The Universe Began to Exist? Craig's Philosophical Arguments For A Finite Past

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ABSTRACT: William Lane Craig offers two philosophical arguments for the conclusion that the universe began to exist. To be compelling, these arguments must not only be sound—we must also have reasons to believe that they are sound. I determine that these arguments do not provide such reasons to many individuals. The arguments ultimately rely on supposedly intuitively obvious absurdities. However, if one fails to see these ostensible absurdities—as many philosophers do—then for her, Craig's arguments lack all epistemic force.

The Kalām Cosmological Argument[1]

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

The Kalām cosmological argument has received considerable attention since William Lane Craig formulated its modern articulation. Interest in this argument has only increased with time, and understandably so. The Kalām has distinct advantages over other formulations of the cosmological argument. Primarily, the strength of the Kalām lies in the modesty

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1. William Lane Craig, *The Kalam Cosmological Argument* (New York: Harper & Row Publishers, 1979): 63.

of certain metaphysical principles that underlie the first premise of the argument. While traditional cosmological arguments and arguments from contingency must depend on exceedingly strong and, hence, contentious formulations of the principle of sufficient reason, a much more effacing principle is expressed in (1). Though the adoption of such a principle alleviates the amount of work necessary to defend the first premise, it shifts the evidential burden onto the second.

Accordingly, Craig offers four arguments, two scientific and two philosophical, in support of (2). In this article, I will limit my examination to the two philosophical arguments—specifically the persuasiveness of these arguments. It seems safe to assume that Craig's presentation of the Kalām is not solely for the purpose of formulating a sound argument; ideally, he wants to give reasons in support of his argument that should be, at the very least, minimally forceful to everyone who understands them.[2] Thus, it is both fair and worthwhile to evaluate whether Craig achieves this purpose. Keep in mind that an effective persuasive argument need not demonstrate the truth of its conclusion beyond all reasonable doubt, but merely show why its premises, and thus its conclusion, are more reasonable to believe than their denials. Therefore, if Craig's two philosophical arguments are to succeed, he must provide reasons that philosophically obligate all evaluators who understand the reasons to accept them as forceful to at least a minimal degree. I will argue that neither of Craig's two philosophical arguments in support of (2) meets this standard. While Craig provides reasons that should persuade some individuals, they are not of such strength that they are compelling for all reasonable individuals. In other words, certain evaluators are rationally justified in denying that Craig's arguments have any epistemic force.

I will begin by examining the argument from the impossibility of the formation of an actual infinite by successive addition. The argument is as follows:[3]

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2. If all people should find some reason R forceful, then no rational and honest person can properly understand R and proceed to reject R as having no epistemic force.
3. Craig, *Kalam*, 103.

4. The temporal series of events is a collection formed by successive addition.

5. A collection formed by successive addition cannot be an actual infinite.

6. Therefore the temporal series of events cannot be an actual infinite.

In order to understand this argument one must first comprehend the difference between potential and actual infinites. A potential infinite is a collection that increases in number indefinitely, always approaching infinity but never reaching it. This can be represented by a curve getting ever closer to an asymptote but never touching it. A potential infinite is in the process of becoming, moving higher and higher on the scale of natural numbers (1, 2, 3, …), while an actual infinite is a completed totality equal in number to the entire set of natural numbers. If one requires a simple way to differentiate the concept of a potential infinity from the concept of an actual infinity, then just remember this: a potential infinity is merely indefinite, whereas an actual infinity is truly infinite. This distinction is important because the infinities most often discussed in mathematics are only potential infinities (∞) whereas Craig's argument deals with actual infinities ($\aleph$). Note also that there is no highest natural number, for no matter what natural number (x) you may consider, it is always possible to generate a higher number (x + 1). Thus, while the set of natural numbers in its entirety is an actual infinite collection, no natural number is the immediate predecessor of actual infinity.

Bearing this distinction in mind, I will briefly outline the argument for (5). If you form a collection by adding one member after another, each addition increases the number of members in the set by a finite amount. In other words, the number of members in the set progresses higher on the scale of natural numbers with each addition. Since no natural number is

the immediate predecessor of actual infinity, a set formed in this manner can never reach the point when the number of members in the set is equal to actual infinity. Hence, a collection formed by successive addition, even one progressing indefinitely into the future, would merely be a potentially infinite set. The principle that underlies this reasoning is often called the impossibility of traversing the infinite—it is impossible to progress from a finite set to an actually infinite set through successive addition.

This principle is certainly sound, but it is important to note that it only applies to finite sets. Thus, if this principle is going to serve as a part of a valid argument in support of (5)—a collection formed by successive addition cannot be an actual infinite—then Craig must make the additional assumption that

> 7. All collections formed by successive addition are finite at some point.

This assumption seems, at the very least, contestable. It is not immediately apparent why all collections formed by successive addition must be finite at one point, and, as far as I can tell, Craig offers no explicit reason to defend this assumption. We can certainly conceive of a collection formed by successive addition that was at no point finite—consider an actual infinite collection that has always been an actual infinite and is being added to successively.

In fact, Paul Draper points out that if the universe is eternal, then the temporal series of events in time would be such a collection. Draper is worth quoting at length:

> If the temporal regress of events is infinite, then the universe has never had a finite number of past events. Rather, it has always been the case that the collection of past events is infinite. Thus, if the temporal regress of events is infinite, then the temporal se-

ries of events is not an infinite collection formed by successively adding to a finite collection. Rather, it is a collection formed by successively adding to an infinite collection. And surely it is not impossible to form an infinite collection by successively adding to an already infinite collection.[4]

This objection undermines support for (5) and consequently, the argument as a whole. Draper's objection does not show that Craig's argument is unsound, but in the absence of some independent reason for (7), it does prevent us from saying that it is more reasonable to accept the argument than to deny it.

Just because Craig does not offer a reason in support of his assumption does not mean that he cannot produce such a reason. So what might Craig say in defense of (7)? At first blush, it seems as if Craig might be tempted to respond by appealing to the word "formed." He might argue that if a set has always existed, then it cannot be formed in any relevant sense. However, this response fails. If any collection that is formed must have begun to exist, then proponents of an eternal universe would have no reason to accept (4)—the temporal series of events is a collection formed by successive addition. They would simply insist that the temporal series of events is not formed by successive addition. Events are being successively added to the temporal series, but the series itself is not formed. Anyone who did not already believe the universe to have a finite past would have no reason to accept (4), undermining the strength of the argument.

The only other response immediately apparent is to argue that it is impossible for any actually infinite set to exist at all. This, however, is Craig's next philosophical argument. If Craig does not use this line of reasoning in support of (7) and the former philosophical argument, then it seems as if we have been given no good reason why we should accept the

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4. Paul Draper, "A Critique of the Kalam Cosmological Argument," in *Philosophy of Religion: An Anthology*, ed. Louis P. Pojman and Michael Rea (Belmont, CA: Thomson Wadsworth, 2008): 47.

argument as sound. On the other hand, if Craig does appeal to the latter philosophical argument to support the former, then these arguments are no longer logically independent as Craig claims that they are.[5] In either case, it seems as if whether Craig succeeds in proving that the universe began to exist will be determined by the success of his next philosophical argument.

As mentioned previously, this argument is based upon the impossibility of an actual infinite set existing in the real world. Craig formulates it as follows:

8. An actual infinite cannot exist.
9. An infinite temporal regress of events is an actual infinite.
10. Therefore, an infinite temporal regress of events can not exist.

(8) is clearly the key premise of the argument, so I will give a concise presentation of Craig's argument in support of it. Craig defends (8) by offering a multitude of thought experiments. These thought experiments serve as *reductio ad absurdums*. They are meant to show the absurdities that would arise if an actual infinite existed in the real world. Craig sets up these scenarios, demonstrates certain logical implications, and then assumes the absurdities to be intuitively obvious.

Craig's favorite thought experiment is that of Hilbert's Hotel. In this experiment, Craig describes a hotel with an actual infinite number of rooms filled with an actual infinite number of guests. He then proceeds to demonstrate the absurdities that would arise if such a hotel were to exist. For instance, if all of the guests in the odd numbered rooms leave and all of the remaining guests move to the room number that is half of their current room number, then all of the rooms would be filled despite the fact that an

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5. William Lane Craig, *Reasonable Faith* (Wheaton, IL: Crossway Books, 2008): 120.

infinite number of guests had checked out ($\aleph - \aleph = \aleph$). To further complicate the situation, if all of the guests from rooms four upwards checked out, then only three guests would remain ($\aleph - \aleph = 3$).[6]   This, Craig argues, is absurd.

At first glance, one might question whether these absurdities, even if genuine, are germane to the impossibility of an infinite temporal regress. It could be argued that Hilbert's Hotel demonstrates the absurdity of an actual infinite set whose members *coexist* in reality, but an infinite temporal regress is an actual infinite set whose members exist *successively*. To grasp this objection, we must first understand that the Kalām presupposes an A-theory of time.[7] Craig explains that in an A-theory of time, "things/events in time are not all equally real: the future does not yet exist and the past no longer exists; only things which are present are real."[8] Consequently, even if the temporal regress of events in time were an actual infinite, at no time would an actual infinite number of events coexist. This is certainly a marked difference between the actual infinite sets involved in Hilbert's Hotel and an actual infinite set of events in time; however, it remains to be seen whether this is a relevant difference.

There are initial reasons to think that this may, in fact, be a relevant difference. Most of the absurdities generated in Hilbert's Hotel are the result of inverse operations such as subtraction and division. Craig explains, "In trans-finite arithmetic, inverse operations of subtraction and division are prohibited because they lead to contradictions; but in reality, one cannot stop people from checking out of the hotel if they so desire."[9] Notice, however, that these trans-finite, inverse operations are only applicable to actual infinites whose members coexist. If the members of an actual infinite set exist successively, then such operations are impossible, for no one can "take away" events that no longer exist. Thus, we might be tempted to

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6. Ibid., 118-119.
7. Ibid., 121.
8. Ibid., 121.
9. Ibid., 120.

think that the supposed absurdities demonstrated by Hilbert's Hotel have no bearing on the possibility of an infinite temporal regress.

This line of reasoning, however, is off base. The originator of the Kalām, al-Ghazali, developed an argument to demonstrate that an actual infinite set of events in time entails the possibility of an actual infinite set whose members coexist.[10] Imagine that every day God creates an immortal human being. If the universe has existed for an actual infinite number of days, then there would also be an actual infinite number of human beings coexisting in reality. Therefore, if it is impossible for an actual infinite set to coexist, it is also impossible for an infinite temporal regress to exist.

For the sake of clarity, however, I will introduce an additional thought experiment created by al-Ghazali that works directly with sets whose members exist successively. Imagine two planets that have been eternally orbiting the sun. The first planet requires only one year to complete a full rotation, while the second planet completes a single rotation every thousand years. If these planets have been orbiting from eternity past, then they have both completed an actual infinite number of rotations or, in other words, the same number of orbits, despite the fact that every thousand years the first planet completes one thousand times as many rotations as the second planet.[11] This, Craig claims, is obviously absurd. Many philosophers, however, simply do not agree.

In fact, a common rejoinder to such *reductios* has been to deny the absurdity of their conclusions[12] —a strategy Graham Oppy (humorously, I suppose) labels "outsmarting" one's opponent.[13] In regards to al-Ghaza-li's orbiting planet, Oppy is quite content to embrace the ostensibly absurd conclusion. The planets have indeed completed the same number of rota-

10. I am thankful to Alexander Pruss for bringing this argument to my attention.
11. Craig, *Kalam*, 98.
12. J.L. Mackie, *The Miracle of Theism* (Oxford: Clarendon Press, 1982): 93; Jordan Howard Sobel, *Logic and Theism: Arguments for and Against Beliefs in God* (Cambridge: Cambridge University Press, 2004): 186-187; Wes Morriston, "Craig on the Actual Infinite," in *Religious Studies* 38 (2002): 147-155.
13. Graham Oppy, *Philosophical Perspectives on Infinity* (Cambridge: Cambridge University Press, 2006): 48.

tions, but the set of all rotations completed by the first planet has a cardinality that is one thousand times greater than the cardinality of the set of all rotations completed by the second planet.[14]   According to Oppy, there is nothing absurd about this. Craig points out that a strategy of outsmarting one's opponent can be highly problematic since any position, no matter how obviously absurd, could be defended as long as its proponent is willing to bite the bullet.[15]   Therefore, we must determine whether the implications of al-Ghazali's orbiting planets, as well as other relevant thought experiments, are such intuitively obvious absurdities that those who deny them are either intellectually dishonest or significantly out of touch with reality.[16]

To gain a clearer understanding, let us examine exactly how these supposed absurdities are generated. The following discussion involves some basic concepts in set theory including one-to-one correspondence and proper subsets. One-to-one correspondence exists between sets A and B if and only if [iff] every member of Set A has one and only one corresponding member in Set B. Further, Set A is a proper subset of Set B iff every member of Set A is also in Set B and Set A is not identical to Set B. Craig attempts to explain the absurdities in his thought experiments by defining two principles.[17]

> i. Cantor's Principle of Correspondence. If one-to-one correspondence exists between two sets, then the number of members in each set is equal.
> ii. Euclid's Maxim. The number of members in a set is always larger than the number of members in any of its proper subsets.

14. In a very rough sense, the cardinality of a set is a measure of how large the set is. Oppy, 49-51.
15. Craig, *Reasonable Faith*, 119.
16. By 'out of touch with reality' I do not mean insane; rather, I refer to situations in which extensive isolation in the world of academia has greatly diminished the richness of one's intuitions such that he or she has lost even the most evident intuitions.
17. William Lane Craig and Quentin Smith, *Theism, Atheism, and Big Bang Cosmology* (New York: Oxford University Press, 1995): 23.

These principles certainly seem obvious, and they are constantly confirmed in our experience. We are not able, however, to endorse both of these principles at the same time when dealing with actual infinite sets. In other words, (i), (ii), and (iii) - There are actual infinite sets - form an inconsistent triad, such that endorsing all three at the same time entails a contradiction.[18]

Let us apply this analysis to al-Ghazali's planets. Examine the actual infinite sets of completed rotations for Planet 1 and Planet 2.

Planet 1: [1,   2,   3,   4,   …]
Planet 2: [1000, 2000, 3000, 4000, …]

When comparing the two actual infinite sets of completed rotations, it is clear that the members of these sets can be placed in one-to-one correspondence with each other - for every member in the first set there is one and only one corresponding member in the second set.

Planet 1: [1,   2,   3,   4,   …]
          ↕   ↕   ↕   ↕
Planet 2: [1000, 2000, 3000, 4000, …]

According to Cantor's Principle of Correspondence, these sets must be equal in number. Set 2, however, is a proper subset of Set 1, meaning that Set 1 will contain each of the members in Set 2 and many additional members. Euclid's Maxim dictates that the number of members in Set 1 is larger than the number of members in Set 2. Here we see the contradiction arise. The number of members in each set cannot be both equal and unequal. A contradiction of this nature will be generated anytime that (i), (ii), and (iii) are simultaneously endorsed. Thus, we must reject either (i) or (ii) when dealing with actual infinites.

18. Similar discussions of this triad can be found in Draper, 48, and Morriston, 154.

Craig argues that in the real world, Cantor's Principle of Correspondence and Euclid's Maxim cannot be reasonably rejected. We may be able to conceive of what it would be like to reject them in mathematical discourse, but when it comes to what is actually instantiated in reality, these principles cannot be denied. Hence, in order to avoid contradiction we must dismiss the possibility of actual infinite sets existing in our world. This is the very point on which many philosophers have challenged Craig. It is obvious and uncontested that (i) and (ii) hold for finite sets, with which we interact continuously in our lives, but why think that it is impossible that one of these principles be denied? What reason can Craig give to convince us that the Principle of Correspondence and Euclid's Maxim must hold for all sets in the real world?

Wes Morriston responds to this point by saying, "Craig's stock answer is to point once again to the intuitive 'absurdity' of infinite libraries and hotels and the like."[19] Ultimately, Craig's claim will rest on intuition. I, for one, do not find arguing in this fashion to be inherently problematic—in fact it seems that virtually all arguments will come to rest on premises we take to be intuitively obvious; however, in such cases the reach of the argument only extends as far as the intuitions supporting it. If Craig's thought experiments do not seem intuitively absurd to an individual, as seems to be the case with many philosophers, then he has not offered any independent reason for why that individual should believe the situation to be absurd. Presumably these absurdities are not so evident that one would have to be intentionally deceitful or significantly out of touch in order to lack the necessary intuitions. It seems reasonable to assume that someone familiar with the branch of trans-finite mathematics could view Craig's thought experiments as merely drawing out intriguing implications of actual infinites in the real world.

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19. Morriston, "Craig on Actual Infinite," 154.

It would seem, then, that Craig does not provide reasons in support of his argument that are minimally forceful to all rational observers. The force of his argument ultimately relies on an intuitive appeal. This in itself is innocuous, but it is problematic when it becomes clear that many individuals seem to reasonably lack the intuitions to make the appeal effective. The argument issues no epistemic obligation to those for which the "absurdities" are not intuitively evident and it appears that the number of people to which this applies is significantly higher than Craig would like.

In this article I have not tried to evaluate whether Craig's two philosophical arguments are sound; rather I have argued that, for many, Craig does not provide strong enough reasons to think that they are sound. In the end, this is not a devastating conclusion for the Kalām. I tend to agree with Michael Bergmann in thinking that disagreement between two individuals, even radical disagreement, cannot always be traced back to irrationality or the use of an impermissible philosophical move.[20] It is vain hope to think that there are always going to be reasons that should be forceful for all rational evaluators. Still, anyone who does see the absurdities as intuitively obvious is obligated to affirm Craig's argument as more reasonable to accept than to reject. As for those who do not possess such intuitions, Craig must provide some independent reason to support his claim before it will be reasonable for them to accept that the universe began to exist on the basis of these arguments. ❖

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20. Michael Bergmann, *Justification Without Awareness* (Oxford: Claredon Press, 2006): 231.