A MODIFIED PHILOSOPHICAL ARGUMENT FOR A BEGINNING OF THE UNIVERSE

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Craig's second philosophical argument for a beginning of the universe presupposes a dynamic theory of time, a limitation which makes the argument unacceptable for those who do not hold this theory. I argue that the argument can be modified thus: If time is beginning-less, then it would be the case that a person existing and counting as long as time exists would count an actual infinite by counting one element after another successively, but the consequent is metaphysically impossible, hence the antecedent is metaphysically impossible. I defend the premises and show that this argument does not presuppose the dynamic theory.

1. Introduction

Whether the universe has an ultimate beginning is a question which philosophers and scientists have wrestled with for a long time. In *The Blackwell Companion to Natural Theology,* William Lane Craig formulates his second philosophical argument for a beginning of the universe as follows:

1. A collection formed by successive addition cannot be an actual infinite.
2. The temporal series of events is a collection formed by successive addition.
3. Therefore, the temporal series of events cannot be an actual infinite.[1]

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Craig notes that such philosophical reasoning in support of the finitude of the past and the beginning of the universe is not mere armchair cosmology, observing that the eminent astrophysicist P. C. W. Davies utilizes this reasoning in explaining two profound implications of the thermodynamic properties of the universe:

> The first is that the universe will eventually die, wallowing, as it were, in its own entropy. This is known among physicists as the 'heat death' of the universe. The second is that the universe cannot have existed forever, otherwise it would have reached its equilibrium end state an infinite time ago. Conclusion: the universe did not always exist.[2]

Nevertheless, a limitation of Craig's formulation of the argument, as he himself notes, is that its second premise presupposes a dynamic (A-) theory of time, according to which the series of past events is not a tenselessly existing manifold all of whose members are equally real (as affirmed by a static [B-] theory of time), rather the members of the series come to be and pass away one after another.[3] This limitation makes the argument unacceptable for those who do not hold a dynamic theory of time. To persuade these people, one would have to first show that the dynamic theory is preferable to the static theory of time – not a straightforward task considering the vast amount of literature on static versus dynamic theory of time (it should be noted, however, that Craig has defended the dynamic theory in a number of publications).[4]

In this paper, I shall argue that the second philosophical argument can be modified so that the argument does not presuppose a dynamic theory of time.

2. The Modified Argument

The modified argument is as follows:

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1. If time is beginning-less, then it would be the case that a person existing and counting as long as time exists would count an actual infinite at a particular point in time by counting one element after another successively.
2. It is not metaphysically possible for a person existing and counting as long as time exists to count an actual infinite at a particular point in time by counting one element after another successively.
3. Therefore, it is not metaphysically possible that time is beginning-less.

The argument is a valid argument of the form

1. If A, then B.
2. Not possibly–B.
3. Therefore, not possibly–A.

Let us now look at the premises.

3. Premise 1

Premise 1 can be shown by the following illustration. Suppose a person counts a number, say '0', at a particular time, say 't_0', and that he counts -1 at t_{-1}, -2 at t_{-2}, -3 at t_{-3}, etc. The person might say (tenselessly), 'I count 0 today, -1 yesterday, -2 the day before that, -3 the day before that, etc'. If time does not have a beginning, then there would be no starting point whatever (this point is often highlighted by opponents of Craig's second philosophical argument).[5] Thus, if time does not have a beginning and that person has been existing and counting as long as time exists, he would have counted an actual infinite at a particular point in time (i.e. t_0) by counting one element after another successively ($\ldots -3, -2, -1, 0$) without beginning at some point. Hence, premise 1 is true.

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It might be objected that this premise assumes that 'as long as time exists' is a period of time the counting of whose moments can be completed, but this assumption cannot be the case if that period is actual infinite; additionally, it might be objected that the notion of counting, with its assumption of beginning and ending, goes out the window if we are dealing with infinites.[6] I would reply by pointing out that these objections do not take away the force of the above illustration: It *is* evidently metaphysically possible that I count 0 today, −1 yesterday, −2 the day before that, −3 the day before that, etc., and that this could be extended backwards to infinity *if* the past were infinite (any problem with the notion of counting from infinity would be due to the fact that an infinite past is impossible, as will be shown below). This shows that the counting of the moments of a period of time *would* be completed and *would* end at a point *if* the past were infinite, and that the notion of counting used in the illustration does not assume a beginning. In what follows, I shall argue that, without begging the question (either way) by presupposing that an actual infinite period of time can (or cannot) exists, the reason one might have for thinking that the completion of the counting of the moments of a period of time 'cannot be the case if that period is actual infinite' only goes to show that an actual infinite period of time cannot exist (and therefore the universe must have a beginning).

4. Premise 2 In The Case Of Beginning At Some Point

Let us first consider premise 2 in the case of beginning at some point and counting one element after another successively. If someone (say, George) begins with 0 at t_0 and counting 1, 2, 3, 4…at t_1, t_2, t_3, t_4,…, would he count an actual infinite at any point in time? Note that the question here is asking for an actual infinite rather than a potential infinite: an actual infinite is conceived as a determinate whole actually possessing an infinite number of members,

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while a potential infinite never actually attains infinity, although it increases perpetually.[7] The answer to the question is 'No', for no matter what number George counts to, there is still more elements of an actual infinite set to be counted: if George counts 100,000 at $t_{100,000}$, he can still count one more (100,001); if he counts 100,000,000 at $t_{100,000,000}$, he can still count one more (100,000,001).

It should be noted that the argument above has two crucial dys-analogies with Zeno's paradoxes of motion: To count an actual infinite by counting one element after another successively, the elements would have to be *actual*, and the number of elements would have to sum up to an actual infinite. By contrast, in the case of Zeno's paradoxes, Craig points out that the intervals traversed are *potential* ('The claim that Achilles must pass through an infinite number of halfway points in order to cross the stadium already assumes that the whole interval is a composition of an infinite number of points, whereas Zeno's opponents, like Aristotle, take the line as a whole to be conceptually prior to any divisions which we might make in it'), and they sum to a merely finite distance.[8]

It has been argued by Fred Dretske that if someone (e.g. George) does not stop counting, then he or she does count to infinity; George will count to infinity 'in the sense that he will count each and every one of the finite numbers – an infinite class', such that 'all the numbers which George will count can be mapped, one-to-one, on every second (third, tenth) number which he will count'.[9] Graham Oppy, agreeing with Dretske, likewise argues that 'one counts to infinity just in case, for each finite number N, one counts past N. But unless one stops counting, one will eventually reach any given finite N'.[10]

However, Dretske's and Oppy's argument would not work against the argument I am offering here. On the one hand, to actually count all the elements one would need an actual infinite duration of time such that George would not stop counting. But to presuppose that there is actual infinite duration is to beg the question against those who would deny

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that an actual infinite duration could exist. Craig points out that one who, having begun, never stops counting counts 'to infinity' only in the sense that one counts potentially infinitely, and he observes that 'Oppy fails so much as to mention, much less take account, of the difference between an actual and a potential infinite in this case'[11] (it should be noted that on a static theory of time the future cannot be a potential infinite; it would be either actually infinite or finite). On the other hand, I am not stating 'counting an actual infinite' in the sense that George will count each and every one of the finite numbers, but rather in the sense that 'at a particular point in time which George counts there are no more elements of an actual infinite set to be counted'. *If* George could count all the numbers (the possibility of this is disputed, as noted above), then numbers he counts can of course be mapped, one-to-one, on every second (third, tenth) number which he counts. However, the question here is whether George can be at any point in time and counts all the numbers by that point, and the answer seems no: there is no point in time where he can complete the counting of an actual infinite number of elements by counting one element after another. Even if it is the case that George counts as long as time exists, actual infinity will always be greater than the numbers to which George counts at a point in time.

Why is it impossible to count an actual infinite at any point in time? The following two reasons have been suggested: (a) one cannot reach the end of that which has no end, such as by beginning from a point, and (b) one will never get over the hurdle of going from having counted a finite set to having counted an infinite set.[12] Each of these reasons seems valid, and sufficient in itself for entailing the impossibility. With respect to (a), there is no 'actual infinite point in time' (say, $t_{\aleph}$) at which one reaches the end of an actual infinite duration, nor is there a 'last number' which ends the series 1, 2, 3, 4…Hence, there is no point in time at which one could count an actual infinite. With respect to (b), it is true that counting finite sets would not result in

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counting an infinite set, and hence no point in time at which one could count an actual infinite. Nevertheless, in addition to (a) and (b), another reason can be given:

> (c) An actual infinite has greater number of elements than what could be counted by the process of counting one element after another.

One might insist that the reasons why it is impossible to count an actual infinite at any point in time are due to (a) and (b), and not (c). However, it cannot be denied that an actual infinite is always greater than the number which George can count by counting one element after another. This is not due to (a) or (b), rather, it is due to (i) the nature of the number of elements of an actual infinite set, which is an essential property of such a set, and (ii) the process of counting one element after another. Additionally, having greater number of elements than what could be counted at any point in time in itself would entail that there is no point in time where one can complete the counting. Hence, like (a) and (b), (c) is also a valid reason, and sufficient in itself for entailing the impossibility. Since (c) would itself be sufficient for entailing impossibility, in a situation where (a) and (b) no longer applies, it would still be impossible to count an actual infinite at any point in time if (c) applies.

The following points should be noted:

1. The reasons for the impossibility of counting an actual infinite is due to the nature of number and the process of counting one element after another rather than the violation of laws of logic, hence this is a case of metaphysical rather than logical impossibility. The notion of impossibility here is stronger than scientific impossibility, for while scientific laws may vary from one possible world to another, the nature of number and the process of counting one element after another that

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renders it impossible to count an actual infinite does not vary. Hence, the conclusion of the argument offered here is true in all possible worlds, just as 'red is a color' is true in all possible worlds. Since such conclusions are true in all possible worlds, they cannot be overturned by future scientific discoveries.

2. (c) is true whether time is dynamic or static. Even if static time were true, it would still be true that no matter what number George counts, there are still more elements of an actual infinite set to be counted. Since (c) is a sufficient reason for why it is not possible to count an actual infinite at any point in time, and since (c) is true whether time is dynamic or static, the conclusion that it is metaphysically impossible to begin at some point and count an actual infinite by counting one element after another successively is true regardless of whether the dynamic theory of time is true.

5. Premise 2 In The Case Of Not Beginning At Some Point

But can someone not begin at some point and count an actual infinite by counting down from infinity one element after another successively?

For the following two reasons, I think it is impossible.

First, an actual infinite has too many elements to be counted one after another, and this is true whether one is counting to or counting down from infinity. It is clearly correct that counting to infinity (0, 1, 2, 3,...) involves counting the same number of elements as does counting down *from* infinity (...−3, −2, −1, 0).

Against a similar argument used by J.P. Moreland, who argues that counting to infinity (0, 1, 2, 3,...) involves the same number of steps as does counting down from infinity

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and therefore counting down from infinity is impossible, Felipe Leon claims that sameness in number of steps does not entail sameness in difficulty of traversal. Leon points to several asymmetries in the direction of traversal that seem to be relevant to the difficulty or ease of traversal in the case of a beginningless time: (i) Going forward, there is an endpoint to reach; not so going backward. (ii) Going forward, you don't have to begin at some point; not so going backward. (iii) Going forward, some infinite traversal or other is completed at each point (for before every point in a beginningless time, some infinite set of events or other has already been traversed – one is always on the other side of 'the hurdle of going from having counted a finite set to having counted an infinite set'); not so going backward. Leon argues that these asymmetries are relevant, because one might believe that no infinite temporal distance is crossable on the grounds that (a) one cannot reach the end of that which has no end, such as by beginning from a point, and/or (b) one will never get over the hurdle of going from having counted a finite set to having counted an infinite set. In view of asymmetries (i) (ii) and (iii), these grounds do not exist in the case of counting down from infinity.[13]

However, in the context of my present argument, I pointed out another reason, in addition to (a) or (b), for thinking that it is metaphysically impossible to count an actual infinite, namely (c) An actual infinite has a greater number of elements than what could be counted by the process of counting one element after another.

One might attempt to deny (c) by replying that, if time is beginning-less and George exists and counts as long as time exists, then it would not be the case that an actual infinite has a greater number of elements than what could be counted by the process of counting one element after another, for in this case George would count an actual infinite by counting one element after another successively. However, this argument would not work. On the one hand, one must be careful not to presuppose that time can (or

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cannot) be beginningless, for to do that would be to beg the question in the dialectic. In other words, one must not assume that George could (or could not) count an actual infinite by counting from infinite past. On the other hand, we have an independent reason (independent in the sense that it does not presuppose whether George could or could not count an actual infinite by counting from infinite past) for thinking that George could not do so. As noted previously in Section 4, (c) is due to the nature of the number of elements and the process of counting one element after another, and it is true in all possible worlds just as 'red is a color' is true in all possible worlds. Without presupposing whether George counts from an infinite past or not, and focusing on the process of counting one element after another itself, it is evident that this process can never account for all the elements of an actual infinite, just as a person counting one book after another can never account for all the books of an infinite library with an actual infinite number of books. Having counted a book, one could count another, and having counted those, one could count yet another, etc.

Since (c) refers to the number of elements, sameness in number of elements between counting to infinity and counting down from infinity would be relevant, and it would entail sameness in difficulty of traversal. To deny this conclusion, Leon would have to show that (c) is not a valid or sufficient reason for thinking that no infinite temporal distance is crossable. But, as argued previously in Section IV, (c) is a valid and sufficient reason for thinking that no infinite temporal distance is crossable.

Second, going back to the scenario where the person might say (tenselessly) 'I count 0 today, −1 yesterday, −2 the day before that, −3 the day before that, etc'. *If* time does not have a beginning, the person should ask 'But if it were the case that I count down from infinity, why is it that I count '0' today? Why not yesterday or the day earlier or the year earlier? At those earlier moments there would be an actual infinite amount of time before, and so '0' must be

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counted earlier (in view of this reason, to respond by saying that it is just a 'brute feature' why the person is counting 0 today rather than at earlier moments is inadequate).[14] Thus, if the past is infinite, I cannot be counting 0 today. But I am counting 0 today, additionally, it is clearly possible that I count −1 yesterday, −2 the day before that, −3 the day before that, etc, and that this could be extended backwards to infinity *if* the past were infinite. Therefore it cannot be the case that the past is infinite.

The above scenario is adapted from one which Craig discusses in *The Blackwell Companion*.[15] Here, it is restated in tenseless terms. In response to the criticisms of Conway and Sorabji, Craig points out that the truth of the conditional 'If the man would have finished his countdown by today, then he would have finished it by yesterday' seems plausible in light of Hume's Principle, which states that two sets are said to be have the same number of members if the members of one set can be related to the members of the other set in a one-to-one correspondence.[16] As Craig explains:

> Since the negative numbers can be put into a one-to-one correspondence with the series of, say, past hours, someone counting from eternity would have completed his countdown. But by the same token, the man at any point in the past should have already completed his countdown, since by then a one-to-one correspondence exists between each negative number and a past hour. In this case, having infinite time does seem to be a sufficient condition of finishing the job. Having had infinite time, the man should have already completed his task.[17]

Here, one should note (which Craig did not) that Hume's principle remains valid even if time is static, and hence the argument against an infinite past would remain valid even if time is static.

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In view of the above two reasons, it is metaphysically impossible to count an actual infinite by counting one element after another successively. It should be noted that the above two reasons are not dependent on a dynamic theory of time. Hence, regardless of whether the dynamic theory of time is true, the conclusion (i.e. premise 2) that it is metaphysically impossible to count an actual infinite by counting one element after another successively (with or without beginning at some point) is true.

6. Conclusion

Given the truth of premises 1 and 2, the conclusion 'Therefore, it is not metaphysically possible that time is beginning-less' follows. Since the truth of premises 1 and 2 are not dependent on a dynamic theory of time, the conclusion is also not dependent on a dynamic theory of time. Unlike Craig's formulation of the argument, the modified argument in this paper does not depend on the temporal series of events being a collection formed by successive addition which, as Craig explains, presupposes a dynamic theory of time. Thus, an unsatisfactory aspect of Craig's argument, viz. its dependence on a dynamic theory of time, has been removed. The conclusion of the argument here is true in all possible worlds and therefore cannot be overturned by future scientific discoveries, as explained above. It can therefore be concluded that, regardless of which theory of time is true and regardless of what science might discover in the future, the universe must have an ultimate beginning.

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Notes

[1] William Lane Craig and James Sinclair, 'The Kalam Cosmological Argument', in William Lane Craig and J. P. Moreland (eds), *The Blackwell Companion to Natural Theology* (Chichester, UK; Malden, MA, Wiley-Blackwell, 2009), 117.

[2] P. C. W. Davies, *God and the New Physics* (New York: Simon & Schuster, 1983), 11.

[3] Craig and Sinclair, 'The Kalam Cosmological Argument', 124.

[4] See, for example, William Lane Craig, *The Tensed Theory of Time: A Critical Examination* Synthese Library 293 (Dordrecht, the Netherlands: Kluwer Academic Publishers, 2000); ibid, *The Tenseless Theory of Time: A Critical Examination* Synthese Library 294 (Dordrecht, the Netherlands: Kluwer Academic Publishers, 2000).

[5] See, for example, Jordan Sobel, *Logic and Theism: Arguments for and against Beliefs in God* (Cambridge: Cambridge University Press, 2004),182.

[6] I thank a previous reviewer of this article for suggesting this objection.

[7] Craig and Sinclair, 'The Kalam Cosmological Argument', 103–105.

[8] Craig and Sinclair, 'The Kalam Cosmological Argument', 119.

[9] Fred Dretske, 'Counting to infinity', *Analysis* 25 (1965), 99–101.

[10] Graham Oppy, *Philosophical Perspectives on Infinity* (New York: Cambridge University Press, 2006), 61.

[11] Craig and Sinclair, 'The Kalam Cosmological Argument', 118n.16.

[12] Felipe Leon, 'Moreland on the Impossibility of Traversing the Infinite: A Critique', *Philo* 14 (2011), 32–42.

[13] Felipe Leon, 'Moreland on the Impossibility of Traversing the Infinite: A Critique', *Philo* 14 (2011), 32–42.

[14] Cf. Oppy, *Philosophical Perspectives on Infinity*, 59, 63; and Oppy's *Arguing about Gods* (Cambridge: Cambridge University Press, 2006), 141–2.

[15] Craig and Sinclair, 'The Kalam Cosmological Argument', 121–2.

[16] Ibid, 104.

[17] Craig and Sinclair, 'The Kalam Cosmological Argument', 121–2.

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