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Doubts about the Kalām Cosmological Argument

Wes Morriston

For more than thirty years, William Lane Craig has vigorously championed the kalām cosmological argument. The argument begins with two familiar premises:

(1) Whatever begins to exist has a cause.

(2) The universe came into existence.

From (1) and (2) it follows that the universe has a cause. Further reflection is then supposed to show that this cause must have been a non-temporal, unchanging, immaterial, and unimaginably powerful person who created the universe out of nothing.

In the present essay, I shall explore and evaluate the case for accepting the two main premises of the kalām argument. Before proceeding further, however, I want to make sure that the word "universe" is understood in a sense strong enough to enable the friends of the kalām argument to reach the conclusion they are aiming for—that the universe was created out of nothing by a person having the impressive features mentioned at the end of the previous paragraph. In order, for example, to show that the cause of the universe is a *timeless, unchanging, and immaterial* being who created it *out of nothing*, we need to know that it is the cause—not just of the space, time, and matter of *our* universe, but of the space, time, and matter of *any* universe that might ever have existed. So the claim we need to investigate is whether *the whole of physical reality* must have a beginning and a cause. With this understood, let us turn our attention to the case for premise 2.

Scientific arguments for premise 2

Two scientific considerations—one based on the expansion of the universe, the other on its thermodynamic properties—are offered in support of premise 2. In my opinion, neither of these arguments settles the matter, but my principal interest lies elsewhere and my treatment will have to be brief.

Expansion and the big bang

It is a commonplace that the history of the universe can be traced back to a big bang that (according to current estimates) occurred about 13.7 billion years ago. Unfortunately matters are not that simple. At best, the extrapolated Hubble expansion takes us back to a time when the universe was in a state of extremely high energy and density. At 10^{-12} seconds after the big bang, it is thought to have been about 100 billion electron volts (100 GeV); at 10^{-35} seconds, it rises to 10^{14} GeV.[1] When energy levels are that high, quantum effects are extremely significant, physics is entirely speculative, and just about everything is up for grabs. In such an extreme situation it isn't clear what physical laws apply, and—although the implications of this are often missed—the physics of the early universe is far too unsettled to enable us to extrapolate all the way back to a "time zero."[2] Indeed, to speak of the "early universe" at all is a bit of a

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[1] See Monton (2008).

[2] One scientist I consulted (Michael Shull, Professor of Professor of Astrophysical and Planetary Sciences and College Professor of Distinction at the University of Colorado in Boulder) put the matter succinctly in correspondence: "I find it surprising that someone would claim … that the extrapolated Hubble expansion, back to "time zero"(13.7 billion years ago) was the start of everything. We know so little about the laws of physics at these times, small lengths, enormous energies, even the nature of space and the vacuum …"

misnomer; what we're really talking about here is just the universe as far back in time as we can "see", given currently well-established physical theory.[3]

There is yet another reason for skepticism about this source of evidence for premise 2. Even if we could extrapolate all the way back to a time zero, this would establish merely that the spacetime of our universe has a beginning. It would give us no reason to conclude that there is nothing on the other side of that beginning (an earlier universe operating in accordance with quite different physical laws, perhaps?), and no reason therefore to think that *the whole order of nature* (physical reality as a whole) has an absolute beginning.[4]

There is, to be sure, an ongoing riot of speculation about these matters; but for the present, there is no telling which, if any, of the hypotheses currently being explored and tested will win out. Until the physicists have sorted things out on empirical grounds, I do not think we should rush to judgment.[5]

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[3] Philosopher of physics Bradley Monton offers an extraordinarily clear, careful, and well-informed presentation of the general line of argument briefly developed here (Monton 2008).

[4] A layperson might wonder whether it makes any sense to talk about what happened before the beginning of spacetime. It's quite clear, however, that it can make sense. To borrow an illustration from Craig (1992, 238-9), one can imagine an immaterial Creator doing a sort of "countdown" to creation: "5, 4, 3, 2, 1, fiat lux!" Here we have a temporal sequence whose members occur prior to the beginning of our spacetime. Craig himself calls this a "knockdown argument" for the conclusion that "time as it plays a role in physics is at best a measure of time rather than constitutive or definitive of time" (1998, 350-1).

[5] Craig and Sinclair have done a remarkable job of summarizing and critically evaluating the theories currently on offer (Craig 2009). I have neither the expertise nor the space to contribute to this fascinating debate. But there is no getting around the fact that there is as yet nothing even remotely approaching a true scientific consensus about these matters.

The thermodynamic properties of the universe

Craig also stresses a second scientific consideration. Given the second law of thermodynamics, the universe must, in a finite amount of time, arrive at a state of equilibrium and suffer "heat death." So if the history of the universe did not have a beginning, heat death would always already have taken place. Since that has not happened, we are invited to conclude that the universe has not always existed and that there must have been an absolute beginning.

The problem with this argument is (once again) that we don't know enough about the so-called "early" universe to say just how far back the second law reaches. Consequently, we are unable to say how long the universe might have been in that mysterious "early" state. The most we are therefore entitled to conclude is that the history of *entropy* has a beginning.

Philosophical arguments for an absolute beginning

There are, however, two purely philosophical arguments for premise 2. Both seek to show that a beginningless series of discrete events is impossible. If this could be established (and if we could assume that the history of the universe consists in a series of discrete events), then we would not have to wait for the physicists to sort things out to conclude that the universe has a beginning—at least in the sense that there must have been a very first event in its history.[6]

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[6] Neither argument establishes that the earliest *event* has a beginning "edge", but I shall be making nothing of this qualification here. For some helpful remarks on this topic, see Craig (2009, 184-5).

First philosophical argument: the impossibility of an actual infinite

The first of these arguments employs the concept of an *actual infinite*, which Craig defines as "a collection of definite and discrete members whose number is greater than any natural number 0, 1, 2, 3, …" (2008, 116). A beginningless series of discrete events could be placed in one-to-one correlation with the natural numbers. The number of events in such a series would therefore be $\aleph_0$ (the first transfinite cardinal); so it would be an actual infinite in the sense just defined. If it could be established that an actual infinite could not exist in the real world, then it would follow that a beginningless series of discrete events is impossible and we would have the absolute beginning we are looking for.

Craig has tried to show just this. Actually infinite collections, he believes, have absurd properties that make them impossible. By way of illustration and argument, he asks us to consider the case of "Hilbert's Hotel" (2008, 108ff). This imaginary hotel has infinitely many rooms, each of which accommodates a single person. So what's the problem? Well, even if the hotel were full, space could still be found for more guests without kicking anyone out or making anyone double up or building any new rooms. All we'd have to do to make space for a single new guest would be to move each current guest to the next room. To make infinitely many rooms available, we could have each current guest move to the room with double his or her old room number. This feature of a Hilbert's Hotel is alleged to be absurd, and the absurdity is blamed entirely on the fact that the hotel is *infinite*.

Craig also stresses another implication—this one having to do with inverse arithmetical operations. If the guests in rooms other than (say) the first three checked

out, the hotel would be virtually emptied—only three guests would remain. But if the guests in every other room checked out, infinitely many guests would remain. And yet precisely the same number ($\aleph_0$) of guests would have checked out. This, Craig thinks, is obviously absurd.

Arithmetic avoids these implications by leaving subtraction undefined for infinity. But while that may keep things working smoothly in the strange world of mathematics, Craig points out that *in the real world* there is nothing to prevent guests from checking out of a hotel. From this, he once again draws the conclusion that there could be no such thing as an infinite hotel.

The lesson, of course, is supposed to be completely general. A true actual infinite, Craig says, is metaphysically impossible across-the-board. If, for example, numbers existed in reality, they would constitute an actual infinite; so Craig thinks we should adopt an anti-realist view of mathematical objects (2008, 117). The same of course goes for an infinite (because beginningless) series of discrete events.

What are we to make of these claims? Some friends of the actual infinite respond by saying that the properties of the infinite are simply different from those of the finite. Of course *we* can't build an infinite hotel. But a God who could create the whole of physical reality out of nothing could make a universe as large as he liked—even an infinitely large one. And if He did, He could certainly put an infinite hotel into it. A hotel like that would indeed have the weird properties highlighted above. But so what?

Although I have a good deal of sympathy for this reaction, I want to press a subtler objection. The supposed absurdities of a Hilbert's Hotel do not follow *merely* from its *infinity*, but rather from what happens when infinity is *combined* with *other*

features of this imaginary hotel. If the guests could not be *moved*, they could not be moved *to other rooms* in such a way as to make room for new guests. Nor would we have to worry about how many guests would remain when different actual infinities of guests have left the hotel.

It is not at all clear, then, that Craig is entitled to conclude that no actual infinite whatever is possible. To see this, notice that mathematical objects (if there are such) are not "movable". So the allegedly absurd implications of a Hilbert's Hotel do not afflict infinite collections of them. More importantly for our purposes, past events are not movable. Unlike the guests in a hotel, who can leave their rooms, past events are absolutely inseparable from their respective temporal locations. Once an event has occurred at a particular time, it can't be "moved" to some other time. The signing of the Declaration of Independence, for instance, cannot be "moved out of" July 4, 1776. Of course, time continued to pass, and new events were (and continue to be) added to those that had already occurred when the signing of the Declaration had been completed. But that is no more absurd than making space for new guests by building new rooms.

It may be thought that I have taken the infinite hotel example too literally. Even if (*per impossibile*) the guests could not be moved, we would still have the following absurd implication. Hilbert's Hotel *could have* accommodated the same guests in its even-numbered rooms, and infinitely many additional guests in its odd-numbered rooms. This won't help to refute realism about mathematical objects, since there is no interesting sense in which they could have occupied different "locations". But it might be thought that it does demonstrate the absurdity of a beginningless series of discrete events. How so? Well, if we distinguish between the beginningless series of *events* and the

beginningless series of *temporal* locations at which they occur, then it might seem that the same events could have been spread out in time in such a way as to make "room" for infinitely many more events.[7]

Whether this is genuinely possible depends, I think, on our view of time. On a relational view, the series of events and the series of temporal locations are inseparable and it makes no sense to suppose that the same events could have been distributed across the same temporal locations in a totally different way. But suppose we waive that point, and (at least for the sake of argument) adopt an absolute view of the nature of time. Have we (at last) arrived at a genuine absurdity? At something that makes it clear that a beginningless series of events is impossible? I won't address this question directly. What I will do instead is to argue that such a conclusion would come at a heavy price, since it would force us to conclude that an *endless* series of future events is no less impossible than a *beginningless* one.

A favorite verse of a much loved hymn comes to mind:

> When we've been there ten thousand years,
> Bright shining as the sun,
> We've no less days to sing God's praise,
> Than when we first begun.

Of course, we shall never arrive at a time at which we have *already* said infinitely many heavenly praises. At each stage in the imagined future series of praises, we'll have said only finitely many. But that makes no difference to the point I am about to make. If you ask, "How many distinct praises *will* be said?" the only sensible answer is, *infinitely many*.

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[7] For a helpful development of this point, see Moreland (2003, 381-2).

I anticipate the following objection. The series of future praises is a merely *potential* infinite. It is, in Craig's words, "a collection that is increasing toward infinity as a limit but never gets there." Such a collection, Craig says, is "really indefinite, not infinite" (2008, 116-17). This objection is badly confused. The salient points are these.

In the first place, the series of praises, each of which *will* be said, is *not growing* since each of its members has yet to occur. Even when the first of those praises is said, the series of *future* praises will still not be *growing*. Instead (if the passage of time is real), it is the series of praises that *have* been said that will begin having members added to it.

In the second place, there need be nothing "indefinite" about a series of future events. To see this, suppose that God has exercised his supreme power in such a way as to *determine* that a single angel – Gabriel, say – will speak certain words of praise at regular intervals forever. Suppose further that God has left none of the details open, and that *each* of Gabriel's future praises is both pre-determined and completely *determinate* – specified down to the smallest detail.

Under these circumstances, there is a one-to-one correspondence between Gabriel's future praises and the natural numbers. So his future praises must count as "a collection of definite and discrete members whose number is greater than any natural number." They are therefore an actual infinite, and whatever paradoxes may be implied by the hypothesis of a beginningless series of past events must also be implied by this endless series of pre-determined (*and determinate*) future events.

In response to this worry, Craig distinguishes between two questions: (i) how many praises will be said? and (ii) what is the number of praises that will be said? The

answer to the first question, he says, is "potentially infinitely many." But the answer to the second question is "none": there simply is no number such that it is the number of praises that will be said (2010, 454-5).

I have already given my reasons for thinking that a series of future praises such as the one I have imagined does not satisfy Craig's own definition of a "potential infinite." But what of his answer to the second question? Why does he think that "none" is the right answer to the question about the number of praises in my imagined series of future praises? The answer might appear to be that Craig is a "presentist" who thinks that there is no number of future events because *future events don't exist*.

Now most philosophers could not give this answer, since they are "eternalists". According to them, temporal becoming is illusory and there is no difference in ontological status between present events and future ones. But what if Craig were right in supposing that only present events exist? Would that help his case? It might seem not, since it would oblige him to say that there is no number of past events either. But Craig is ready with an explanation. Even though past events do not exist, he says, "they are still part of the actual world in a way that future events are not, since the actual world comprises everything that has happened" (2010, 456).

What's going on here? Well, Craig appears to be drawing a distinction between saying that something *exists* and saying that it is *actual*. Past events don't exist; but they are actual because they have become so. Future events, by contrast, neither exist nor are they actual. Unlike past events, they have yet to become actual.

What should we make of this distinction? Is it the case that something that *will* occur (especially if it has already been *determined* to occur) is less a part of "actuality"

than something that *has* occurred? That seems like a stretch to me; but even if it were true it would not help Craig's case, since the items in a collection do not have to be "actual" in his special sense in order to be numerable. To see this, suppose that instead of pre-determining each member of an *endless* series of praise-events, God merely pre-determines each member of a *finite* series. For definiteness, suppose that he creates a perfectly functioning timer, sets it to ten minutes, and fixes things up in such a way that Gabriel cannot help saying certain words of praise whenever the timer registers that an additional minute has passed. Does the fact that Gabriel's future praises have not yet been "actualized" entail that they are numberless? Not at all. The number of praises, each of which *will* occur, is obviously *ten*.[8]

Let us return, then, to the case of an *endless* series of praise-events. Unlike a series of ten, there will never be a time at which *all* the events in an endless series of future events *have been* actualized. Does this imply that "none" is the correct answer to the question about the number of future praise-events? It does not. As long as each of those future events is definite and discrete and determined to happen, they can be placed in one-to-one correspondence with the natural numbers, and their number must be $\aleph_0$ (the first transfinite cardinal number). Their ontological status (whatever it turns out to be)

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[8] Notice that I did not say that that the number of praises that will *have* occurred is ten. That's true too, but it is important to distinguish between the following questions:

(i) How many will have occurred when all have been said?

(ii) How many are such that each will be said?

The answer to (ii) is the same as the answer to (i) for any finite series of future events, but not for an infinite one.

provides no more reason for saying that the correct answer to the question about their number is “none” than it does in the case of a finite series of future events.

Even on a presentist view, then, there is no *relevant* difference between a beginningless series of past events and an endless series of events each of which is determined to occur in the future. The absurdities that supposedly attend a series that can be placed in one-to-one correlation with the natural numbers will afflict an endless series just as much as a beginningless one. To this simple point, the passage of time makes not a particle of difference.

At this juncture, a committed finitist might want to bite the bullet and concede that an endless series of future events is (also) impossible. This seems implausible to me, but I cannot prove that it is mistaken. However, I doubt that many advocates of the kalām cosmological argument will be happy with this implication, since most of them believe both in divine omnipotence and in the life everlasting. Given the life everlasting, the future must be endless; and given divine omnipotence, it must be *possible* for God to cause it to be the case that each of an endless series of praises will be said.

Second philosophical argument: successive addition and the actual infinite

Let us turn next to Craig’s “successive addition” argument for premise 2. According to this argument, any series of (discrete) events in time must be formed by successive addition. As each event occurs, it is “added” to those that have already occurred. That goes for a *beginningless* series of events as much as for any other. However, a beginningless series would be an actual or completed infinite. Since no infinite series can be formed by successive addition, it follows that a beginningless series

of events in time has contradictory properties. It must be formed by successive addition (since it is a series of events in time), but it can't be (since it is an actual infinite). A beginningless series of events is therefore absolutely impossible.

One obvious worry about this argument concerns the claim that an actual infinite cannot be completed by successive addition. We cannot, of course, *begin* with a first event and successively add in more events until infinitely many have been added in. But in a *beginningless* series (if such were possible) there would be no *first* event. At each stage of the series, infinitely many would *already* have been added. At each stage, therefore, a different infinite series would already have been completed. Why could a beginningless series of past events not have been "formed" in this way? Craig explains:

> … [B]efore the present event could occur, the event immediately prior to it would have to occur; and before that event could occur, the event immediately prior to it would have to occur; and so on ad infinitum. So one gets driven back and back into the infinite past, making it impossible for any event to occur. Thus, if the series of past events were beginningless, the present event could not have occurred, which is absurd (2008, 122).

Well yes, before the present event occurred, the event immediately prior to it must have occurred; and before it occurred, the one immediately prior to it must have occurred. If, then, a series of events has no beginning, then before any given event in that series occurs, infinitely many previous ones must have occurred. That's all perfectly correct. But it's hard to see what the problem is supposed to be, since on the hypothesis of a beginningless past each of those infinitely many events *has* occurred. When the present arrives, *all* of its (infinitely many) predecessors *are* past.

So what does Craig mean when he says that "one gets driven back and back into the infinite past?" And why does he think this would make it "impossible for any event to occur?" I suppose one would be "driven back and back" into the beginningless past if one were (foolishly) looking for the starting point of a series that has no starting point. One would also be "driven back and back" if one were (again foolishly) trying to enumerate all the events in a series that has no first member. Neither of these projects can succeed. But so what? From the fact that we cannot – *beginning now* – complete the task of enumerating all the events in a beginningless series, it does not follow that the present event cannot arrive or that a beginningless series of events that have already arrived is impossible. To suppose otherwise would be to confuse the items to be enumerated with the enumerating of them—it would be like arguing that there must be finitely many natural numbers because we can't finish counting them.

There is admittedly one way in which the possibility of a beginningless series of past events entails the possibility of an infinite count. Instead of imagining someone who is "driven back and back" ad infinitum, we must imagine someone who has always already counted out the previous item in a beginningless series. As you might expect, Craig argues that this too is impossible.

> To say that the infinite past could have been formed by successive addition is like saying that someone has just succeeded in writing down all the negative numbers, ending at 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 shows again 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 (2008, 124).

This is much too quick for me. Given beginningless time, our man has indeed always already had *enough time* to complete his count of all the negative numbers, but it does not follow that he must have done so. It's true that we have been given no reason why he is reaching zero just now rather than at some earlier time. I'm not sure we couldn't build a reason into our story, but that is a side issue. The important point is this: from the fact that we know of no reason *why* something is so, it does not follow that it is impossible for it to *be* so.

Must whatever begins to exist have a cause?

Let us turn, finally, to premise 1. Why should we believe that everything—even the whole of physical reality—must have a cause if it begins to exist? Craig claims that this principle is "rooted in the metaphysical intuition that something cannot come into being from nothing." If things could just "pop into being uncaused out of nothing," he says, then it would be "inexplicable why just anything and everything do not come into existence uncaused from nothing" (2008, 111). By way of illustration and argument, he asks, "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?"

Assuming a negative answer to this question, Craig jumps to the conclusion that the same goes for the universe. If, "prior to the existence of the universe," he asks, "there was absolutely nothing—no God, no space, no time—how could the universe possibly have come to exist?" (113).

Quite a lot has gone wrong here. For one thing, we are invited to characterize the negation of premise 1 in a potentially misleading way. To the philosophically unsophisticated reader, it sounds rather as if Craig is equating the denial of premise 1 with the suggestion that once upon a time ("prior to the existence of the universe") there was a situation in which nothing at all (not even time) existed—and then, "out of" that black hole of nothingness, the universe "popped into existence." This is, to be sure, utter nonsense. There is no "time at which there is no time," and if there were nothing at all, there would (of course) be nothing at all—not even a "popping into existence." But such absurdities are not entailed by the simple denial of the proposition that the beginning of the universe has a cause.

In my view, then, advocates of the kalām argument would do well to avoid talking about the impossibility of something coming into existence out of sheer nothingness. It is a source of potential confusion, and it adds nothing to the case for premise 1. Charitably interpreted, the claim that something can't come from nothing just *is* the claim that nothing can come into existence uncaused.

Here is another, more substantive, worry about the way in which Craig defends premise 1. I quite agree that a tiger couldn't spring into existence uncaused. But we have been given no reason to think that what's true of a tiger applies to physical reality as a whole. Remember that we're talking about the origin of the whole natural order here.

A tiger comes into existence *within* the natural order, and within that order it is indeed impossible for *things like tigers* just to pop into existence. But as far as I can see, there is no comparable *context* for the origin of physical reality as a whole, and no analogous reason for thinking that it could not have begun to exist uncaused.

However, Craig insists that his causal principle is not "a merely physical law like the law of gravity or the laws of thermodynamics, which are valid for things within the universe." Instead, he says, it is "a metaphysical principle: being cannot come from non-being; something cannot come into existence uncaused from nothing. The principle therefore applies to all of reality, and it is thus metaphysically absurd that the universe should pop into being uncaused out of nothing" (2008, 133-14; see also 2009, 186-7).

Well, yes, that is what Craig claims. Stripped of all the vivid but confusing talk about "popping into being uncaused out of nothing," Craig is saying two things: first, that premise 1 is true; and second that it is a *metaphysically necessary* truth—true, I suppose one might say, in all possible worlds. At this point, I believe that Craig has simply lost the thread of the argument. Recall that he began by arguing that this metaphysical principle must be true on the ground that *it is required to explain* "why just anything and everything do not come into existence uncaused from nothing." In response, I have pointed out that the premise of this argument is patently false. *Within* the natural order, it is quite easy to explain where tigers come from and why they can't just pop into existence. We don't need a general metaphysical principle in order to provide the desired explanation. It is not dialectically apt merely to repeat that the metaphysical principle in question is true.

Interestingly, Craig also defends premise 1 on empirical grounds. He says that it is "constantly confirmed in our experience," and from this he concludes that even "[a]theists who are scientific naturalists … have the strongest of motivations to accept it" (2008, 111-12). This is surely a bit quick. It's true that we often discover causes, but not always. One wonders what Craig thinks *dis*confirmation of his principle would look like. But leaving this point aside, one wonders what exactly it is that a "scientific naturalist" has been given such a strong reason to accept. Is it Craig's all-embracing metaphysical principle, or is it the comparatively modest claim that *within the natural order* things don't begin to exist without (natural) causes? As far as I can see, Craig has given no reason for preferring the first of these answers.

It is also worthy of note that the empirical route is quite a dangerous one for the friends of the kalām argument to take if they want to conclude that the universe was created *out of nothing* by the will of a *timeless* and *immaterial* person a long time ago. Here are some other well-attested empirical generalizations, each of which is incompatible with that hypothesis about the origin of the universe.

(A) *Material* things come from *material* things.

(B) Nothing is ever created *out of* nothing.

(C) Nothing is ever caused by anything *that is not itself in time*.

(D) The mental lives of all persons have temporal duration.

(E) All persons are embodied.

It might of course be said that while these generalizations apply *within* the natural order, they do not apply to the natural order as a whole or to its cause. But then, of course, one

could reasonably ask why the same should not be said of the claim that *whatever begins to exist has a cause*.

It is also worth pointing out that prima facie, at least, quite a number of these generalizations have as much claim to be metaphysical truths as Craig's premise 1. One might be left with the impression that the friends of the kalām argument are picking and choosing metaphysical principles to suit the needs of the argument they want to make.[9]

Concluding remarks

This concludes what I have to say about the twin pillars of the kalām argument. I do not claim to have shown that either premise is false—merely that they are not adequately supported by the arguments I have discussed. This is, to be sure, a somewhat disappointing conclusion. But (in the spirit of Socrates) I have long thought it important to know when we don't know.

For Further Reading

William Lane Craig and James D. Sinclair, "The Kalām Cosmological Argument," in William Lane Craig and J. P. Moreland (eds.), *The Blackwell Companion to Philosophical Theology* (Chichester, West Sussex: John Wiley & Sons, 2009), 101-201.

Paul Draper, "A Critique of the Kalām Cosmological Argument," in Louis P. Pojman and Michael Rea (eds.), *Philosophy of Religion: An Anthology*, sixth edition (Boston, MA: Wadsworth, 2011), 172-77.

Wes Morriston, "Must Metaphysical Time Have a Beginning?" *Faith and Philosophy*, 20(3), 288-306.

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[9] However, Craig does provide an interesting discussion of (B) and (C) (2009, 188-9). For my take on this, see Morriston (2002), 238-241.

Yujin Nagasawa, "The Big Bang, Infinity, and the Meaning of Life," *The Existence of God* (New York: Routledge, 2011), 102-152.

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