in Figure 1. According to the Infinite Universe view, the universe has been around for an infinite number of years. We can conceive of our position in time as a point on a number line that extends infinitely into both the past and the future. For example,

..., -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, ...

Let ‘0’ be the present moment and let ‘-1’ be some moment in the immediate past. ‘-2’, then, will be a moment further back in time. It doesn’t matter what unit of time we assign to these numbers (e.g., seconds, minutes, years, etc.). The important thing is that each integer represents some finite unit of time. Those who claim that the universe had no beginning claim that an actual infinite amount of time has transpired in the history of the universe. There is no finite number, *n*, such that the universe is *n* years old.

In order to appreciate the significance of this claim, we need to distinguish between an ‘actual infinite’ and a ‘potential infinite.’ An actual infinite is a set or series that has an infinite number of members or steps. Think about the number of members in the set of all positive real numbers—i.e., {1, 2, 3, 4, 5, ...}. How many members are

there in this set? Infinitely many. The set of all positive real numbers, then, is an example of an actual infinite. Infinite series have a certain property that will be important in the discussion that follows: it is impossible for anyone to complete an infinite series. No one can successfully list all of the even numbers—no matter how fast they may proceed. Similarly, no one could ever walk, fly or drive an infinite distance—even if they could travel faster than the speed of light.

A potential infinite, by contrast, is a set or series that, at any given point, has a finite number of members or steps but which could always—at least in principle—be increased in size by adding additional members or steps. Here's an old philosophical puzzle: Suppose that you want to run from point *A* to point *B*. Before you could reach point *B*, you would have to reach the midpoint between *A* and *B*. But before you could reach the midpoint between *A* and *B* (let's call it '*C*'), you would have to reach the midpoint between *A* and *C*. But before you could reach the midpoint between *A* and *C* (let's call it '*D*'), you would have to reach the midpoint between *A* and *D*. But before you could reach... Well, you get the idea. This process of dividing a certain finite distance in half could, in principle, be carried out an infinite number of times. In other words, the finite distance between *A* and *B* is infinitely divisible. No matter how many times you have divided some distance in half, you can always carry out another division.

The pre-Socratic philosopher, Zeno of Elea (born 489 B.C.), used this line of thinking to claim that genuine motion is impossible. It is impossible, he claimed, to go from point *A* to point *B* because in order to do that, you would need to cross an infinite number of midpoints between *A* and *B*. But, he claimed, it is impossible to cross an infinite number of anything. Therefore, genuine motion is impossible.

The solution to Zeno's puzzle is to distinguish between a potential and an actual infinite. While it is impossible to traverse or go across an actual infinite distance, it is not impossible to traverse a finite distance that can be potentially divided an infinite number of times. You can succeed in running from point *A* to point *B*, so you can't use Zeno's paradox as an excuse for not exercising.

Let's return to the claim that the universe had no beginning. This claim implies that an actual infinite amount of time has elapsed during the history of the universe. Is this an intelligible or coherent claim? The kalam cosmological argument says "No." If the universe had no beginning, then in order for the universe to arrive at the present moment, an infinite amount of time had to pass before now. But infinite series cannot be completed. Therefore, it is impossible for an infinite amount of time to have elapsed. Just as one cannot begin from this present moment and ever reach the end of an actual infinite number of seconds from now, the universe could not have gone from an actual infinite amount of time in the past until the present moment. As J. P. Moreland (1987, p. 29) put it, "Counting to infinity through the series 1, 2, 3, ... involves the same number of steps as does counting down *from* infinity to zero through the series ..., -5, -4, -3, -2, -1, 0." Regardless of which direction one is going through the steps, it is logically impossible to complete an actual infinite number of steps.

Consequently, the kalam cosmological argument claims we can conclude that the supposition that the universe had no beginning leads to absurdity. It entails that an actual infinite temporal series has been completed in the history of the universe. But it appears to be logically impossible for an actual infinite series of any kind to be completed. Therefore, the universe must have had a beginning.

II. Was the Beginning of the Universe Caused or Uncaused?

The next step in the kalam cosmological argument is to determine whether the beginning of the universe had a caused or whether it was uncaused. The kalam argument employs the same argumentative strategy here as it did in the previous section. In order to demonstrate that the beginning of the universe had a cause, it assumes (just for the sake of argument) that it was uncaused and shows that this assumption leads to absurdity.

Think about what it would mean for the universe to have a beginning and for that beginning to have no real cause. This means that the universe just popped into existence

without anything bringing its existence about. It went from not existing to existing and this transition was not caused by any existing thing or by any prior event. It just happened. Something came from nothing. Let's call this the 'Uncaused Universe' view. It is represented as position (2) in Figure 1. Surely this view is absurd. As the medieval philosophers used to say, *ex nihil nihil fit*: nothing comes from nothing.

Sometimes people say things like, "He came out of nowhere" or "It appeared out of nothing." But these can be nothing more than hyperboles. It is absolutely impossible for something to come from nothing. Of course, something may seem to pop into existence from what is *apparently* nothing. We may not be able to see how something came to be or what gave rise to it. The region of space in which something materialized may appear empty to the naked eye. But an object composed of matter cannot literally come into existence out of absolutely nothing. The matter that made it up had to come from somewhere. Our minds cannot accept the suggestion that things can pop into existence without any reason.

As I am using the term, 'nothing' cannot be used to refer to a vast emptiness or an enormous vacuum. 'Nothing' means absolutely, positively nothing at all. As Peter van Inwagen (1993, p. 72) writes,

To say that there is nothing is to say that there isn't *anything*, not even a vast emptiness. If there were a vast emptiness, there would be no material objects—no atoms or elementary particles or anything made of them—but there would nevertheless be something: the vast emptiness.

Note that even an enormous vacuum would have discoverable physical properties. It would exist in a particular location and would exist for a particular amount of time. Anything that can have spatial and temporal properties is not nothing.

At this point, some readers might be tempted to think that the evidence in favor of the Big Bang theory proves that the universe did, in fact, pop into existence out of nothing. That, however, would be a mistake. The Big Bang theory does not state that first there was nothing at all in the universe and then "Bang!" the universe came to be.

Rather, the theory states that all of the mass, energy, space, and time in the universe were concentrated into a single mathematical point with no dimensions and then (about 15 billion years ago, according to contemporary estimations) “Bang!” there was a massive explosion that sent all of this mass, energy, space and time hurtling away from that central mathematical point. In other words, the Big Bang theory tries to explain the current state of the universe by appealing to events involving prior states of the universe. No Big Bang theorist thinks that the “Bang!” came to be out of absolutely nothing. There had to be something there to go “Bang!”

Furthermore, there is intense speculation among physicists about how and why all of the universe came to be concentrated in that single point right before the Big Bang. No one claims that first there was nothing and then all of the sudden an enormous amount of mass, energy, space, and time popped into existence at a single point and then exploded. Scientists believe that, just as there is an explanation that accounts for the course of the universe ever since the Big Bang, there must be another explanation that accounts for what happened before the Big Bang.^[1]

The most commonly accepted non-theistic explanation of what happened before the Big Bang is known as the ‘oscillating model’ of the universe. According to this theory, the Big Bang was preceded by a Big Crunch, which was preceded by another Big Bang, and so on. A Big Crunch is where all of the matter, energy, etc., in the universe collapses into a single mathematical point because of the gravitational attraction between all of the matter and energy. We can understand the oscillation between Big Bangs and Big Crunches by visualizing the path traced by various pieces of debris after an explosion. At first the debris travels away from the surface of the earth, but since the speed of the debris isn’t enough to overcome the earth’s gravitational field, eventually the various pieces slow down and then fall back to earth. The Big Crunch is kind of like that. After a previous Big Bang, scientists hypothesize that all of the mass, energy, etc., in the universe expanded away from a central point, but the rate at which the universe expanded was not sufficient to overcome the force of gravitational attraction between the various parts of the universe. As a result, the rate at which all of the galaxies in the

cosmos traveled away from one another slowed and then the whole thing collapsed upon itself. Many scientists postulate an infinite series of Big Bangs and Big Crunches.^[ii]

So, when theists and atheists debate about whether the universe had a beginning, they are not debating about whether the *present structure* of the universe had its beginning in the Big Bang. On that point, there is wide agreement. They are debating the larger question of whether there was an absolute starting point for the entire cosmos and, if so, what was responsible for setting all of that in motion.

Some theists might be tempted to think that the divine act of creating the universe was an instance of something coming to be out of absolutely nothing. This response, however, involves a confusion. Although orthodox theism has always maintained that God created the world *ex nihilo*—i.e., out of nothing—there wasn't *absolutely nothing* in existence before God's creation of the material universe. There was God. There may not have been any matter, energy, planets or stars. But there was nevertheless something in existence that could serve as a definite cause for the event of creation: God. By contrast, the Uncaused Universe view is the claim that there was no absolutely nothing—not even a divine being—in existence before the universe began and that the universe popped into being out of this absolute emptiness for no reason at all. That is surely an absurd suggestion.

Consequently, the universe could not have come from nothing. If the universe had a beginning, there had to be some cause responsible for that beginning.

III. What Kind of Cause Brought the Universe into Being?

A. Now let's consider what kind of cause could have brought the universe into existence. Was that cause something within the universe itself or was it something outside of the universe altogether?

According to the view I will call the ‘Self-Caused Universe’ view, what caused the universe to come into being was the universe itself. It wasn’t created by something other than the universe. The universe—by its own power—caused itself to go from non-existence to existence. This is surely absurd. If the universe didn’t exist before the existence of the universe, there is no way it could have the power to perform an act of creation. If the universe did have the capacity to perform an act of creation, then—contrary to the suggestion under consideration—the universe was in existence at that time after all.

According to the ‘Part-Caused Universe’ view, what caused the universe to come into being was not the universe itself as a whole, but rather some very important part of the universe. Instead of the whole causing the whole, this view claims that a part caused the whole. However, the question the kalam cosmological argument seeks to answer is “Why does the universe *as a whole* exist?” or, alternatively, “Why is there anything at all rather than nothing?” Even if we could explain the existence of the whole in terms of some very important part (and that is doubtful, to say the least), we would still not have an explanation of why there is anything at all. We could still ask, “Why does that very important part exist?” The Self-Caused Universe view and the Part-Caused Universe view are both versions of position (3) in Figure 1.

Let ‘ U ’ be the sum total of everything that exists in the material universe. The most that could be explained by appealing to something within the universe (let’s call it ‘ a ’) would be an explanation of everything in U except for a . But the cosmological argument is looking for an explanation of the whole ball of wax— U itself—not merely some part of it (e.g., U minus a). So, the cause for the existence of the universe cannot be found within the universe itself. Therefore, whatever brought the universe into being must lie outside the universe.

The universe is the sum total of all matter and energy existing in four-dimensional spacetime. If the cause of the universe were not part of the universe, then it would have to be something that was not composed of matter or energy and not located in four-dimensional spacetime. Many philosophers refer to everything that falls within the

universe as ‘the natural world’ or ‘nature.’ If the cause of the universe lies outside the natural world, then it seems appropriate to call that cause ‘supernatural.’

B. Let’s call whatever it was that caused the universe to exist the ‘*U*-cause.’ If the *U*-cause lies outside the universe, then the *U*-cause will have one of the following two properties. Either the *U*-cause was caused to exist by something else or else it was not caused to exist by something else (i.e., it does not depend upon anything else for its existence). The kalam argument claims that the first option leads to absurdity. If the *U*-cause was itself caused to exist by something else, then we will want to know what caused the existence of the *U*-cause. Let’s call the thing that caused the *U*-cause the ‘*U*-cause-cause.’ We can now ask the same thing about the *U*-cause-cause that we asked about the *U*-cause, viz., “Was the *U*-cause-cause brought into existence by something else or does it not depend upon anything else for its existence?” Suppose that the *U*-cause-cause depends upon something else for its existence. That means that there was some third thing—the *U*-cause-cause-cause—that caused the *U*-cause-cause. Of course, we can ask the same question all over again: “Was the *U*-cause-cause-cause brought into existence by something else or does it not depend upon anything else for its existence?” And so on.

What if, for every *U*-cause (or *U*-cause-cause, etc.), it was the case that that cause was itself caused to exist by something else? This possibility is represented as position (4) in Figure 1. Position (4) implies that there has been an actual infinite series of prior causes. In other words, the universe came to existence only after an infinitely long series of causes was completed:

..., *U*-cause-cause-cause, *U*-cause-cause, *U*-cause, the universe

But an actual infinitely long series cannot be completed. This is just like counting down from negative infinity to zero: No matter how fast you counted, you could never finish. That’s part of the nature of an actual infinite. So, the assumption that the existence of the universe depends upon an actual infinite series of prior causes is absurd. If a claim has

been shown to lead to absurd consequences, we are justified in concluding that the opposite of that claim must be true.

So, the series of causes of the universe must be finite; it must come to an end. (Either the *U*-cause is itself uncaused or it was caused to exist by something that is uncaused. Either way, the existence of the universe ultimately requires that there be some being that does not depend for its existence upon anything else.) If the series of causes is finite, that means that the first member of the series must not depend upon anything else for its existence. It must be the sort of thing that simply exists but was not caused by something else to exist. So, we can conclude that whatever is ultimately responsible for the existence of the universe is itself uncaused. This option is represented as position (5) in Figure 1.

Let's think about the points that the kalam argument has argued for in this section: a) that the ultimate cause of the universe must be supernatural (i.e., it must lie outside the natural universe) and b) the ultimate cause of the universe must itself be uncaused. Think about how many things fit the following set of descriptions:

- *x* is powerful enough to bring the universe into existence.
- *x* is sufficiently knowledgeable to create a universe like ours with all of its natural laws and complex configurations of matter and energy.
- *x* is not made out of matter or energy and is not located in four-dimensional spacetime (i.e., *x* is not part of the natural universe).
- *x* does not depend upon anything besides itself for its existence.

Defenders of the kalam cosmological argument suggest that only one thing fits that description: God. Consequently, they conclude that the kalam argument proves the existence of God.

IV. Summary

We can summarize the steps of the kalam cosmological argument as follows:

1. Either the universe had a beginning or it did not have a beginning.
2. The claim that the universe did not have a beginning entails that an actual infinite amount of time has elapsed in the history of the universe (i.e., that an infinite temporal series has been completed).
3. But no actual infinite series of any kind can be completed.
4. So, the universe must have had a beginning.
5. Either the beginning of the universe was caused or else it was uncaused.
6. The claim that the beginning of the universe was uncaused entails that the universe popped into existence out of nothing.
7. But it is absurd to think that the universe came from absolutely nothing.
8. So, the beginning of the universe had a cause.
9. The cause of the beginning of the universe was either something within the universe itself or else something outside the universe.
10. The cause of the beginning of the whole universe cannot lie within the universe.
11. So, the cause of the universe had to be something outside the universe as a whole (i.e., it had to be a supernatural cause).
12. Either the *U*-cause (that which caused the universe) was caused to exist by something else or else the *U*-cause does not depend upon anything else for its existence.

13. We cannot suppose that the *U*-cause depends for its existence upon an infinite series of causes because an actual infinitely long series of causes cannot be completed.
14. So, either the *U*-cause was ultimately caused to exist by something else that does not depend for its existence upon anything else or else the *U*-cause does not depend upon anything else for its existence.
15. Either way, the universe ultimately depends for its existence upon something that: a) is supernatural; and b) does not depend for its existence upon anything else.
16. The only object that can fit the description in (15) is God.
17. So, the kalam cosmological argument proves the existence of God.

V. Objections and Replies

A. Are Actual Infinites Really Impossible?

The kalam cosmological argument proceeds by claiming that certain things are *impossible*—e.g., an infinitely old universe and a universe caused by an infinite series of causes. Some thinkers have challenged these claims to impossibility. They reason as follows:

Scientists employ the notion of infinity in a wide variety of equations that describe the behavior of the physical universe. Some physicists, for example, have claimed that the universe is infinitely large in size and many more have claimed that it is infinitely old. Moreover, scientists in other fields often speak of different kinds of objects or events having various kinds of infinite magnitudes. The kalam cosmological argument's claim that there cannot be any kind of actual infinite seems to fly in the face of accepted scientific practice. If the claims of

theistic defenders of the kalam cosmological argument conflict with the claims of our best contemporary science, it would not be rational to choose the claims of theism over the claims of science.

Some theistic defenders of the kalam cosmological argument try to avoid this objection by distinguishing between the following claims and maintaining that the cosmological argument only requires the weaker one:

- a) Actual infinities cannot be instantiated in the real world.
- b) It is impossible to traverse an actual infinite.

According to (a), it is impossible for there to be an infinite number of objects, events, steps in a series, or members of a set; and it is impossible for any object or event to possess a property of infinite magnitude—e.g., infinite density, infinite mass or infinite speed. In short, nothing in reality can be infinite. The notion of infinity is merely a mathematical fiction. It exists only as a figment of people's imagination. It cannot exist in reality.

This position does seem to conflict with accepted scientific practice. Chemists, engineers, physicists, biologists and other scientists occasionally have reason to employ the notion of infinity in their calculations and theories. If this view is correct, all of these scientists are sorely mistaken in thinking that their theories refer to anything in reality when they employ the notion of infinity. Although this does not amount to a decisive objection to the kalam argument, it does seem to undermine some of its persuasive power. If the kalam cosmological argument presupposes that there can be no actual infinities of any kind, some scientifically-minded people are going to be unwilling to go along with it.

However, it does not seem that defenders of the kalam argument need to commit themselves to (a). All that their argument requires is (b), which is a more modest claim. (b) allows that there may very well be infinite numbers of things in reality and that things may possess properties with infinite magnitudes. One can use the notion of infinity in

one's calculations *as long as one does not suppose that the actual infinite in question has been or can be traversed*. For example, consider the claim that, right before the Big Bang, all of the matter, energy and spacetime in the universe were concentrated into a point of infinite density. This claim does not presuppose that any infinite series is actually being completed or crossed. With the notion of infinite density, there is no worry about how one could ever begin at one end of the actual infinite (in this case, the density of the universe) and travel to the other end, which is infinitely far away. In the case of infinite density, that doesn't even make sense. So, there are no worries here about traversing an actual infinite. (b), then, can allow a limited use of infinities in scientific reasoning. Since (b) does not conflict with accepted scientific practice the way that (a) does, and since the kalam argument can be formulated with (b) instead of (a) in mind, the kalam cosmological argument does not force one to choose between science and theism.

B. Traversing an Actual Infinite

Some thinkers have questioned the kalam defender's claim that it is really impossible to traverse an actual infinite. For example, Alvin Plantinga (2000, p. 25) writes,

[I]t is characteristic of an infinite series that it can't be completed by starting from the beginning (or, more generally, some point only finitely far from the beginning) and adding things (events, say) one at a time (or more generally, finitely many at a time). This is true, provided the things (events) in question are added at a constant rate. If you start with the first event (or the n th, for some finite n) and add another event every second, you will never complete the series: at any subsequent time only a finite number of events will have occurred. According to current lore about the infinite, however, there is no bar of this kind to completing the infinite series in a finite time if the time taken for each event diminishes appropriately. For example, the first event takes one second to happen; the second event takes half a second; the third a quarter, the fourth an

eighth of a second, and so on. At that rate, it won't take long at all for an infinite number of events to have elapsed—only a couple of seconds.

Keith Parsons (1990, pp. 186-187) relays the following, more concrete example of what Plantinga has in mind.

Now it certainly seems intuitively plausible to say that an actual infinite cannot be crossed. However, if the mathematics of infinity has revealed anything, it is that our intuitions are not very trustworthy when dealing with such topics... [M]athematician Rudy Rucker imagines a mountain that is higher than infinity. However, says Rucker, climbers of this mountain could traverse an actual infinity of cliffs if they used a procedure he calls a “speed up”: “The idea is to climb the first cliff in one hour, the next cliff in half an hour, the on after that in a quarter of an hour, and, in general, the n th cliff in $1/2^n$ hours. Since $1 + 1/2 + 1/4 + 1/8 + \dots$ sums to 2, we see that after two hours our climbers have passed infinitely many cliffs.”

The speed up procedure can be diagrammed as follows:

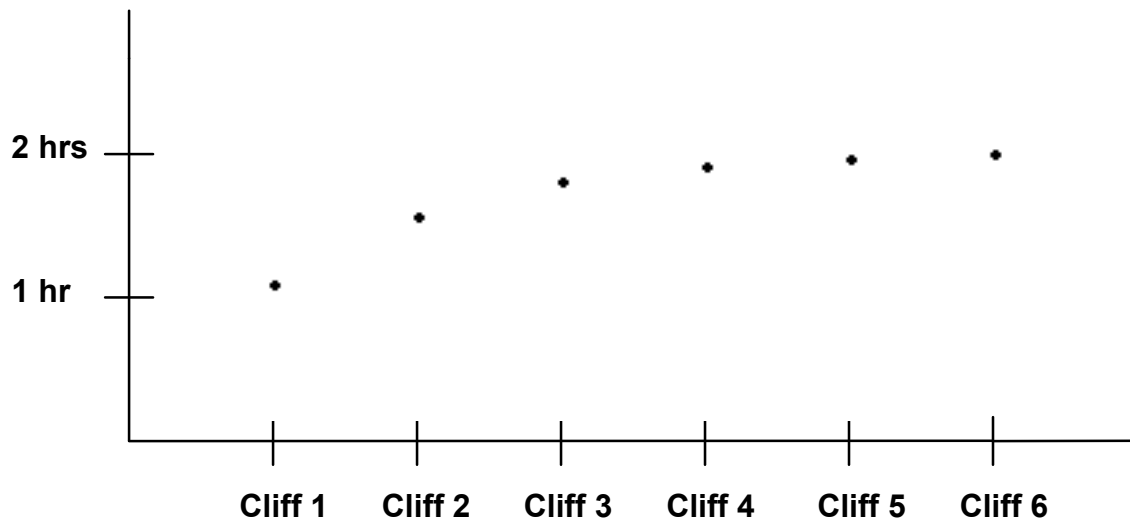


Figure 2

As the speed-up climber cuts his climbing time in half with each new cliff, his total climbing time asymptotically approaches two hours.

There would obviously be a variety of practical and physical obstacles standing in the way of any attempt to carry out the speed up procedure. Just to mention one: as bodies approach the speed of light, their mass increases, so that if they could ever reach the speed of light, they would be infinitely massive. An infinitely massive mountain climber would have an extremely difficult time taking even a single step.

In spite of the impracticality of the speed up procedure, Plantinga and Parsons make an important point. The kalam cosmological argument does not claim that the traversal of an actual infinite is something that cannot be accomplished because there are too many physical or practical obstacles associated with it. The kalam argument claims that, even if the physical and practical obstacles could be removed, it would still be impossible to do it. Traversal of an actual infinite is logically impossible (i.e., impossible in the strongest sense of that term). It is not merely practically or physically impossible (i.e., impossible in some weaker sense of that term). If Plantinga and Parsons are correct in thinking that the speed up procedure is logically possible (even if it is practically and physically impossible), then they will have undermined an important premise of the kalam cosmological argument.

However, Plantinga's and Parson's remarks about the speed up procedure commit a logically fallacy known as 'begging the question.' This fallacy is committed when:

- a) one assumes from the beginning that one's conclusion is true;
- b) one fails to provide any independent reason(s) for believing that one's conclusion is true;
- c) one declares that one's conclusion follows from the reason(s) that one supposedly gave; and

d) the only thing one's conclusion follows from is the prior assumption that one's conclusion is true.

If, for example, you assume that killing is always wrong and then use this assumption to argue that killing is always wrong, you will not have proven that killing is always wrong. The question is why someone should believe that killing is always wrong. Telling them that it is always wrong doesn't give them a reason to believe it is always wrong. But this is precisely what people do when they beg the question.

[illegible]

Let's reflect upon what the speed up procedure requires of our climber. Traversing an actual infinite, Plantinga and Parsons say, is possible if you can follow the speed up procedure. Following the speed up procedure means being able to travel infinitely fast. Or, since speed is distance divided by time, following the speed up procedure means being able to travel an infinite distance in a finite amount of time. Plantinga and Parsons use the example of the speed up procedure to try to prove that traversing an actual infinite is possible. However, their argument looks like this:

- i) Premise: Assume it is possible to travel an infinite distance in a finite amount of time.
- ii) Conclusion: It is possible to travel an infinite distance in a finite amount of time.

The speed up procedure example doesn't prove it is possible to traverse an actual infinite. Rather, the example assumes from the beginning that it is possible and then, on the basis of this assumption, concludes that it is possible to traverse an actual infinite. This is begging the question. Plantinga and Parsons are acting as if they have provided independent reasons for believing it is possible to traverse an actual infinite, when in fact they have not. The "argument" provided by Plantinga and Parsons is not any more convincing than Biff's "argument" in the following dialogue:

Biff: God exists.

Buffy: Why should I believe that?

Biff: Because He does.

Biff's answer to Buffy's question fails to provide the kind of reason she was seeking. The truth of a certain claim, *A*, cannot count as a reason for believing *A*. When we ask for reasons, we are looking for *independent grounds* for believing *A*.

Because Plantinga's and Parsons's objection begs the question, they fail to undermine the kalam argument's claim that traversing an actual infinite is impossible.^[iii]

C. But Who Made God?

When faced with the cosmological argument and its claim that the universe must have been created by God, some students reply “But who created God?” If reflecting upon the existence of the universe leads us to conclude that the universe had a supernatural cause for its existence, shouldn’t reflecting upon the existence of God lead us to conclude that God, too, had a cause for His existence? Some students feel that theists are unfairly applying a double standard and exempting themselves from their own medicine.

To answer this objection, defenders of the kalam argument need only refer back to the discussion of the *U*-cause in section III.B. If God is the cause of the existence of the universe—i.e., if God is the *U*-cause—we can ask, “Was God caused to exist by something else or does God not depend upon anything else for His existence?” If God was created—i.e., if there was something that made God or caused Him to exist—then we can ask, “Was this God-cause caused to exist by something else or does the God-cause not depend upon anything else for His existence?” If this God-cause was itself created by something else, then we need to ask this same question at a higher level. There are two results of continuing this line of questioning: either a) we reach a stopping point with something that is uncreated (i.e., whose existence does not depend upon anything else); or b) we assume that God’s existence has an infinite series of causes. Option (b), however, implies that an infinitely chain of causation has actually been completed. The kalam argument has already claims that it is absurd to think an actual infinite can be traversed. Therefore, the assumption that it is always appropriate to ask, “But who made *x*?” leads to absurdity. Because this assumption leads to an absurdity, we are warranted in concluding that it is false. This means we can conclude that there are some things that are not themselves created or caused to exist. They simply exist of their own power and do not depend upon anything else for their existence. This is what theists claim is true of God. Thus, the objection under consideration does not appears to succeed.

D. An Objection from Quantum Physics

Occasionally I've had students object to the claim that nothing can come from nothing. They allege that quantum field theory has shown that objects really can and do just pop into existence out of nothing.^[iv] According to contemporary quantum physics, virtual particles can pop into existence in what is called the 'quantum vacuum.' They are called 'virtual particles' because they cannot be observed directly, although their indirect effects can be measured (Hawking, 2001, p. 118). Because the quantum vacuum doesn't appear to be an object—according to our ordinary notion of object—it is sometimes said that virtual particles literally come into being out of nothing. However, no matter how unusual the quantum vacuum may be, it is indeed something. As van Inwagen (1993, pp. 116-117) explains,

[The quantum vacuum] is simply the lowest energy state of the quantum field (the quantum vacuum is, therefore, a mere modification of the quantum field: the words 'quantum vacuum' are a name that is applied to the quantum field when it is a certain state, just as 'fist' is a name that is applied to a hand when it is in a certain state), and the quantum field is a physical object with a very complicated structure, a structure that is specified by a set of equations that contain a variety of apparently arbitrary numbers.

The quantum vacuum is unstable. It has properties that do not allow all of its parts to remain in its lowest energy state for a continuous amount of time. According to van Inwagen (1993, p. 117), "When the quantum field locally and temporarily departs from its lowest energy state, particles appear (a particle and its anti-particle or a single particle that is its own anti-particle)." On a superficial level, it may seem as if these particles "come to be out of nothing," but this is not and cannot be literally true. There is something real there—the quantum field—and the properties of this thing are studied by physicists. There are real, physical events concerning this thing that lead to the appearance of new particles; but this is a far cry from things popping into existence out of

nothing. Genuine nothingness has no properties, cannot be studied by any science, and cannot give rise to anything. So, the results of quantum physics do not undermine the principle that nothing comes from nothing.

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Endnotes

[i] Van Inwagen (1993, p. 72) writes, “no one is going to show how a state of affairs in which there were no things of any sort developed into a state of affairs in which there were things.”

[ii] According to William Lane Craig (1990), thermodynamic considerations make an infinite cycle of Big Bangs and Crunches problematic.

[E]ven if the universe is sufficiently dense so that it will someday recontract, it still faces a thermodynamic heat death. As the universe recontracts, it will grow hotter and hotter until all the elements are dissolved and the whole of space-time reality coalesces into a single black hole coextensive with the universe, from which it will never reemerge. Although some theorists have sought to avert this fate by postulating that the universe could bounce back from a contraction to a new expansion phase, recent studies of thermodynamics of a contracting universe confirm that reexpansion would not occur. And even if it could, other studies have shown that due to entropy increases from cycle to cycle, the oscillating universe would expand further each cycle, so that as one traces the cycles back in time, the expansion radius of the universe becomes progressively smaller until one reaches a first expansion and the beginning of the universe. In fact, astronomer Joseph Silk estimates on the basis of currently observed entropy levels that the present expansion could not have been preceded by more than 100 previous cycles. Thus, thermodynamics confirms the origin of the universe in the finite past. (Craig 1990, pp. 146-147)

Hugh Ross (1994) echoes Craig’s point.

In 1983 and 1984, Marc Sher, Alan Guth and Sidney Bludman demonstrated that even if the universe did contain enough mass to halt its current expansion, the collapse would yield not a bounce but a thud. Because of the huge entropy of the universe, any ultimate collapse would lack, by many orders of magnitude, the mechanical energy needed to bring about a bounce. This huge entropy was the justification for the title of the paper by Sher and Guth, “The Impossibility of a Bouncing Universe.” (Ross 1994, p. 149)

According to John Leslie (1989, ch. 4), however, the claims of Craig and Ross are far from conclusive. Leslie claims that Stephen Hawking’s research on black holes suggests that the universe might be able to bounce back from a Big Crunch.

[iii] Some philosophers argue that it is the kalam cosmological argument that begs the question against those who believe in an eternally old universe. Plantinga (2000, p. 25) writes,

But the real problem with the [kalam cosmological] argument lies in a different direction.... To claim that it [is impossible for an infinite series of events to have occurred] is to claim just what is to be proved: *that the series in question had a beginning*. The premise tells us that if you start from some finite point in a series—that is, some point finitely far from the *beginning* of the series—and add a finite number per unit time, then you will never complete the series. Fair enough; but if the world has existed for an infinite stretch of time, then there *was* no first moment, no first event, and no beginning either to the series of moments or the series of events; more generally, at any preceding moment an infinite time would *already* have elapsed.

Anthony Flew (1990, p. 164) expresses a similar sentiment:

This argument assumes the very conclusion which it is presented to prove. For only if you set out from a temporal starting position infinitely far removed from the present would you have to “cross an actual infinite” in order to get where we are now. But to hold that the universe was without beginning and will be without end, precisely is to *deny* that the universe and time itself had a beginning (and will have an end). It is not to *assert* that it did, after all, have a beginning; but a beginning one actual infinite time ago.

Plantinga (a theist) and Flew (an atheist) assume that the kalam argument cannot be stated without begging the question. They believe the logical form of the argument is something like this:

- i) Assume there was a beginning to the universe.
- ii) Assume that this beginning point lies in the infinitely remote past.
- iii) It would be impossible to begin at this infinitely distant starting point and to travel from then to now because traversing an actual infinite is impossible.
- iv) Therefore, the assumption that the universe’s beginning is infinitely far away in time is false.
- v) Therefore, the point at which the universe began to exist is finitely distant.

Plantinga and Flew claim that atheists should not grant the first assumption of the argument. From the assumption that the universe had a beginning, the defender of the kalam argument will always be able to successfully defend the view that the universe had a beginning in the finite past. The key, Plantinga and Flew claim, is to deny kalam

defenders their favored starting point. If you do that, they will be unable to win the game so easily.

It seems to me, however, that Plantinga and Flew are mistaken in assuming that the kalam argument can only be stated in a question-begging way. Look back at the summary of the kalam argument given in section IV above. The first four claims in the argument read:

1. Either the universe had a beginning or it did not have a beginning.
2. The claim that the universe did not have a beginning entails that an actual infinite amount of time has elapsed in the history of the universe (i.e., that an infinite temporal series has been completed).
3. But no actual infinite series of any kind can be completed.
4. So, the universe must have had a beginning.

The third premise allows the kalam defender to grant (for the sake of argument) the atheist's assumption that the universe had no beginning at all. The kalam defender can then point out that, even granting this assumption, the atheist's view implies that an actual infinite series has been completed. The third premise simply denies that the actual infinite series in question (the infinite amount of time elapsed during the history of the universe) can be completed. This denial can be maintained without begging the question in any way against the atheist.

[iv] Sometimes these claims are accompanied by the slogan "nothingness is unstable." However, since 'unstable' expresses a property, there has to be something that possesses this property—i.e., something that is unstable. As van Inwagen (1993, p. 116) points out, instability has a temporal component: something is unstable if it has a strong tendency or disposition to change over time. But if there is absolutely nothing, then there can be nothing present to have such a temporal property.