An Argument for God Software Engineering

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THE KALAM COSMOLOGICAL ARGUMENT

(Written not by Curtis Hrischuk but by some other fellow)

What follows is a short presentation of the Kalam Cosmological Argument for the existence of God. The sources used in this presentation are documented according to current Modern Language Association standards. Consult the cited works of Craig for a more thorough statement and defense of the argument.

The KCA has its roots in medieval Arabic philosophy and theology. The Arabic word "kalam" means "speech," but more broadly it means "natural theology" or "philosophical theism" (Craig, KALAM, 4). The distinctive feature of kalam-style cosmology is its stress on the impossibility of the actual infinite. Put simply, kalam arguments try to demonstrate (1) that the existence of an actual infinite (a concept from modern set theory to be discussed shortly) is impossible and (2) that even if it were possible, the universe itself is not actually infinite and hence must have had a beginning.

The KCA has also been defended by Christian and Jewish philosophers. It is currently being defended by professional philosophers William Lane Craig and J. P. Moreland. The majority of what follows comes from Craig's defense of the argument, though I will use my own words and sometimes my own examples and comments.

Here is an outline of the argument--

[1] The universe either had:

[A] a beginning
[B] or no beginning

[2] If it had a beginning, the beginning was either:

[A] caused
[B] or uncaused

[3] If it had a cause, the cause was either:

[A] personal
[B] or not personal

The KCA works by supporting the [A] option of each premise and then using it in the following premise. Hence the KCA is actually a series of connected arguments. To be successful each of

these arguments must be logically valid and have true premises. Since the KCA is a series of arguments that take the form of a valid argument known as a disjunctive syllogism, the KCA's formal validity is beyond dispute. To be a sound argument, however, the KCA must have true premises, and thus the bulk of this presentation will attempt to support the premises.

Let's begin with [1]: the universe either had a beginning or did not have a beginning. Craig offers three arguments in support of a universe with a beginning. Two are philosophical; one is scientific. Here is the first philosophical argument:

1. An actual infinite cannot exist.

2. A beginningless series of events in time is an actual infinite.

3. Therefore, a beginningless series of events in time cannot exist. (Craig, THE EXISTENCE OF GOD, 39)

Premise One

In contemporary set theory, an actual infinite is a collection of things with an infinite number of members, for example, a library with an actually infinite set of books or a museum with an actually infinite set of paintings. One of the unique traits of an actual infinite is that part of an actually infinite set is equal to whole set. For example, in an actually infinite set of numbers, the number of even numbers in the set is equal to *all* of the numbers in the set. This follows because an infinite set of numbers contains an infinite number of even numbers as well as an infinite number of all numbers; hence a part of the set is equal to the whole of the set. Another trait of the actual infinite is that nothing can be added to it. Not one book can be added to an actually infinite library or one painting to an actually infinite museum.

By contrast, a potential infinite is a set of things that *can* be added to. The collection of paintings in a real museum is a potentially infinite set; one can always add another painting to the collection (given enough space), but there will always be a finite number of paintings in the museum. Another way of stating the difference between an actually infinite set and a potentially infinite set is that the latter has identical ordinal and cardinal numbers, but the former has a cardinal number known as the aleph zero or aleph null and an ordinal number which designates the entire series of natural numbers.

A common objection at this point is that if an actual infinite cannot exist, and God is infinite, then God cannot exist. This objection is based on a confusion of the terms "infinite" and "actual infinite." An actual infinite is a technical concept found in set theory that refers to sets and collections, not to single beings. To deny that an actual infinite can exist is to deny that a library with an actually infinite set of books or a museum with an actually infinite number of paintings can exist. God, on the other hand, is a being, not a set or collection of things, and hence God is not an actual infinite.

It should be noted that kalam defenders do not dispute the legitimacy of the actual infinite as a mathematical concept. Craig writes that what kalam defenders argue "is that an actual infinite

cannot exist in the real world of stars and planets and rocks and men" (Craig, THE EXISTENCE OF GOD, 42). In fact, until Gregor Cantor's work in set theory, mathematicians rejected the existence of an actual infinite as a mathematical concept. But Cantor himself denied the existential possibility of the actual infinite. In correspondence with the Pope, he even suggested that the existential impossibility of the actual infinite could be used in a mathematical-metaphysical proof for the existence of God.

Another famous mathematician and expert in set theory, David Hilbert, writes:

. . . the [actual] infinite is nowhere to be found in reality. It neither exists in nature nor provides a legitimate basis for rational thought--a remarkable harmony between being and thought. . . .

The role that remains for the [actual] infinite to play is solely that of an idea . . . (Craig, KALAM, 87)

But why can't an actual infinite exist in the real world of rocks and trees? Hilbert explains why by using an argument known as "Hilbert's Hotel":

Let us imagine a hotel with a finite number of rooms, and let us assume that all the rooms are occupied. When a new guest arrives and requests a room, the proprietor apologises, 'Sorry--all the rooms are full.' Now let us imagine a hotel with an infinite number of rooms, and let us assume that again all the rooms are occupied. But this time, when a new guest arrives and asks for a room, the proprietor exclaims, 'But of course!' and shifts the person in room 1 to room 2, the person in room 2 to room 3, the person in room 3 to room 4, and so on. . . The new guest then moves into room 1, which has now become vacant as a result of these transpositions. But now let us suppose an *infinite* number of new guests arrive, asking for rooms. 'Certainly, certainly!' says the proprietor, and he proceeds to move the person in room 1 into room 2, the person in room 2 into room 4, the person in room 3 into room 6, the person in room 4 into 8, and so on. . . . In this way, all the odd-numbered rooms become free, and the infinity of new guests can easily be accommodated in them.

In this story the proprietor thinks that he can get away with his clever business move because he has forgotten that his hotel has an *actually infinite* number of rooms, and that *all the rooms are occupied*. The proprietor's action can only work if the hotel is a potential infinite, such that new rooms are created to absorb the influx of guests. For if the hotel has an actually infinite collection of determinate rooms and *all* the rooms are full, then there is no more room. (Craig, KALAM, 84-85)

Craig uses the example of a library to illustrate this same point. Imagine an actually infinite library of books that come in two colors: black and red. The books are placed on a shelf in an alternating pattern of black and red. It is obvious that there are an equal number of black books and red books. But if this library is actually infinite, the number of black books is equal to the number of all the books, i.e., the number of black books is equal to the number of red books *plus* the number of black books. While these counter-intuitive paradoxes might make sense at the level of mathematical theory, they do not make much sense in the real world of books and

libraries.

Premise Two

A beginningless series of events in time is an actual infinite. In other words, if the series of past events had no beginning, it is actually infinite. If premise one is correct, however, it follows that a beginningless series of events in time cannot exist. Consider the following example. The Battle of Hastings took place in 1066. The Declaration of Independence was adopted in 1776, 710 years after the Battle of Hastings. If the series of past events in the universe is actually infinite, we can say that the Battle of Hastings was preceded by an infinite number of events. We can say the same about the Declaration of Independence. In fact we can say that the set of past events before the Battle of Hastings is equal to the set of past events before the Declaration of Independence, because part of an actually infinite set is equal to the whole set, as noted above. But how can that be? 710 years separate these two events, i.e., 710 years were added to the set of past events before the Battle of Hastings to get to the Declaration of Independence. By definition, however, nothing can be added to an actual infinite. Hence the series of past events before the Battle of Hastings cannot be actually infinite. Craig thus draws the conclusion to the first philosophical argument as follows: "[s]o the series of all past events must be finite and have a beginning. But the universe *is* the series of all events, so the universe must have had a beginning" (Craig, THE EXISTENCE OF GOD, 47).

The second philosophical argument for the beginning of the universe does not dispute the existence of the actual infinite, but instead points out that an actual infinite is not attained by adding new members to a potential infinite:

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. (Craig, THE EXISTENCE OF GOD, 49)

Premise One

Returning to the example of the Battle of Hastings and the Declaration of Independence, it is obvious that the 710 years between them came about by adding one year after the other. History is the continual addition of new events, one event being added after another.

Premise Two

Remember that nothing can be added to an infinite set. Any set to which can be added another member is not infinite, simply because another member could always be added. Infinity could never be reached by addition. This is called the impossibility of traversing an infinite. Craig asks us to "Imagine a man running up a flight of stairs and every time his foot strikes the top step, another step appears above it. It is clear that the man could run forever, but he would never cross all the steps because you could always add one more step" (Craig, THE EXISTENCE OF GOD,

50).

It follows from this that the series of events in time cannot be actually infinite. 1993 would never have arrived had it been preceded by a infinite number of years, because one cannot cross an infinite number of years to reach 1993 anymore than the man running up the stairs can cross an infinity of steps. Thus the number of years before 1993 must be finite and potentially infinite, but not actually infinite.

The scientific argument for a finite universe is by far the most controversial. Cosmologists constantly gather new evidence and refine theories accordingly. Skeptics often object that cosmology is too tentative of a discipline from which to draw absolute conclusions and thus does not provide good evidence for theistic arguments, and they further object that supporting theistic beliefs with tentative scientific arguments means that such beliefs run the risk of being falsified. These objections fail to grasp three important points. First, scientific arguments for theism do not intend to draw absolute conclusions, but to establish the likely probability that God exists. Second, the same risk that theism runs in using tentative scientific arguments is exactly the same risk that atheism runs. Third, a universe with an absolute beginning is well supported by scientific findings, and classical big bang theory is currently the best cosmological theory.

These findings include the following (consult the works cited for a more comprehensive explanation of these findings). First, earlier this century, Edwin Hubble discovered that light from distant galaxies is red-shifted, implying that the universe is expanding from an initial explosion which took place a finite time ago. Although a few scientists have challenged this interpretation of the red-shift, it has been supported by observation and successful prediction and has an explanatory power unmatched by other theories (Craig, KALAM, 160). Second, the big bang theory predicted the discovery of three-degree blackbody radiation, a discovery which surprised other cosmological theories. Third, astrophysicist Robert C. Newman writes "If there is any process which causes our universe to lose energy at a non zero rate, then an oscillating universe would have run out of energy (and so ceased to oscillate) long ago" (Newman, "The Evidence of Cosmology," 85). This means that it is all but improbable that the universe as we know it is one universe in an infinite series of expanding and contracting universes. Fourth, there is no explanation for why a contracting universe would "bounce" and begin expanding again. Recent evidence confirms that galaxies are moving too quickly away from one another for gravity to pull them back into a compressed point. Fifth, in April 1992, American scientists discovered ripples of matter at the edge of the universe. These ripples are evidence that the universe was given its structure very early in its history and further confirm that the universe had a definite beginning.

Having given three arguments to show that the universe had a beginning, we can move on to the second dilemma posed by the KCA:

[2] If the universe had a beginning, the beginning was either:

[A] caused
[B] or uncaused

Before discussing the [A] option, we should consider what is becoming a common response to this dilemma from those critical of the cosmological argument. Some theorists speculate that before Plank's time (10 to the negative 43 seconds after the universe began) the universe came into existence out of a quantum mechanical fluctuation. Hence some argue that the universe came out of nothing. Moreland, however, rightly points out that identifying nothingness with something, in this case a mechanical fluctuation, is a mistake; nothingness does not cause anything, let alone fluctuate or bring a universe into existence. Astronomer Hugh Ross notes that one of these theorists, Alan Guth, remarked that "such ideas are speculation squared." Put more concretely, there are three main problems with the quantum fluctuation speculation: it is based upon (1) a non existent theory of quantum gravity, (2) the use of imaginary numbers, and (3) the assumption that the universe was in a quantum state in its early beginning and thus had an indeterminate beginning.

Problem (1) could be solved by the discovery of a quantum theory of gravity, but such a discovery has not been forthcoming and should not be taken for granted. (2) puts the argument that the universe came from quantum fluctuation on non-realist grounds. Renowned physicist Stephen Hawking writes:

If the universe really is in such a quantum state, there would be no singularities in the history of the universe in imaginary time. . . . The universe could be finite in imaginary time but without boundaries or singularities. When one goes back to the real time in which we live, however, there will still appear to be singularities. . . . 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" (Ross, 114).

Note especially the phrase "when one goes back to the real time in which we live." This is a remarkable scientific confirmation of what kalam philosophers have been saying for a long time and what mathematicians such as Cantor and Hilbert confirm: the actual infinite cannot exist. When the imaginary transfinite mathematics of the actual infinite is translated into real finite terms, the results are nonsensical.

This leads to problem (3). If the universe was in a quantum state at its beginning, then one could speculatively circumvent the problem of switching between imaginary and real time, but this brings up a further problem. Under the Copenhagen interpretation of quantum physics, there needs to be someone to observe the quantum fluctuation that produced the universe. Since, of course, no human beings were present at the inception of the universe, it is obvious who the best candidate is for being the observer of the alleged quantum fluctuation that brought forth the universe. To avoid the theistic implications of this interpretation, some theorists have argued that our universe fluctuated out of superspace in which an infinite number of universes were physically possible. However, this is another example of "speculation squared." Craig writes of this: "It hardly needs to be said that this is a piece of speculative metaphysics no less objectionable than theism; indeed, I should argue, more objectionable because the reality of time is ultimately denied as all dimensions, temporal as well as spatial, are subsumed into superspace" (Craig, "In Defense of Rational Theism," 148). Moreover, it posits the existence of an actually infinite number of universes--and since an actual infinite cannot exist, this speculation is at odds

with reality.

Finally, the concept of quantum indeterminacy only tells us that measurements at the atomic level cannot be taken with precision; it is not a metaphysical or ontological principle. Applied to the beginning of the universe, if the universe was in a quantum state, quantum indeterminacy simply means that we cannot know with Newtonian precision what happened before Plank's time. It does not mean that the universe popped into existence uncaused or that the ultimate cause of the universe is indeterminate. On the contrary, it was the work of Hawking et. al. that established the singularity theorem, i.e., a theorem which affirms that space and time had a definite beginning--regardless of whether scientists can measure with certainty what happened before Plank's time.

Since the appeal to quantum indeterminacy does not support the [B] option, what can be said in favor of the [A] disjunct? Consider the principle of sufficient reason as formulated by the German philosopher Leibniz: "no fact can be real or existing and no statement true unless it has a sufficient reason why it should be thus and not otherwise" (Leibniz, 198). This principle is often stated as "everything that begins to exist has a cause of its existence" or "every event has a cause." It is hard to overestimate how essential this principle is to rational enquiry. Biologists who seek to explain the origin of life depend upon it. So do detectives solving a crime, meteorologists forecasting the weather, and doctors diagnosing a patient. In commenting on Leibniz's cosmological argument, one philosopher writes ". . . if one were to reject it [i.e. the principle of sufficient reason], the argument would fail. But this is a principle Leibniz contends it would be absurd to reject. And it is also one of the most fundamental principles of rational thought" (Schacht, 54 55).

Moreover, the principle of sufficient reason has never been falsified in the history of rational thought. Hence the principle can amply be defended upon empirical grounds as well as philosophical grounds. Why, then, should one balk at the principle of sufficient reason in regards to the beginning of the universe? Why arbitrarily set aside a fundamental principle of rational thought to avoid the implications of a universe with a beginning? Thus unless someone can give a good reason for waiving the principle at this point, we can conclude that a universe that began to exist had a cause of its existence.

This leads us to the final dilemma:

[3] If the universe had a cause, the cause was either:

[A] personal
[B] or not personal

Even if one should accept the [A] option of the first two dilemmas, why should one believe that the cause of the universe is a personal being? Some argue, for example, that even if the universe had a cause, its cause could have been a natural one. Presumably this means that the universe could be the product of an impersonal physical cause. The problem with this is twofold. First, what does it mean to say that the cause of the universe is a natural one? Natural causes exist within the universe, not outside of it. If something preceded the universe, then by definition it is

not a natural cause, because the laws of nature came into existence after whatever preceded the universe.

Second, if the cause of the universe is a sufficient cause, meaning that the existence of the cause alone guarantees the existence of the universe, the universe would always have existed. To make this clear consider the sufficient cause of lighting a match. When a match is struck against the proper surface, it ignites, and thus striking the match is the sufficient cause of an ignited match. Note that as soon as a sufficient cause exists, the effect follows immediately; there is no gap between the cause and the effect. This raises a question: if the sufficient cause of the universe has always existed, then why has the universe not always existed?

The answer to this question is that the cause of the universe is a personal agent who willed the creation of a finite universe. To use the match example, once the match is struck the effect immediately follows, but if a personal agent does not strike the match, the effect does not have to follow. Likewise, if the cause of the universe is personal, the universe does not have to be eternal like its sufficient cause. Instead, the universe could have been willed into existence much like a person wills to light a match. Once the cause is set into motion the effect follows, but only after the cause is set into motion; and a personal agent has the power not to set the cause in motion. Thus we can conclude that the cause of the universe is personal.

Conclusion

Now that we have supported the [A] option of each dilemma, we can draw this conclusion: the universe was brought into existence by a personal agent. Now this conclusion might startle some people. Many of us believe that the existence of God cannot be proven or cannot be proven with any strong certainty. But if the three main premises of the KCA are sound and adequately supported, then the conclusion is true regardless of the remarkable and startling implications of such a conclusion.

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