

ON FINITISM AND THE BEGINNING OF THE UNIVERSE: A REPLY TO STEPHEN  
PURYEAR

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Stephen Puryear argues that William Lane Craig's view that time as duration is logically prior to the potentially infinite divisions we make of it involves the idea that time is prior to any parts we conceive within it (Priority of the Whole with respect to Time: PWT). He objects that PWT entails the Priority of the Whole with respect to Events (PWE), and that it subverts the argument, used by proponents of the Kalam Cosmological Argument (KCA) such as Craig, against an eternal past based on the impossibility of traversing an actual infinite sequence of events. I argue that proponents of KCA can affirm that time is not discrete, nor is time continuous with actual infinite number of parts or points, rather time is a continuum with various parts but without an actual infinite number of parts or points. I defend this view and reply to Puryear's other objections.

Keywords: space, time, continuity, infinity, events, Kalam Cosmological Argument

### **1. Introduction**

In his article 'Finitism and the beginning of the universe', Stephen Puryear [2014] notes that proponents of the Kalam Cosmological Argument (KCA) such as William Lane Craig have argued that the past must be finite in duration because otherwise reaching the present moment would have involved something impossible, namely, the 'traversing' of an actual infinite sequence of events. He also observes that some other philosophers have replied by claiming that actual infinite sequences are 'traversed' all the time in nature, for example, whenever an object moves from one location in space to another. Puryear thinks that proponents of KCA have to either (i) claim that actual infinities are not traversed in nature because space, time, and other continuous wholes divide into parts only in so far as we divide them in thought and thus divide into only a finite number of parts, or (ii) claim that space,

time, and change (events) are discrete. Puryear remarks that the second claim is widely rejected by philosophers and physicists. His article focuses on the first claim, and he argues that it subverts the very argument against an eternal past that it was intended to save.

Puryear's article is systematic and detailed. However it has a number of deficiencies, the most important of which is that he has failed to consider the view that time is a continuum with various parts but without an actual infinite number of parts or points. I shall explicate and defend this view below.

## **2. Time as a continuum**

Puryear thinks that Craig's view that time as duration is logically prior to the potentially infinite divisions we make of it [Craig and Sinclair 2009: 112–13] involves the idea that time is prior to any parts we conceive within it (Priority of the Whole with respect to Time: PWT). He argues that PWT entails the Priority of the Whole with respect to Events (PWE), and that it subverts the argument against an eternal past, which he formulates as follows:

- (1) If the universe did not have a beginning, then the past would consist in an infinite temporal sequence of events.
- (2) An infinite temporal sequence of past events would be actually and not merely potentially infinite.
- (3) It is impossible for a sequence formed by successive addition to be actually infinite.
- (4) The temporal sequence of past events was formed by successive addition.
- (5) Therefore, the universe had a beginning.

Let us consider Puryear's claim that PWE impugns premises (1) and (2). This claim is based on his argument that Craig's view entails that the history of the universe up to the present is in itself just one long event which we divide in thought. Puryear writes

For if events do not divide into parts except in so far as we divide them in thought, then we must admit that just as time is in itself merely one long interval, the history of the universe up to the present is in itself just one long event. [Puryear 2014: 627]

However, proponents of KCA can deny this. They can agree that there are distinct events such as a certain raising of my right arm within a distinct period of time. They can affirm that there are distinct periods that exist apart from our conceptual activity, but deny that there is an actual infinite of them that exist apart from our conceptual activity. They can affirm that time is not discrete, nor is time continuous with actual infinite number of parts or points,<sup>1</sup> rather time is a continuum with various parts but without an actual infinite number of parts or points.

The view that time is a continuum which ‘exists primarily as a whole rather than as a collection of ordered points’ is held by Craig ([2000: 229]; attributing this insight to Charles Peirce). Aristotle likewise held that time is a continuum which is not reducible to anything else (*Physics*, chapter 11), and that time is not discrete because the temporal parts ‘join together at some common boundary...For present time joins on to both past time and future time’ (Aristotle, *Categories*, VI). It should be noted that Craig does not think of the ‘present time’ as an extensionless point but as a duration. The extent of the duration is not a minimal discrete physical unit (chronon), but depends upon the extent of the entity described as present. He writes

There is no such thing as ‘the present’ simpliciter: it is always ‘the present \_\_\_\_,’ where the blank is usually filled by a reference to some thing or event. The duration of the present will be as long or as short as the event or thing under discussion [Craig 2000, 245].

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<sup>1</sup> Craig and Sinclair [2012, 100] explain that it has not been proven that space and time really are composed of an actual infinity of points rather than simply modelled as such in general relativity.

Following Henri Bergson and Arthur Prior, Craig thinks that ‘real duration is not composed of instants or time atoms but is ontologically prior to our mathematization of it. All metrical concepts of time are secondary constructions’ [ibid, 245]. The ontological priority of a smooth duration to the mathematization of it in terms of real numbers is analogous to the idea of a line which can be understood as something prior to any set of points on it [Moore 2001: 157–8].

Proponents of KCA can argue that an actual infinite number of parts or points can be made on the continuum only in abstraction, and these do not exist apart from our conceptual activity. There are only a finite number of parts that do exist apart from our conceptual activity, and these can always be divided into two sub-parts only as a result of our conceptual activity. To object that time is continuous if and only if there is a third instant of time between any two instants of time would be to presuppose that time is fundamentally composed of instants, which is what proponents of KCA can deny.

Puryear seems to think that the view that there are only a finite number of parts reduces to the view that time is discrete [Puryear 2014: 626–627], but this is false. The difference between the view that time is a continuum with only a finite number of parts, and the view that time is discrete, is that on the former view time is fundamentally continuous whereas on the latter view time is fundamentally discontinuous, in which ‘change itself would go in little jumps, that is, it would proceed from one state to the next without occupying any intermediate state, for there would be no intermediate state. Motion, for example, would be like a series of successive stills in a movie film’ [Le Poidevin 2003: 120]. On the contrary, on the view in which time is a continuum, there are no such ‘jumps’.

Further conceptualisation of this picture of ‘time as a continuum that (a) is not fundamentally composed of instants and (b) can be divided into finite parts (in nature) but, thus divided, is nevertheless continuous and not discrete’ would depend on whether one

accepts a relational or a substantial theory of time, and whether one accepts a dynamic (A-) or a static (B-) theory of time.

For his defence of KCA Craig utilizes a relational view,<sup>2</sup> and this is the view I hold as well: on this view, time can be understood as an ordered series of changes in an earlier than/after than relation.<sup>3</sup>

Craig prefers a dynamic theory of time, and he thinks that ‘the impossibility of traversing an actual infinite’ argument against an eternal past requires it; however, it has been argued recently that this argument can be reformulated such that it will work on a static theory as well [Loke 2014].

According to the dynamic theory, the members of a series of events come to be and pass away one after another. By contrast, according to the static theory the members of a series of events do not come to be and pass away one after another; rather, the series of events is a tenselessly existing manifold all of whose members (including future events) are equally real. An event is understood here as a change, which involves a thing gaining or losing one or more properties [Hedrick 2014: 33]. On the dynamic theory, the gaining/losing of properties involves a coming to be/passing away of properties of things. On the static theory, the gaining/losing of properties does not involve a coming to be/passing away of properties, rather it involves things having different temporal parts at different times (perdurantism).

According to my view, if one accepts the dynamic theory, time can be conceptualised as a continuing smooth (non-jumpy) process of the coming to be/passing away of properties of things, a process that is not fundamentally composed of instants or chronons but of durations in which properties come to be/pass away. The process is not discrete because there is no gap between the durations, which are joined together, and because the coming to be/passing away of properties occurs smoothly and continuously. If one accepts a static

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<sup>2</sup> <http://www.reasonablefaith.org/gods-creation-of-time>.

<sup>3</sup> Whereas on a substantial view time is a substance which can exist even when there is no change.

theory, time can be understood as composed of parts which are fundamentally durations rather than instants, and time is continuous (rather than discrete) in the sense that the different temporal parts are joined together and that changes take place within the durations smoothly.

Thus, on my view time is not discrete on either the dynamic or static theory, because the ends of the finite temporal parts are joined together and that changes (e.g. a moving entity coming to rest) take place smoothly. There are various ways in which the joining of parts at boundaries can be conceived [Varzi 2013]. To illustrate one possible way of joining temporal parts, consider Aristotle's view that things neither move nor rest *at* a point, but they move or rest only *during* an interval (*Physics* 232a32–34). The extensionless 'point of transition' which we conceptualise between 'moving interval' and 'resting interval' can be understood as the coincidence of the boundaries of the two intervals at which they join together, and as Aristotle explained there is neither motion nor rest at (this) point.

Concerning Craig's argument that a beginningless universe would entail the traversing of an actual infinite, Puryear notes that Craig might argue that the past could be divided into sub- events simply by specifying a way of dividing it into events of a certain duration (e.g. lasting one second each), which would entail the past having an actually infinite sequence of such events if the universe had no beginning. Puryear thinks that such a reply will not work. The reason is as follows: Puryear notes that Morrision has argued that one could come up with a specification relative to which the number of coexistent sub-regions of a given region of space  $R$  is actual infinite, e.g. 'starting with  $R$ , divide the results of the previous division by half ad infinitum', and that we do not need to complete the series of divisions in order to know that, relative to this rule, there is an actual – and not merely a potential – infinity of sub-regions [Morrision 2002: 162]. Puryear thinks that Morrision has shown that the fact that we can specify a rule for dividing a continuous magnitude such as a region of space into parts ad infinitum makes it the case that such magnitudes have or at least can have an actual

infinity of parts. Puryear argues that proponents of KCA has to reply to Morrision that the divisions within a continuum are there only in so far as we actually conceive them, and not just in so far as we specify a procedure for conceiving them, but this move would prevent proponents of KCA from using a similar strategy to specify an infinity of divisions for a beginningless universe [Puryear 2014: 624, 628].

In reply, I think that proponents of KCA can reply to Morrision as follows: They can argue that their arguments are directed only against an actual infinite number of concrete entities such as an actual infinite temporal regress of events; they are not directed against an actual infinite number of abstract entities. Distinguishing between abstract infinities and concrete infinities is of importance; concrete entities have causal powers and can be part of a chain of causes and effects, while abstract infinities do not have causal powers and therefore cannot account for the origin of things such as our universe. They can then reply to Morrision's Rule by arguing that an actual infinity of sub-regions exist only as an abstraction which we conceive relative to this Rule, but an actual infinity of sub-regions do not exist concretely in space itself; rather the series of divisions that is actually completed as well as the number of sub-regions that result in the concrete world is always finite. There is no requirement that an actual infinite series of divisions has to be completed, and it has been argued above that we can conceive time as a continuum without an actual infinite number of parts or points. On the other hand, if there is an actual infinite past, then this would require the traversing of an actual infinite in the concrete world, as illustrated, for example, in the case of a person who has been existing and counting one element after another successively as long as time exists: if there is an actual infinite past, he would be required to have counted an actual infinite in the concrete world, which, as proponents of KCA would argue, is impossible [Loke 2014].

There is another possible response to Puryear which proponents of KCA might consider, namely to argue for the possibility of space, time, and change being discrete (for a recent attempt see Van Bendegem [2011]). The main contribution of my paper lies in developing and defending the alternative view of time as a continuum.<sup>4</sup>

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