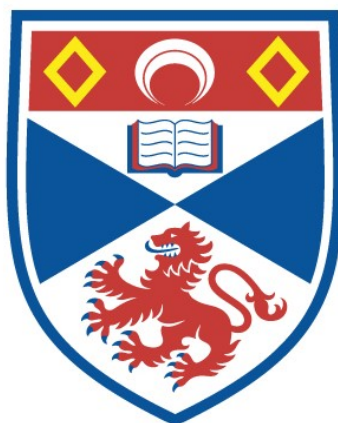# RUNNING OUT OF TIME : THE TEMPORAL CASE AGAINST THE KALAM

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Running Out of Time: The Temporal Case Against the Kalam

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Abstract: In this dissertation, I argue that if the kalam cosmological argument works, then it must work on either the A-theory of time or the B-theory of time. I offer several arguments for thinking that the kalam does not work on either the A-theory of time or the B-theory of time. The two main versions of the A-theory, presentism and the growing block theory, are considered. Even though I argue that the growing block theorist has the greatest chance of making the kalam work, I nonetheless argue that their attempts fail for various reasons. In the end, the kalam is left unsupported by any major theory of time and is therefore vitiated.

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Introduction:

The Kalam Cosmological Argument (hereafter kalam) has recently enjoyed considerable scholarly attention, mainly due to William Lane Craig's hand in its revitalization. Pithy and concise, the argument holds that (i) whatever begins to exist has a cause, (ii) the universe began to exist, (iii), therefore, the universe has a cause (Craig, 2008, p.111). Commenting on the newfound interest in this argument, Quentin Smith (2007) notes that "a count of the articles in the philosophy journals shows that more articles have been published about Craig's defense of the kalam argument than have been published about any other philosopher's contemporary formulation of an argument for God's existence" (p.183).

This dissertation seeks to reinvigorate the decades-old debate surrounding the kalam. Arguments against the kalam often couch themselves in views about actualizable infinities, supertasks, and metaphysical possibility. The issue is that more elegant and thorough responses to the kalam are available. This dissertation looks at one such response. Namely, in this dissertation, I argue that neither the A nor the B theory of time can support the Kalam. Left without any plausible theory of time to undergird its premises, the kalam is left in tatters.

This dissertation consists of two parts. Part one argues that the kalam cannot work on the B-theory of time, while part two argues that the kalam cannot work on the A-theory of time. I have divided each part into chapters exploring specific topics in more detail. In the following part, I will argue that the kalam cannot work on a B-Theory of Time.

Part One

I.Chapter One: The Kalam Cosmological Argument

Despite the kalam's widespread influence, one point of contention has been the dependence of the kalam on the A-theory of time. Although Craig openly predicates his argument on the A-theory of time, he leaves unaddressed the question of the translatability of his argument into the B-theory of time. To resolve this issue, certain thinkers, such as Curtis Metcalfe (2013), have argued that one can reformulate the kalam successfully in terms of the B-theory of time.

While these attempts are initially plausible, part one of this dissertation will argue that some of the reasoning that thinkers such as Craig adduce in favor of the claim that the universe must have a beginning would, under B-theory, likewise entail that the future must end or, if it does not, that the future is actually infinite, which would defeat the main philosophical underpinnings of premise two of the B-theoretic kalam (Morriston, 2003). Therefore, in either case, philosophical arguments against the possibility of an actual infinite do not establish the second premise of the B-theoretic kalam, which is the key premise of the argument.

I will make this argument in three chapters. Chapter one, which includes §1, will provide a comprehensive overview of the kalam as Craig presents it in his written work. We will entertain defenses of premise one—that whatever begins to exist has a cause—and premise two—that the universe began to exist— as well as standard philosophical and scientific arguments that have been leveled against each premise. Additionally, we will see that philosophical arguments in defense of premise two prove more promising than those couched in cosmology.

Chapter two, which will include sections §2 and §3, will relate the kalam to two distinct theories of time: the A-theory and the B-theory. In §2, I will show the relation between the kalam

to the A-theory of time. In §3, I will explore how the kalam can be formulated in terms of the B-theory of time according to Metcalfe (2013).

Chapter three, including the remaining sections, will detail my argument against B-theoretic versions of the kalam. In §4, I will present an objection to the kalam that draws inspiration from Cohen (2015), Oppy (2006a), Malpass (2021), and Malpass and Morriston (2020). In essence, this objection will maintain that an endless future proves problematic for kalam supporters who reject the possibility of an actual infinite instantiating itself in the real world. In §5, I will argue that an A-theorist can potentially free himself from the throes of this objection without difficulty. In §6, I will argue, as has gone unremarked, that the A-theorists' viable rebuttals of their critics are not available to the B-theorists who seek to defend a tenseless version of the kalam.

In particular, I will argue that those who defend the B-theoretic kalam must either sacrifice their belief in eternal life, the B-theory, or the viability of their philosophical arguments supporting the second premise of the kalam. In this way, while critics of the kalam such as Malpass and Morriston have hitherto employed this endless future objection in connection to Craig, and so implicitly in the context of the A-theory, I will argue that it serves as a more powerful objection against the B-theoretic kalam.

Ultimately, part one of this dissertation will demonstrate that typical philosophical reasons for supposing that the universe began to exist problematically entail, on a B-theoretic framework, either a finite future or a future that is actually infinite. Considering both cases, it is clear that a finite future will clash with an eternal afterlife, while an actually infinite future, at least in the B-theory, will subvert a critical defense of the second premise of the kalam: that actual infinities cannot exist in reality.

Since scientific findings will prove inconclusive in establishing premise two, the B-theorist may not seek refuge in cosmology to rescue their argument. Because philosophical and scientific arguments fail to support the B-theoretic kalam, the prospects for a successful B-theoretic version of the kalam are, as this essay will show, bleak. This essay will establish that, in practice, one may see the kalam as relying instead on the A-theory since the argument succumbs to an insuperable objection when formulated B-theoretically.

§1 The Kalam Cosmological Argument

Of the many arguments for God's existence, the kalam is notable for its simplicity and initial plausibility (Bobier, 2013). Craig, the most ardent kalam advocate, tends to formulate the argument as follows.

1.) Whatever begins to exist has a cause.

2.) The universe began to exist.

3.) Therefore, the universe has a cause. (Craig, 2008, p.111)

The logic used in this argument is valid, so any questions concerning its strength center on the truth of the premises.[1] To defend each of these premises, Craig presents a series of arguments we will explore. We will spend most of this essay exploring two philosophical arguments used to defend premise two. The first is an argument against the instantiation of an actual infinite in the real world. The second is an argument against the possibility of forming an actual infinite through successive addition. With that said, we shall now explore the kalam's first premise.

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[1] At this point, some might rightfully say that Craig predicates his argument on the assumption that time is not infinitely divisible, which runs counter to the commonplace notion that space-time should be modeled pursuant to a mathematical continuum. Also, for the sake of argument, we will side step this worry for now to see how Craig's arguments fail in other, time-related ways.

§1.1 Premise One

The premise that "whatever begins to exist has a cause," also known as the causal premise, is commonsensical enough for Craig not to require a thorough defense (Craig, 2000a, p.141). Nonetheless, Craig (2011) offers three reasons for supposing that his first premise is true:

(1) Something cannot begin to exist uncaused.

(2) If something can come from nothing, then it is inexplicable why anything and everything does not come from nothing.

(3) Everyday experience and scientific evidence confirm the truth of premise one. (p.326)

Although our discussion of premise one will be comparatively brief, it is still worth exploring each point.

First, Craig argues that for something to come from nothing is worse than magic. Defined simply as 'not anything', nothing seems incapable of producing anything because it lacks any properties, let alone causal powers. As Jacobus Erasmus (2018) writes: "It seems, therefore, metaphysically absurd that something could come into existence uncaused out of absolutely nothing" (p. 82). In this sense, the notion that being cannot come from non-being is a metaphysical first principle for Craig. Echoing this sentiment are voices, it appears, from either side of this debate. The skeptic David Hume, for instance, once wrote in a message to John Stewart that:

I never asserted so absurd a Proposition as *that anything might arise without a*

Cause: I only maintain'd, that our Certainty of the Falshood of that Proposition

proceeded neither from Intuition nor Demonstration; but from another Source.

(Hume, 1754, as cited in Grieg, 1932, p. 187).

Kai Nielsen, another skeptic, emphasizes this point further when he imagines

overhearing a loud bang. In setting up his case, Nielsen (1971) writes: "Suppose you suddenly

hear a loud bang…and you ask me, 'What made that bang?' and I reply, 'Nothing, it just

happened.' You would not accept that. In fact, you would find my reply quite unintelligible" (pp.

47-48). Agreeing with Nielsen, Craig finds it unintelligible how being could come from non-being

or that something can come from nothing.

In the case of the universe, before the big bang, there was not even a potential for the

creation of the universe. However, if there was no potential for the universe to come into being

since nothingness has no potentialities, then how, Craig asks, could the universe have become

actual? In Craig's eyes, if he aligns himself with modern big bang cosmology, the atheist who

denies premise one is in a bit of a bind. As Smith (1993) does, they must argue that since the

universe has no potentialities, the universe came "from nothing, by nothing, and for nothing"

(p.135). However, this seems metaphysically absurd since nothingness has no causal powers

and is thus ill-equipped to produce anything, let alone a universe. As David Oderberg (2018)

writes:

[...] when the denier of the causal principle says that it is possible for something

to come *from* nothing what are we to understand by "from?" Again it cannot have

a causal sense because something is supposed to have come into existence

uncaused. All that appears to be left is a timeless contradiction — the existence

of nothing and the existence of something. (p. 236)

Hence, because existence springing from non-existence is, for Craig, so metaphysically

absurd, Craig concludes that (1) provides good reason for assenting to the causal premise.

Second, borrowing from A.N. Prior (1968), Craig argues that once one is committed to

believing that something can come from nothing, there appears to exist little reason to suppose

that other things such as universities or wineries do not pop into existence uncaused. Nothing

about nothingness could prefer creating universes over, say, new factories, since "nothing" has

no properties. Since nothingness is simply an absence of anything and hence has no properties,

it is unfathomable why nothingness would have an aversion to creating things other than

universes (Craig & Sinclair, 2009, p.186). Therefore, in light of the second reason, Craig argues

that one should take the kalam's first premise on board as a justifiable metaphysical first

principle.

Third, the causal premise has received almost universal support from empirical science.

Anyone committed to modern science, which bases itself upon notions of cause and effect, is

hard-pressed to justify denying that premise one is more plausibly true than false. The

appearance of new species, the forging of new chemical compounds, and the emergence of

new biological adaptations invariably seem to trace their origin back to an antecedent cause.

Every empirical success that science has enjoyed in attributing causal antecedents to events

supports the causal premise (Koons, 2000, pp. 108-110). Even those disinclined towards

theism, Craig thinks, should therefore find the causal premise plausible (Craig, 2000a, p.145).

Despite widespread empirical support, critics often dispute the empirical support for the causal premise by citing findings from quantum mechanics (Howson 2011; Grünbaum 2004, 2009). In a nutshell, scientists such as Lawrence Krauss (2012) and Alexander Vilenkin (2006) argue that the universe could have emerged uncaused by quantum occurrences. These lines of inquiry certainly raise intriguing questions that space limitations prevent us from exploring further. For our purposes, it is worth mentioning that this, albeit interesting, objection has failed to blunt the edge of the causal premise (Loke, 2017, pp.125-133; Philipse, 2012, p.223). Most of the literature has subsequently been focused on premise two, to which we will now turn.

§1.2 Premise Two

Scientific Considerations:

§1.2.1 Scientific Evidence

One might naturally think that there is at least scientific evidence for this premise which states that the universe began to exist. Indeed, Craig has appealed to cosmological evidence in support of premise two. Of the many discoveries made in cosmology, perhaps one of the most suitable for Craig's purposes is the big bang. According to big bang cosmology, around 13.7 billion years ago, the universe was condensed into an infinitely dense and infinitesimally small point. Importantly for the theist, this point of infinite density is akin to nothing because anything larger would be denser.

Because the universe must have sprung from such a diminutively small point, the astronomer Fred Hoyle (1972) notes that the big bang theory implies that the universe was, at one point in the past, "shrunk down to nothing at all" (p. 36). Therefore, this model of the

universe's origins can seem to indicate *ex nihilo* creation or creation out of nothing. Having all matter, energy, space, and time originate from what looks like nothing gives off the impression of a genuine beginning. In the words of Frank Tipler and John Barrow (1986): "At this singularity, space and time came into existence; literally nothing existed before the singularity, so, if the Universe originated at such a singularity, we would truly have a creation *ex nihilo*" (p.442). To this extent, Craig cites scientific findings from big bang cosmology to describe the universe as having an absolute beginning.

In addition, Craig bolsters his case by citing a theorem first developed by Arvind Borde, Alan Guth, and Alexander Vilenkin (Borde et al., 2003). The Borde-Guth-Vilenkin theorem, or BGV, shows that universes that have, on average, been expanding throughout their history cannot be past-eternal. The upshot, for Craig, of the BGV is thus to suggest that expanding universes, such as our own, must be past-finite. Vilenkin (2006) stated this point firmly when he wrote that: "With the proof now in place, cosmologists can no longer hide behind the possibility of a past-eternal universe. There is no escape, they have to face the problem of a cosmic beginning" (p.176). Therefore, the BGV appears to evidence the second premise of the kalam by providing empirical grounds for believing in a cosmic beginning.

However, there are multiple ways in which one may regard such empirical support as misguided. Initially, *pace* Barrow and Tipler, it is unclear that big bang cosmology points to the universe's *absolute* beginning *ex nihilo*. Standard models of cosmology do not provide a definitive answer to whether the universe they model is indeed past-finite. As John Earman (1995) notes:

> By itself, a model of the big bang—say, a standard FRW model—is neither
> compatible nor incompatible with the notion that there are instants of time before

the initial singularity. The fate of that notion depends on our choice of extendibility

conditions. (p.207)

In essence, Earman's point is that standard big bang models are indifferent to whether

the universe's beginning was absolute. This question focuses on what physicists call

'extendibility conditions' (Earman, 1995, p. 207). Depending on what extendibility conditions are

applied to the metric of an FRW model, there may or may not be meaningful physical extensions

of that metric through the singularity. One can, for instance, align with Robert Geroch and

Jennie Traschen (1987) notion that physically meaningful extensions of the metric should be

regular, in which case no meaningful physical extension of the metric exists in a standard FRW

model.

The takeaway here is that since the big bang is neutral about whether the beginning is

absolute, as illustrated by the varying effects of extendibility conditions, it is not clear that the big

bang serves as definitive evidence for an absolute beginning. Subsequently, more

argumentation is needed before the big bang can count as conclusive evidence for the second

premise of the kalam.

Worse still, there are plenty of plausible cosmological models that are past-eternal.

Bounce cosmologies, for instance, propose that the universe spawns from the collapse of a

previous universe. According to cyclic models proposed by Steinhardt and Turok (2002, 2007),

our universe is the latest iteration in a long series of big bangs, each of which was galvanized by

the big crunch of the previous universe. Furthermore, according to the black hole model

proposed by Lee Smolin (1992), universes are born from the parent universe via black holes.

Eminent scientists have regarded both theories as plausible in their own right (Novello &

Bergliafa 2008; Popławski 2010, 2016).

To this extent, the empirical support lent to any of these theories rebuts the claim that the big bang represents an absolute beginning. After all, the big bang is consistent with these other models in which there is no absolute beginning. Therefore, the big bang may not, *pace* Craig, serve as knockdown evidence for an absolute beginning. If one of these models receives adequate empirical support, as is certainly deemed plausible by dint of scholarly assent, then, in the words of Daniel Lindford (2020): "Craig and Sinclair's contention that the universe began to exist will have lost considerable empirical support because [...] bounce cosmologies should not be interpreted as depicting the [universe] as having begun to exist" (pp. 20-21). Therefore, the idea that the big bang definitively proves that our universe had an absolute beginning is misguided.

Expressing this point, Abey Ashtekar (2019) says: "there is [a] definition of [the] big bang which would be an absolute beginning and [in] which the curvature of space-time, matter density becomes infinite. Most cosmologists would not agree that there was such a big bang." In this sense, cosmologists' consensus is that the big bang is not definitive evidence for an absolute beginning. For these reasons, big bang cosmology will not suffice to defend the second premise of the kalam adequately.

Second, the BGV theorem also comes short of proving that the universe had an absolute beginning. The BGV comments only about whether cosmic *inflation* is past-eternal, not cosmic history. Contrary to Craig, the BGV proves a beginning to inflation rather than an absolute beginning to the universe. Guth (2016a, as cited in Carroll & Craig, 2016; Guth, 2016b) has been vocal about the limited scope of the theorem. In an interview, Guth (2016b) said that the theorem just "means inflation must have had a beginning; it doesn't really say that the universe had a beginning."

In fact, certain models in which the universe is eternal in both the past and the future, such as the Carroll-Chen (2004) model, are compatible with the BGV. The Carroll-Chen model does not violate the BGV theorem since one would see previous universe eras as contracting; by contrast, the BGV theorem only forbids indefinite expansion (Guth, 2016b). Therefore, the BGV theorem seems to have a limited purview that is compatible with models, such as the Carroll-Chen (2004) model, which is a universe that is eternal in both directions of time.

In addition, other authors of the BGV, such as Vilenkin (2019), agree with Guth's sentiment. If most of the authors of the BGV theorem feel that their theorem does not prove an absolute beginning, then there is good reason to suppose that Craig has misinterpreted the scope of the theorem. Consequently, Craig's use of the BGV as evidence of an absolute beginning is ineffective.

Yet, the failure of cosmological evidence to establish premise two is no disaster for Craig since he does not want to rest premise two on scientific findings. Instead, Craig bases his primary defense for premise two on philosophical arguments, to which we will now turn.

Philosophical Considerations:

§1.2.2 Hilbert's hotel argument:

The first philosophical argument defending premise two of the kalam is an argument against the possibility of an actual infinite instantiating itself in reality. In line with Landon Hedrick

(2018), we will dub this argument the *Hilbert's Hotel Argument* or HHA. Al-Ghazali, one of the

original proponents of the argument, specifically argued that if the universe is past-eternal, then

an infinite number of past events have occurred before the present moment. But since an

actually infinite number of things cannot instantiate itself in reality, it is not the case that there

could have been an infinite number of past events; ergo, the universe must have had a

beginning. Defining the argument more formally, we may present the following.

      1. An actual infinite cannot exist.

      2. An infinite temporal regress of events is an actual infinite.

      3. Therefore an infinite temporal regress of events cannot exist. (Craig,

      2013, p.7).

Before defending each premise in Craig's argument, it is necessary to distinguish an

actual from a potential infinite. Specifically, while Ghazali, like Craig, denied the existence of an

actual infinite, and hence a past-eternal universe, he fully embraced what might be called the

"potential infinite." When one states that potential infinities can exist, one merely states that a

finite quantity that increases towards infinity as an unreachable limit can exist. For example, one

can divide a meter into halves, then quarters, and then eighths *ad infinitum* until an

infinitesimally small distance is nearly but never actually reached. At no point in this

never-ending process will one have ever arrived, in principle, at an infinity-eth division.

Both Craig and Ghazali are unbothered by potential infinities, since they serve only as

ideal, unreachable limits. However, both take exception to the existence of an actual infinite,

which would amount to, in Andrew Loke's (2016) words, a "determinate whole actually

possessing an infinite number of members" (p.58). If such an actual infinite were to exist in

reality, then various absurdities would arise. And since Craig sees these absurdities as

metaphysically unpalatable, we are led, in Craig's view, to affirm premise one of HHA that an actual infinite cannot exist.

Moreover, since, as premise two reasonably states, an infinite temporal series of past events would be an actual infinite, it follows that an infinite temporal series of past events could not exist. Therefore, the universe cannot be beginningless, which means that the universe must have begun to exist. Although each of these premises is interesting, we will examine Craig's defense of premise one, as this premise has been more contentious.

Craig (2013) tends to defend the first premise of this argument by drawing from various thought experiments designed to illustrate how actual infinities eventuate in absurdity when instantiated in the real world (p.9). Perhaps his favorite thought experiment is the brainchild of David Hilbert, known as Hilbert's hotel. Hilbert starts his thought experiment by asking one to imagine an ordinary hotel with finitely many rooms and no vacancies. When Sally walks up to check into this fully occupied hotel, a beleaguered hotel manager informs Sally that there are no rooms available and that she must look elsewhere for lodging.

After considering this ordinary situation, Hilbert asks one to imagine an infinite hotel that is likewise fully occupied. No vacancies exist, in other words, in the entire infinite hotel; in every room, there is a designated guest. Faced again with Sally, the hotel manager is this time more than happy to accommodate her stay. To do so, the manager shifts each guest one room over. So, guest one in room one moves to room two, guest two in room two moves to room three, and so on ad infinitum. Consequently, Sally can now occupy the newly vacated room one. However, before Sally arrived, every room was already occupied by an existing guest.

Worse still, we now imagine that an infinity of guests requested rooms for a night at Hilbert's hotel. Once again, the hotel manager would easily find accommodation for each guest. This time, instead of moving each guest to one room, the manager would move every guest to a room that is double theirs in number. So, guest one would move to room two, and guest two would move to room four, and so on ad infinitum.

By shuffling guests in this fashion, each guest who is already lodging at Hilbert's hotel would find themselves in an even-numbered room since any number multiplied by two is even. Therefore, every odd-numbered room, much to the ingenuity of the manager, would be available. With this new availability, the manager readily accommodates the infinite number of new arrivals who have come to the Hilbert Hotel in search of a room. And still, before this infinity of guests arrived, there were no vacancies at Hilbert's hotel.

The absurdities become even more pronounced once one imagines guests checking out of Hilbert's hotel. Of the infinite guests staying at Hilbert's Hotel, suppose that every guest in an odd-numbered room had to check out. In this case, infinitely many guests would have vacated their rooms, leaving infinitely many guests behind. But now suppose that all guests in rooms four and above checked out. Infinitely many guests would have left their rooms, leaving three guests behind. Although infinitely many guests checked out both times, a different number of guests were left behind in each case. Thus, we arrive at the bizarre result of subtracting identical quantities, namely infinities, from identical quantities and arriving at different results.

With these absurdities brought to the foreground, the question remains of whether such a hotel could exist in reality. In Craig's eyes, Hilbert's hotel illustrates how actual infinities cannot exist in reality, since these kinds of absurdities are the result. As Craig (2013) writes: "Can anyone believe that such a hotel could exist in reality? Hilbert's Hotel is absurd. Since nothing

hangs on the illustration involving a hotel, the metaphysical absurdity is plausibly attributed to the actual infinite as such" (p. 10). Whether it is infinite guests in an infinite hotel, infinite books in an infinite library, or infinite pages in an infinite book, metaphysical absurdities are seen to be inherent within the very notion of an actual infinite existing in reality (Gamow 1946, p. 17, Craig 2000a, p. 82, Bernadete 1964, p. 238).). Subsequently, in Craig's view, it is metaphysically impossible for an infinite number of things actually to exist in reality.[2]

§1.2.2.1 Objection One

Critics may object that Cantorian set theory has weakened arguments of this kind that aim to demonstrate the impossibility of an actual infinite existence in reality. As a critic may argue, it is part and parcel of modern mathematics to speak of sets with infinitely many members. The set of natural numbers [1, 2, 3, 4, ….] has an actually infinite number of members. From this development in set theory, many critics have reasoned that this type of argument has been undermined.

In contrast, as Craig alleges, there may be good reasons for seeing this critique as misguided. First, one can see this critique as begging the question against anti-platonist views of mathematical objects (Craig & Sinclair, 2009, p.106). Instead of rejecting actual infinities as mathematically legitimate entities, anti-platonists need only argue that mathematical legitimacy does not confer a positive ontological status to those mathematical entities in question. It is in this light that David Hilbert himself wrote:

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[2] One might think that an infinite series of past events is consistent with the universe beginning to exist so long as past events are progressively shorter because they take progressively less time. However, for the purposes this paper, we will think in terms of events that do not get smaller in time than a certain size or do not get separated in time less than a certain amount to rule out getting smaller and smaller indefinitely. So an infinite series of events of the kind we have in mind would take an infinite amount of time. We are thus just going to focus on the claim that if the universe had no beginning, then there must be an actual infinity.

> [...] the infinite is nowhere to be found in reality. It neither exists in nature
>
> nor provides a legitimate basis for rational thought […] The role that
>
> remains for the infinite to play is solely that of an idea [...]. (Hilbert 1983,
>
> p. 201)

Therefore, one may see Cantorian set theory as resting upon a series of axioms that, once accepted, allow one to enter into a mathematically consistent "universe of discourse" (Craig & Sinclair, 2009, p.107). Upon entering the universe of discourse by making the necessary assumptions, one can make non-contradictory claims about actual infinities. Unfortunately, for the critic, this *only* demonstrates how to set up a universe of discourse for engaging in mathematically consistent talk about actual infinities. This critique does nothing to indicate that an infinite number of mathematical entities exist or that an actually infinite number of things exist.

With many viable anti-platonist theories about mathematical objects on offer, it is unclear why Cantor's universe of discourse, which enables us to speak of actual infinities without contradiction, would entail that actual infinities have a positive ontological status. After all, there are plenty of anti-platonist positions one could adopt concerning mathematical objects, such as Constructublism (Chihara 1990), Figuralism (Yablo 2000), and Fictionalism (Daly 2006; Plebani 2018). In this vein, Craig and Sinclair (2009) briefly rebut this critique when they write of the critic that:

> [I]f he is to maintain that mathematical objects furnish a decisive counterexample
>
> to the denial of the existence of the actual infinite, [he] must provide some
>
> overriding argument for the reality of mathematical objects, as well as rebutting

defeaters of all the alternatives consistent with classical mathematics – a task whose prospects for success are dim, indeed. It is therefore open to the [supporter of the kalam] to hold that while the actual infinite is a fruitful and consistent concept within the postulated universe of discourse, it cannot be transposed into the real world. (p. 108)

Thus, while initially appearing to supply us with reason to suspect that actual infinities can exist in reality, the critic's critique at most shows that Cantor established a universe of discourse in which one can speak of actual infinities without contradiction.

Nevertheless, as the preceding analysis showed, setting up a universal discourse such that one might make non-contradictory statements about actual infinities does not suffice to show that an actual infinity has a positive ontological status. In fact, mathematical objects may best be described by anti-platonist theories that accord no ontological status to mathematical entities, even though those theories might regard them as mathematically legitimate because they allow one to make consistent, non-contradictory mathematical statements.

To demonstrate that Cantorian set theory poses as formidable an objection as the critic advertises, the critic must establish two things in Craig's view. First, they must show that the mathematical objects are real. Second, they must also provide convincing reasons for thinking that each anti-realist view of mathematical objects is false. However, accomplishing these two feats is a task that, in Craig's view, is arduous to a fault. By raising the burden of proof in this way, the critic's objection appears to have limited prospects for success.

§1.2.2.2 Objection Two

For Craig, the critic's most viable move is a concession to the conclusions drawn from Hilbert's hotel. Far from casting away these conclusions as if they are unwanted, the critic is best suited to embrace them as what one might expect if actual infinities *did* exist. "Friends" of the possibility of an actual infinite are recommended to, in the words of Graham Oppy (2006b), "outsmart" their opponents by noting that: "In many cases, these allegedly absurd situations are just what one ought to expect if there were [...] physical infinities" (48). From this point of view, Hilbert's hotel is less a metaphysical absurdity and more an expected result given the possible reality of an actual infinite.

However, one may regard Oppy's response as wanting. To start, Hilbert and his supporters would concede that if an actual infinite could exist, then absurdities arising from Hilbert's hotel would be expected. However, the question is not whether an actual infinite would occur in absurdity, since both sides seem to agree on that point. Instead, the question at issue is whether such a hotel is, in fact, possible. Oppy's out-of-the-box reply leaves this question more or less unaddressed. Besides, those left uncomfortable with accepting metaphysical absurdity need not find their discomfort refuted by a skeptic's welcoming of the absurd. As Craig (2013) states: "He who finds such scenarios metaphysically intolerable cannot be gainsaid simply by the skeptic's willingness to embrace the absurd" (p. 11). For these reasons, Oppy's outsmarting reply fails to defeat Craig's defense of premise one of the HHA. Having defeated each objection to the most contentious premise of the HHA, Craig is in good standing to argue that the HHA is robust.

§1.2.2.3 Metaphysical Possibility, Logical Possibility, and Absurdity

Craig may have some subjective notion of absurdity that seems like an inadequate basis to reject an argument. For instance, suppose that you have some light, and you measure the speed of it and somebody moving relative to you also measures the speed of it. Now imagine that you and this other person consider yourselves at rest. Surprisingly, each of your measurements would yield the same result. Whereas, if one observer is moving 10-kilometers per second faster relative to the other, then you would expect a 10-kilometer per second difference in what they measure. However, there is not, and it seems like Craig could not deny this. Yet, one would be mistaken to suppose that referencing this situation's absurdity somehow refutes the underlying physics. Arguments in metaphysics are rejected if one can write down a series of premises and derive a contradiction or if a particular premise is false.

So, depending on how Hilbert's hotel is set up, a contradiction may or may not be drawn. For instance, in the case where all the rooms are full, and a new guest is accommodated by the shifting of guests into the next room, one must be very careful. One must specify what can and cannot happen with precision. Suppose that one says that the concierge can only move a guest into a room that is already empty. Because we have stipulated that none of the rooms are empty, it follows that we could not move any of the guests. Thus, the supposed absurdity evaporates once reasonable constraints are introduced.

In the end, Craig argues that something counterintuitive is reason enough to reject its possibility. But it seems that one can argue for anything at all in this fashion. Quantum mechanics is counterintuitive, but surely my misgivings do not constitute proof that it is not possible. But it does not stop at quantum mechanics, for most scientific findings were counterintuitive when they were developed.

Subscribing to a theory that could prompt the reversal of this scientific progress is even more counterintuitive than the theories it seeks to reject. Heliocentrism, relativity theory, dark matter, and evolution by natural selection are all implausible to those steeped in a philosophical milieu that would regard them as not squaring with contemporary intuitions. Yet, these theories have significant explanatory power and are assented to by most academics.

Craig will respond by distinguishing a 'broad' logical possibility from a 'narrow' logical possibility. For Craig, the statement that something has a size but not a shape is strictly logically possible but not broadly possible. In other words, there is no logical contradiction involved in something that has a size but not a shape, yet it seems too absurd for such an entity to exist.

However, one could dispute whether this example from Craig qualifies as something he would call strictly logically possible. To illustrate this point, suppose that the space is made up of points. Even in this scenario, it is difficult to see how something that is extended could fail to have a shape. Also, if it has a size, it must consist of some

points. And any continuous set of points occupies a region of space, and any region of

space has a shape. So, once one scrutinizes this example fully, the argumentative force

it is supposed to possess seems lacking.

However, Saul Kripke injected nuance into this debate that is worth noting. In

particular, Kripke showed that statements that do not look contradictory at first blush

may be so upon further analysis. Take, for instance, the example of Hesperus and

Phosphorus, which are two names for the same star. Hesperus is the morning version

of the star, and Phosphorus is the evening version of the star. The surface form of the

proposition "Hesperus is bright and Phosphorus is not bright" is not a contradiction since

it is not of the form $P \wedge \sim P$. Nevertheless, it is a necessary falsehood, and that is

because those two names refer to the same star. In Kripke's terms, they "rigidly

designate" (Kripke 1980).

So, although there are possible worlds in which someone could utter that

sentence truly because Hesperus and Phosphorus referred to different things, in the

actual case, matters are different. In other words, given their actual referent, if we are

speaking in such a way that we are talking about the actual Hesperus and the actual

phosphorus, there is no possible world in which that object can be bright and not bright.

One must be careful, then, about these different dimensions of being. When

Craig potentially says that it is logically possible that Hesperus could not be Phosphorus

since one cannot derive a logical contradiction from that proposition, it is possible in a

very limited sense. Namely, it is possible in the sense that there is a possible world in which those names pick out different stars that have different properties. But there is a real sense in which it is impossible because that object could not possess the property of being bright and not bright. So, even if Craig's examples work, it is not clear whether he has properly considered how propositions that are not immediately contradictory can be contradictory upon further analysis.

§1.2.3 The Argument from Successive Addition

Second, Craig advances another independent philosophical argument to demonstrate that the universe must have begun to exist, called the argument from successive addition or SAA. Technically, one can represent the argument as follows:

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

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

2.3 Therefore the temporal series of events cannot be an actual infinite. (Craig, 2000a, p.103)

There is no, in principle, rejection of an actual infinite existing in reality within these premises (Craig, 2008, p.120). This argument seeks to prove that one cannot form an actual infinite by successive addition. Since a beginningless past would involve creating an actual

infinite through successive addition, the past cannot be beginningless. Thus, the universe must have had a beginning.

Premise 2.1 captures our everyday intuition that the time series on which we live is formed through addition. As time moves forward, one moment is added to the next, and we progress sequentially through an ordered sequence of events. Like beads on a necklace, events on a timeline are added one after another in the future-oriented direction. Most importantly, for this argument, this series of events is formed through the gradual accrual or successive addition of one event after another. Although I will discuss this conception of time more in §2, it suffices for our present purposes to say that this premise has enough common sense appeal to grant it a certain degree of plausibility. One's everyday experience, as Craig thinks, affirms premise 2.1 to the extent that one is justified in considering it as more plausible than not.

Premise 2.2 claims that a collection formed by successive addition cannot be actually infinite. Craig sees the impossibility of forming an actual infinite through successive addition as following naturally from the impossibility of counting to infinity (Craig, 2013, p.11). After all, one cannot traverse an actually infinite number of elements by starting at one location and counting upwards or downwards. One's inability to count to infinity by starting from '1' exemplifies this point as it becomes clear that for whatever number one has just counted, there will always be an infinite number of successors left to count (Craig, 2000a, p. 104).

Likewise, make the reasonable supposition that one is hard-pressed to form an actual infinite by starting at zero and counting upwards. In that case, one appears equally troubled with forming an actual infinite by beginning in the infinite past and reaching an endpoint. Craig (2013) encapsulates this seemingly irresolvable difficulty in a question when he asks: "If one cannot count to infinity, how can one count down *from* infinity" (p.12). To illustrate this point, imagine

that Steven is finishing counting all the positive integers ending in zero such that he is overheard exclaiming: "3,2,1, 0." In this case, Craig may make two distinct points that he views as favorable to his position.

First, this thought experiment underscores that before counting any particular number, Steven would have had to have already counted infinitely many numbers such that he would never have arrived at the present number. In other words, Steven must have preceded his count of zero with one, before that with two, before that with three, and so on *ad infinitum*. Before he counts any number, an infinity of numbers must be counted first, driving one far enough into the past such that no number could ever be counted (Craig & Sinclair, 2009, p. 118). Therefore, if Steven's countdown is truly beginningless, and he must count an infinite number of numbers before arriving at any number, it becomes difficult to explain how he could reach zero, even though it is true *ex hypothesi*. As applied to a beginningless series of events, John Hospers (1967) notes:

> Since there is an infinite series of events in the history of events, they will take an infinite amount of time to get through. How is this different from saying they will *never* get through? If an infinite series of events has preceded the present moment, how did we get to the present moment? How could we get to the present moment-where we obviously are now-if the present moment was preceded by an infinite series of events? (p.434)

So, it seems that the present moment would never become present if an infinite series of antecedent events must have first elapsed. However, intuitively one *knows* that they are in the present moment since that is when they are reading this sentence. Consequently, this demonstrates that the past must be finite and have a beginning.

Second, if an infinite amount of time has passed since Steven began his count, one is justified to ask why he did not finish his count yesterday or the day before. After all, by yesterday an infinite amount of time would have passed such that Steven would have had ample time to complete his count. Steven should have finished his countdown at any point in the past, since infinitely many seconds would have elapsed by then. And yet, this produces an absurdity. For nowhere in the past can one say that Steven completed his count down since there will always be an earlier time at which he should have finished. However, this contradicts the claim that his countdown just ended, which is true by hypothesis. Because attempting to form an actual infinite by successive addition results in these kinds of absurdity, Craig concludes that there is good reason to suppose that one cannot form an actual infinite by successive addition.

§1.2.3.1 Objection

One response to this kind of illustration is to argue that Steven's countdown ends today rather than yesterday as a matter of brute contingency. In other words, if nothing necessitates B and B does not necessitate itself, then we can consider the existence of B as a brute contingency, since there is no sufficient reason for B (Oppy, 2006b, 279). There is no deeper explanation as to why Steven's countdown ends today; it just happens by chance. The critic can then see that Craig's argument is based on the principle of sufficient reason, which states that everything must have "a reason, a cause, or a ground" (Melamed and Lin, 2016). In other words, every event B must be necessitated by its cause A, such that the cause necessitates the effect (Oppy, 2006b, p. 278). If, for example, 'A' is a sufficient condition for me to write this sentence, then A requires that I write this sentence. With this clarification in place, the critic can reformulate the argument in terms of Steven's countdown as follows:

1.   There are no events that violate the principle of sufficient reason

2.   Steven's countdown violates the principle of sufficient reason

3.   Therefore, Steven's countdown is metaphysically impossible

Hence, the critic sees Craig's argument as hinging on the principle of sufficient reason.

However, as the critic holds, the principle of sufficient reason is contentious enough to cast doubt on the argument's first premise. One can object to the principle of sufficient reason by considering the totality of contingently true propositions. As Oppy (2006b) does, imagine that for every true proposition p, there is another proposition q that explains the veracity of p. If there are contingently true propositions, one is reasonable in supposing that there is a 'contingently true proposition that is the conjunction of all contingently true propositions' (Oppy, 2006b, p.280). Dubbed the maximal contingent proposition, or MCP, this plausible proposition clashes with the principle of sufficient reason (Oppy, 2006b, p.280). The q that provides a complete explanation for p, which could be the MCP, cannot be contingently true because the propositions cannot explain their veracity entirely on their own.

However, one cannot explain contingent propositions, such as the MCP, in terms of necessary propositions in which another necessary proposition necessitated its truth. After all, any proposition that results from necessity is itself true by necessity (Oppy, 2006b, 281). With neither a contingent nor a necessary explanation on offer, the only option left to explain the MCP is that of a brute contingency. Given the MCP, the existence of *brutally* contingent propositions, whose truth lacks an explanation, follows naturally. As Oppy himself writes,

"[...] on the assumption that there is a maximal contingently true proposition, it follows that there are contingently true propositions whose truth has no explanation: There are contingently true propositions that are brutely true" (Oppy, 2006b, p. 281)

Unless Craig wants to deny Oppy's plausible assumptions, then Craig's first premise may be undermined by this counterexample to the principle of sufficient reason. To avoid this result, Craig may reject the existence of maximally true propositions, facts, or states of affairs. However, the *prima facie* plausibility of these things seems to outstrip any *post hoc* denial of their existence.

However, Craig can respond to Oppy's objection by distancing himself from more robust versions of the principle of sufficient reason. Instead of justifying a robust principle of sufficient reason, Craig can make his point merely by adhering to the more modest principle that there must be an explanation for Steven finishing his countdown when he does rather than at any earlier point. This moderation allows Craig to sidestep concerns about how the MCP may undermine his argument. In fact, by adopting a more modest principle of sufficient reason, Craig clarifies that this counterexample is mainly irrelevant to the case of Steven's countdown. Nothing in the thought experiment seems to concern the MCP (Craig & Sinclair, 2009, p.166).

What matters, in this case, is that Steven has already had an infinite amount of time to complete his countdown and yet has not finished before today. However, one has good reason to suppose that Steven should have finished before today, given that an infinite amount of time had already passed (Oderberg, 2018, p.123; Craig & Sinclair, 2009, pp.122-123). Craig argues that such issues fail to arise once one regards Steven's countdown as metaphysically impossible. Only when the universe is past-eternal do these metaphysical absurdities arise.

From this, Craig concludes that the universe cannot be past-eternal. And if the universe is not past-eternal, then it must have had a beginning, which is the second premise of the kalam. In this light, we can perhaps formulate Craig's argument as follows:

> 1. If the universe is past-eternal, then it is metaphysically possible for Steven to count down from infinity.
> 2. It is not metaphysically possible for Steven to count down from infinity.
> 3. Therefore, the universe is not past-eternal.

As the previous analysis shows, premise one in this argument is true by stipulation. That is, using the infinite time at his disposal, Steven has just completed his countdown of all positive integers ending in zero *ex hypothesi*. Premise two is justified by appeal to the two arguments previously mentioned. First, one could not explain why Steven finished his countdown today rather than yesterday, which is absurd. Second, Steven could have never begun counting since, for every point in the past, he should have already finished, which is a metaphysical impossibility since he must have finished by now *ex hypothesi.* Taken together, these arguments seem to lend considerable support to premise two. Therefore, these arguments provide reasons for thinking that each premise is more plausible than not and that the argument is sound. As a result, it follows that the universe is not past-eternal, which means that it must have had a beginning, which is the second premise of the kalam. Craig's argument is thus undisturbed by the critic's admittedly clever response to premise one of the SAA.

§1.3 The Conclusion

Having reached his conclusion, Craig notices that one can draw theologically significant conclusions about the cause of the universe. In summary, this cause must be an uncaused, timeless, changeless, immaterial, and personal being endowed with enormous power and freedom of the will. First, the cause must be uncaused since there cannot be an infinite regress of causes, as we have explored. Second, the cause must be timeless and thus changeless, at least without the universe, since the first cause created time. Third, since the first cause creates space, it must also be transcendent and thus spaceless.

Fourth, this being must be personal so that a timeless cause can produce a temporal effect. If the cause of an effect is a mechanistic set of necessary and sufficient conditions, then the cause could not exist without its effect. To illustrate this point, Craig imagines that there exists water that has been frozen for all eternity. Notably, the necessary and sufficient conditions for water freezing are that the water has reached a temperature of zero degrees C. If these necessary and sufficient conditions have been met since eternity past, then any present water would be likewise eternally frozen.

The water in this situation could not possibly begin to freeze some finite time ago since the conditions for its freezing have always existed. Therefore, if a cause is always present, it seems as if the effect must always be present. However, this would seem to imply that if the cause of the universe was eternal, as God is supposed to be, then the universe must also be eternal, which is false in light of arguments against a past-eternal universe.

One can escape from this situation by supposing that the cause of the universe is a personal agent with free will. Like any being endowed with free will, this being could spontaneously cause any effect without any antecedent determining factors necessitating their action. Here Craig often draws on the example of an eternal man sitting for eternity in a chair.

Using his free will, the man decides freely to stand up. Thus, there would be an instance of an effect that had a beginning, even though its cause was eternal.

Similarly, God's creation of the universe could be a free act not determined by any antecedent conditions. God's creation of the universe may be freely willed in the same way that the standing up of the eternal man was freely willed. In each case, the free will of an agent allows an eternal cause to produce an effect with a beginning. Therefore, one can regard the first cause as a personal cause since only a personal cause could be eternal and yet give rise to an effect with a beginning (Craig, 2008, p.153). Thus, we are brought to a transcendent cause of the universe and a personal creator.

Finally, this personal creator must be enormously powerful to have created all matter and energy. By teasing out what qualities such a first cause must possess, Craig concludes that the cause must be an uncaused, timeless, spaceless, immaterial, personal creator who is enormously powerful and is endowed with freedom of the will. And this, Craig notes, is equivalent to what is typically meant by God (Craig 2008).

II. Chapter Two: The Kalam on the A-theory and the B-theory

§2 The A-Theory of time and the kalam

Craig (2008, 2010) has repeatedly emphasized that a dynamic, or A-Theory of time, underlies the kalam. To understand the A-theory of time, one must first understand what is known as the A-series. According to the A-Series, there is one time known as the present, distinguished from earlier times, known as the past, and later times, known as the future

(McTaggart 1908). Events, then, are regarded as past or future to differing degrees. The 2028 presidential election, for example, is farther in the future than the 2024 presidential election. Similarly, the 2016 presidential election is farther in the past than the 2020 presidential election.

The A-Theory is simply the view that the A-series best represents time. The A-theory claims that there is a bona fide distinction between past, present, and future moments, and these distinctions represent objective features of reality. Time, in this view, passes from one moment to the next as the present slides further and further into the future. As time progresses, events that were once present become past, and events that were once future become present. In this sense, an event's "A-properties," such as its relative pastness, presentness, or futurity, change as time progresses toward the future.

Additionally, temporal becoming is a real and objective feature of reality on the A-theory of time (Craig, 2001, p.139).[3] That is to say, things genuinely *come into being* and then go out of existence as time passes. The reality of temporal becoming is also meant to explain why one can adopt feelings of dread about events lying in the future but then look back on those events with a sense of relief once they have passed. Prior (1959) invoked this argument to claim that our espousals of joy that painful experiences are over would not make sense unless those moments have lapsed into the past.

While critics, such as Christopher Suhler and Craig Callendar (2012), have since questioned the plausibility of some aspects of Prior's argument, it is enough for our purposes to note that there is an intuitive ground for thinking that an A-theoretic understanding of time could account for our attitudes towards events in time (Craig, 2001, p. 137). For these reasons, both

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[3] Unless otherwise mentioned, this section will explore the A-theory's main variant known as presentism.

critics and proponents of the A-theory have acknowledged that it is the more commonsensical view of time (Craig, 2008, p. 121; Dainton, 2016, p.10; Zimmerman, 2008, p.221).

One may see the A-theory as integral to the kalam and its subsequent defense. The SAA, for instance, relies critically upon the A-theory of time. Specifically, premise 2.1 suggests that the past, present, and future were not created all at once. Instead, events gradually accrued over time until they reached the present moment. Directionality characterizes this accrual of events as they move in the uniform direction of past to present to future. Therefore, time is supposed to pass, or flow, from one moment to the next on this conception of successive addition. The addition of these events involves a genuine sense of temporal becoming in which events *come into being*. Since events come into being on most versions of this theory, reality is created moment-by-moment rather than *all at once*. As a result, one may understand premise 2.1 as presupposing the A-theory of time (Craig & Sinclair, 2009, p.124).

While it is true that Craig (2000b,c) has done his philosophical due diligence to defend the A-theory, it is also worth noting that one of his two philosophical arguments supporting premise two of the kalam depends on a minority view in the philosophy of time. In light of arguments concerning special relativity, the rate at which time passes (Smart 1949; Markosian 1993), and whether one could build a time-passage-detection machine (Prosser 2016), it is safe to say that the burden of proof for defending the A-theory of time, and by extension the SAA, is quite high.

Aside from the SAA, premise one of the kalam also depends, to an extent, upon the A-theory. When Craig argues that whatever begins to exist has a cause, he suggests that the universe comes *into being* at some time in the finite past (Craig, 2000a, p. 36; Craig & Sinclair,

2009, p. 184). This notion of beginning to exist relies heavily upon the concept of temporal becoming. For Craig and Sinclair (2009), to say that x begins to exist is to say that:

A. [...] x comes into being at t.

B. x comes into being at t iff (i) x exists at t, and the actual world includes no state of affairs in which x exists timelessly, (ii) t is either the first time at which x exists or is separated from any t′ < t at which x existed by an interval during which x does not exist, and (iii) x's existing at t is a tensed fact. (p.184)

In this way, something's beginning to exist depends upon that thing's existence being a tensed fact. A tensed fact means, here, to express facts relative to the present moment. The fact that I am now writing this paragraph is a tensed fact because it relays information about how an event is related to the present. Because A-properties constantly change as time passes, these tensed facts change their truth values as well. Accordingly, while it is now true that I am writing this paragraph, it will (most likely) not be true that I am writing it ten years from now.

If tensed facts exist, then time is truly tensed. In particular, past, present, and future reflect real, mind-independent features of reality. All past events are over because they no longer belong to the objective present. All future events are yet to come as the present moves along into the ever-approaching future. Temporal becoming thus becomes a robust feature of reality if time is tensed. If time is tensed, then the A-theory, which accords real ontological status to pastness, presentness, and futurity, and sees temporal becoming as a genuine mind-independent phenomenon, is true.

In this sense, the kalam presupposes the A-theory, or tensed theory, of time. A past-finite universe *came into being* when it began to exist. Because *beginning to exist* means that the

beginning of a thing must be a tensed fact, and tensed facts entail an A-theory of time, then something's *coming into existence* must entail the A-theory of time. The A-theory of time, in this way, guarantees that the universe came into being by dint of its past-finite nature. The upshot of this analysis is that the A-theory is central to Craig's notion of "begins to exist," which is also central to the first and second premise of the kalam. As a result, the A-theory is also central to the kalam's first premise, as critics and proponents of the argument have both noted (Miksa, 2020 p.251, Grünbaum 2000, p.16).

While the relation of premise one to the A-theory of time is an interesting topic that repays additional study, it is beyond this paper's scope to explore this subject further. It is simply worth noting that the kalam relies heavily upon the A-theory of time for the present purpose. For the remainder of this paper, the main question is whether a non-A-theoretic formulation of the kalam can be made successfully. If so, then the kalam may be able to extricate itself from a minority view in the philosophy of time. In the next section, we will explore one such attempt.

§3 B-theory and the kalam

The A-theory's primary alternative is the B-theory of time. Just as the A-theory holds that the A-series best describes time, the B-theory holds that the B-series best describes time. The B-theory still claims that times are arranged in a particular order. Times such as t_1, t_2, and t_3 are ordered along the B-series according to earlier or later relations. T_2, for instance, is later than t_1 but earlier than t_3. These times stand in these relations to each other for all times. For example, "Margaret Thatcher's reign as prime minister is earlier than Prince George's birth" is an unchanging fact about the world. So, although time is ordered on the B-series, it is only ordered

according to how different times relate to each other. Unlike the A-series, there is no uniquely designated present time around which events are ordered.

In this vein, the B-theory holds that time is ordered but that there is nothing metaphysically unique about the present moment. Therefore, the B-theory suggests that there is no metaphysical or ontological distinction between past, present, or future. Time, then, is also understood as not passing on the B-theory. Therefore, the position of the B-theorist is that there is no objectively present time to which one may refer. Time is no less a static phenomenon than space. Considered as a collection of objective, mind-independent qualities, the dynamic, A-properties properties of time are mainly illusory.

When someone says it is *now* 1:26 pm, it is analogous to saying that Martyr's Kirk is *here* in St Andrews. Yet, Joe Biden might be dwelling at home claiming that the White House is *here*. Biden's claim in this case, is as true as Kristina's claim that Martyr's Kirk is *here* in St Andrews. These statements are true because statements about where "here" is are relative to where that statement is uttered. On the B-theory, the word "now" functions similarly. One's statement that it is *now* 1:26 pm is true since it was 1:26 pm during that statement's utterance. However, when an hour ago, I said that it was "now" 12:26 pm; that was true, since at that time, "now" referred to 12:26 pm. Just as in space, there is no objective "here," there is no objective "now," for the B-theorist in time. Existing as a four-dimensional block with three dimensions of space and one dimension of time, the universe, for the B-theorist, does not have an ontologically privileged present, and time does not pass (Sider, 2001, p.12; Prosser, 2016, p.3). In a nutshell, the B-theorist views time as a static reality akin to space and denies it has the relevant A-properties.

As applied to the kalam, one may at first struggle to see how one may reformulate the kalam in terms of the B-theory of time. Stripped of any notion of temporal becoming, the B-theory of time may make the enterprise of describing a universe that *comes into being* seem misguided. According to the B-theory, things in time come into existence in the same way that things in space have beginning and endpoints; that is to say, they just have an edge. However, it would be odd to state that a ruler *comes into existence* at the first inch. It is in this vein that Craig and Sinclair (2009) comment that:

> From start to finish, the kalam cosmological argument is predicated upon the A-Theory of time. On a B-Theory of time, the universe does not, in fact, come into being or become actual at the Big Bang; it just exists tenselessly as a four-dimensional space-time block that is finitely extended in the earlier than direction. If time is tenseless, then the universe never really comes into being, and, therefore, the quest for a cause of its coming into being is misconceived. (pp. 183-184)

The kalam's supporters have subsequently tended to couch their argument in the A-theory of time and the metaphysical principles that lie therein (Miksa, 2020, p. 251). Anyone seeking to extricate the kalam from the A-theory must, then, remove the A-theoretic framework in which the argument sits without losing its deductive force.

One such attempt has been made by Metcalfe (2013). Metcalfe begins by detailing how things may begin to exist even on a B-theory of time. As mentioned earlier, on the B-theory of time, events in time are indexed as being earlier than or later than other events in time. The Chicago Bears, for instance, are indexed as forming their team in 1920, which means that they were formed *earlier than* 1921 and *later than* 1919. Even if the B-theorist is right, and all the

moments before and after 1920 exist equally, one can still see 1920 as marking the moment where the Bears *began to exist*. Equip with this analysis, one may define "begins to exist" on the B-theory of time as follows:

Something begins to exist at t_1 iff (a) it does not exist at any earlier time than t_1 and (b) there exists a t_2 later than t1 such that at all times between t_1 and t_2 it exists.

Consistent with what may seem rational, this definition allows something to exist over a period of time, namely t_1-t_2, without implying that it must exist at t_1. Whether, for instance, the Bears exist at t_1 is immaterial, since that is precisely what one is trying to abstract away from in this definition. This definition allows something that does not exist at t_1 and yet exists at every later time such that it has no first time at which it exists. In other words, things can begin to exist on this definition, without there being a first moment of their existence. That being said, one can lay out Metcalfe's argument in the following manner::

P1: Whatever begins to exist at t_1 such that (a) it does not exist at any earlier time than t_1 and (b) there exists a t_2 later than t_1 such that at all times between t_1 and t_2 it exists, has a cause.

P2: The universe began to exist at t_1 such that (a) it does not exist at any earlier time than t1 and (b) there exists a t_2 later than t_1 such that at all times between t_1 and t_2 it exists.

C1: Therefore, the universe has a cause.

The logic used in this argument mirrors that of Craig's formulation. Given that this argument is logically valid, criticisms will arise from whether the premises are true. Like Craig,

Metcalfe provides minimal support for premise one, as he sees its metaphysical underpinnings as intuitively robust. Therefore, Metcalfe directs most of his attention towards defending premise two, that the universe began to exist. Metcalfe considers two philosophical arguments to support premise two, the second of which depends upon the first. In what follows, each of these arguments will be analyzed, after which I will present an objection to both.

§ 3.1 Avicenna's Argument

Metcalfe begins his case by advancing what I will call Avicenna's argument (hereafter AA). AA may be formulated as follows:

[3.1] Quantities that are both whole and essentially ordered cannot exist as actually infinite.

[3.2] On the B-series, time meets Avicenna's wholeness and ordering conditions.

[3.3] Therefore, on the B-series, time is not actually infinite. (Metcalfe, 2013, p. 18)

Before delving into the specific details of this argument, it is essential to define some key terms. By "whole," Metcalfe refers to entities that exist all at once. The B-series would then be whole since all points exist tenselessly. By "essentially ordered," Metcalfe means that each member in a set has a precisely defined position relative to other members. John McGinnis explains what Avicenna, and Metcalfe, mean by "essentially ordered" in concise terms. Specifically, McGinnis (2010) writes that to be essentially ordered means that: "Each member in the set has some well-defined position relative to the other members, such that the whole set can be called

'ordered'" (p. 20). On the B-theory, time has this essential ordering. Every event in time is ordered in a well-defined fashion relative to other events along the B-series. With the terminology thus defined, an assessment of the premises is now in order.

As the definitions of the terms suggest, 3.2 is true given a further analysis of what "whole" and "essentially ordered" mean. Upon conducting this analysis, one can notice how the B-series is both whole and essentially ordered. In particular, the B-series is whole because it exists all at once tenselessly and is essentially ordered since every moment in time is ordered in a well-defined manner relative to other events in time. The upshot of this analysis is that one may reasonably regard premise 3.2 as true.

The emphasis is then on 3.1. That is, the argument's soundness hinges on the truth of this premise. Because the argument stands or falls on the truth of 3.1, Metcalfe develops his most trenchant arguments for its defense. Mainly, he employs a thought experiment first devised by Avicenna to prove that a whole, essentially ordered actual infinite could not exist in reality.

Avicenna makes his case by asking one to imagine two beams, beam x and beam y. By supposing that beams x and y would extend infinitely far into space from Earth, one would have what Avicenna would call a whole and essentially ordered infinite pair of beams. Two points account for why Avicenna considers these beams whole and essentially ordered. First, each beam is whole since they exist all at once. Second, each beam is essentially ordered since each part of beams x and y is placed in a well-defined position relative to other spots on the beam. Having noted these points, Avicenna supposes that he was to take a section, A, from beam x and place it on top of beam y. Thus, a distance of "A" shortens beam x.

But notice: now one faces issues that threaten to become reductios. First, if one compares both beams after A is subtracted from x and added to y, it seems strange to say that both beams are still infinite. After all, x should be shorter than y after the material was removed from x and placed above y. Second, if removing A from x sufficed to make x finite, then reuniting A with x again would only make x a finite beam. After all, a finite length plus a finite length is always finitely extended. Metcalfe and Avicenna regard the impending reductios as powerful: contradictions arise in either case, which indicates that a whole and essentially ordered actual infinite cannot exist in reality (Metcalfe, 2013, p. 18). Therefore, since assuming the existence of whole and essentially ordered actual infinities results in absurdity, one is encouraged to believe, as Metcalfe does, that premise 3.1 is true. With both premises adequately defended, Metcalfe concludes that the B-series is not actually infinite.

§ 3.2 The Past-finite Universe Argument

The present discussion now turns to how the previous argument has made headway in demonstrating that the universe began to exist according to the B-theory. Metcalfe draws his analysis together when he formulates his next argument, which he uses to prove that the B-series and, thus, the universe began to exist. One may formulate Metcalfe's (2013) argument as follows::

2. Argument from the Beginning of the B-Series

[4.1.] If there is no beginning to the B-series, then an actual infinite exists.

[4.2.] An actual infinite does not exist.

[4.3.] Therefore, it is false that there is no beginning to the B-series.

[4.4.] Therefore, there is a beginning to the B-series. (p. 23)

For 4.1, as noted earlier, the B-series is whole because it exists all at once tenselessly and is essentially ordered because all points along the B-series are well-defined relative to other points along the series. Metcalfe, therefore, sees the beginningless B-series as analogous to Avicenna's beams in terms of their wholeness and essentially ordered nature, which means that the beginningless B-series, like the beams, would amount to an actual infinite if they existed in reality.

Avicenna's argument demonstrating that a whole and essentially ordered actual infinite cannot exist is adduced to substantiate premise 4.2. Because that argument received ample support from *a priori* considerations, Metcalfe argues that he has met his burden of proof for establishing the plausibility of premise 4.2. With these two premises adequately defended, 4.3 naturally follows via *modus tollens*, and 4.4 is merely a positive restatement of 4.3. Summarizing his argument, Metcalfe (2013) writes:

> That is, time on the B-theory seems to be whole, existing all at once, and
> ordered, in set positions relative to other moments. Thus, the B-theory of time
> gives us, according to Avicenna, an actual infinite. Recall, though, that this infinite
> is just what Avicenna says cannot exist. The argument we got from the beam
> thought-experiment was that this type of infinite gave us absurd results and had
> to be abandoned. So by meeting these two conditions (being whole and being
> ordered), B-theory time as an actual infinite simply cannot exist. (p.20)

Metcalfe, therefore, argues that actual infinities of the kind postulated by a beginningless B-series cannot exist. Instead, the B-series must be past finite to avoid otherwise absurd results. Moreover, if the B-series is finite, it must have begun to exist, thus demonstrating the second premise of the B-theoretic kalam.

Metcalfe's argument is then properly understood as resting in a B-theoretic context. Rather than using infinite guests in an infinite hotel, as Craig does, Metcalfe uses infinite beams to establish the same defense of premise two B-theoretically. Consequently, Metcalfe's argument uses Craig's Hilbert's hotel-style reasoning, except explicitly in terms of the B-theory, to say that the B-series must be past-finite and therefore have a beginning. In essence, it is very much the same argument, doing the same work, but this time made in terms of the B-theory.

Here, as it seems, there is a perfectly viable B-theoretic version of the kalam. I now want to consider whether the B-theoretic kalam is viable upon closer examination. To do so, we will now turn to an objection to the kalam in general, which, as I shall argue, is especially effective against the B-theoretic kalam in particular.

III. Chapter Three: Morriston's Angel's and the B-theorist's Bind

§4 Morriston's Angels

One may, however, object that these arguments intending to preclude the possibility of an actual infinite existing, in reality, prove too much. Specifically, Craig and Metcalfe's arguments for the impossibility of an actual infinite also refute the possibility of an endless future. And yet, an endless future seems metaphysically possible on its face. Consequently, one may wonder if Craig and Metcalfe's arguments suffice in demonstrating a past-finite universe.

To illustrate this point, Wes Morriston (2010) supposes that God has tasked two angels, Gabriel and Uriel, with singing praises eternally (p.443). Gabriel and Uriel alternate praises

depending on the minute; Gabriel sings praises falling on the odd-numbered minutes, while Uriel takes the remainder. To avoid any dereliction of duty, God exercises his omnipotent power and decrees that Gabriel and Uriel *will* sing praises eternally. Each praise in Gabriel and Uriel's set of praises is definite, since it is well defined and discrete since the praises are individually separated (Morriston, 2010, p.443).

Yet, it is true that at any point, the number of praises that Gabriel and Uriel will have sung is finite. Gabriel and Uriel will never have reached an infinite praise at any specific point along their praising sequence. However, Morriston (2010) notes that when asked how many praises Gabriel and Uriel will sing, the answer can only be: "infinitely many" (p.443). By God's own decree, an actual infinite will have been instantiated in reality. Therefore, Morriston's example provides a troubling counterexample to Craig and Metcalfe's claim that actual infinities cannot exist in reality. Additionally alarming for Craig is that this actual infinite is formed through successive addition, which would challenge the SAA (Dretske 1965; Malpass 2021; Morriston 2021). Each praise is added one after another, so that the number of praises that Gabriel and Uriel will sing is actually infinite.

Furthermore, Morriston's example challenges key arguments that Craig and Metcalfe present in defense of the second premise of the kalam. Morriston's objection presents a case in which, *pace* HHA and AA, an actual infinite has instantiated itself in reality. For our purposes, then, the following analysis will focus primarily on HHA and AA, which argue against the possibility of an actual infinite existing in reality. Taken together, we will call these arguments the "absurdity arguments."

In this vein, to make matters worse for Craig and Metcalfe, Morriston imagines how someone who shares Craig and Metcalfe's absurdity argument-esque intuitions about actual

infinities may respond to his example. Perhaps, for instance, God could make room for infinitely more praises by having Gabriel and Uriel wait a minute after each of their praises. In place of those now vacant minutes, God could place a third angel, Raphael, who could sing praises in that slot for eternity, thus generating infinitely more praises. However, despite Raphael adding an infinite number of praises to Gabriel and Uriel's infinite number of praises, the angels will sing the same (infinite) number of praises, which is absurd (Morriston, 2010, p.444).

Additionally, God can subtract as many praises as he pleases from the praise load of Gabriel and Uriel. God could, for instance, silence Gabriel and Uriel after praise number four—subtracting infinitely many praises to leave only three behind. Moreover, God could also silence Gabriel, removing infinitely many praises to leave infinitely many behind. Thus, the critic may argue that one has subtracted identical quantities from identical quantities, yet has arrived at different results. Morriston's example, therefore, yields inconsistent implications due to the impossibility of an actual infinite existing in the endless future, as described by the thought experiment. Thus, one can generate an absurdity argument concerning an endless series of events in an endless future. Taking into account these absurdities, the critic may argue that actual infinities, such as the one described in Morriston's example, cannot exist in reality.

Morriston's example highlights that the absurdities of an endless future are similar to the absurdities generated by a beginningless past. One is meant to see this point by first supposing that the absurdities arising from a beginningless past generate good arguments for believing that the universe is past-finite. In that case, it appears as though the absurdities arising from an endless future would also give good arguments for believing that the universe is future-finite. Oppy (2006a) states this point well when he writes: "If there are reasons of the kind that Craig is here countenancing for supposing that the past cannot be infinite, then surely those reasons will carry over to support the contention that the future cannot be infinite" (p.141). Thus, if Metcalfe

and Craig's arguments establish that the universe must have begun to exist, they must also plausibly establish that the universe must end.

However, an endless future seems metaphysically possible or is at least not obviously metaphysically impossible. Therefore, rather than trying to prove the finitude of the future, the purpose of this argument is much more limited in scope. This argument serves as a reductio to demonstrate that Craig and Metcalfe's arguments are flawed. Specifically, Craig and Metcalfe's arguments are flawed in citing these alleged absurdities to prove the impossibility of an actual infinite existing in reality. More specifically, the argument shows that there is something wrong with Craig and Metcalfe's reasoning because their arguments do not seem to successfully establish, in the parallel case, the metaphysical impossibility of an endless future.

As a result, one should remain skeptical of whether these absurdities demonstrate that actual infinities cannot exist in the past or future-facing directions. As Yishai Cohen (2015) writes:

> Since these alleged absurdities are similar in kind to the alleged
> absurdities that follow from a beginningless past, it follows that Craig's
> argument against the possibility of a beginningless past results in an
> equally good argument against the possibility of an endless future, or at
> least a pre-determined one. Thus, to the extent that we are skeptical of
> the impossibility of a pre-determined endless future, we should similarly
> be skeptical of Craig's argument for the impossibility of a beginningless
> past. (p.167)

Morriston's example, therefore, shows that Craig and Metcalfe's arguments prove too much. That is, not only do Craig and Metcalfe's arguments demonstrate the impossibility of a beginningless past, but they also demonstrate the impossibility of an endless future. However, an endless future seems metaphysically possible or, at least, not *prima facie* metaphysically impossible. Consequently, we can remain unpersuaded by the citation of absurdities to demonstrate the impossibility of an endless future. And yet, if citing absurd results does not persuasively establish a finite future, then citing absurd results should not prove a finite past either. Simply put, just as these absurdities do not suffice in showing that the future is finite, so too do they not suffice in establishing that the universe is past-finite.

The more pressing difficulty emerges here once one takes stock of those who typically defend the kalam. Christians who believe in an everlasting life comprise the lion's share of kalam proponents. Presumably, eternal life represents an everlasting life in which one is forever in God's presence. Nevertheless, one may wonder how a belief in eternal life squares with a denial of an actual infinite existing in reality. Since heaven is regarded as an actual dwelling (2 Cor. 5:8), one may not resolve this tension by claiming that heaven is metaphorical or unreal. Thus, a genuine dilemma faces Christian defenders of the kalam. Either time is finite, in which case a cornerstone of Christian theology is false, or time is infinite, and the philosophical defenses for the kalam are false. Neither horn of the dilemma proves savory as the Christian's hand is forced to make an unwelcome choice in both cases. Malpass and Morriston (2020) summarize this point trenchantly when they write:

> Perhaps more importantly, many contemporary proponents of the Kalam
> argument believe in the life everlasting, where this is conceived as a never
> ending sequence of heavenly or hellish experiences, each of which will occur. So
> if an endless series is infinite in the same sense as a beginningless one, these

philosophers are in a bit of a bind. Either one of their key arguments for the

impossibility of an infinite past is unsound, or an important tenet of their faith is

not only false but metaphysically impossible. To get out of this bind, they need to

come up with a 'symmetry breaker' – a reason for thinking that 'an infinite

temporal *regress* of events is an actual infinite' is *true*, but that 'an infinite

temporal *progress* of events is an actual infinite' is *false*. (p. 831)

Malpass and Morriston (2020) highlight tensions that proponents of the kalam face. In

particular, Malpass and Morriston note how the commitment of the kalam proponent to eternal

life clashes with their arguments that an actual infinite cannot exist in reality. After all, eternal life

in heaven suggests that an endless series of events will occur as one basks in God's glory.

However, if this endless series is similar to a beginningless one, as Morriston's example would

imply, then it seems as if such a series could not exist. After all, the impossibility of an actual

infinite existing in reality, as demonstrated by Craig and Metcalfe's arguments, would preclude

such a possibility. However, Christian theology seems to dictate that there is eternal life. Yet, by

contrast, Craig and Metcalfe's absurdity arguments suggest that such future eternities could not

exist if they mirror a beginningless past.

Thus, to extricate themselves from this bind, proponents of the kalam must provide

reasons for thinking that a beginningless past, unlike an endless future, is an actual infinite.

Otherwise, arguments that prove a finite past would also establish a finite future. And such a

future-finite universe would once again challenge the Christian belief in eternal life. Alternatively,

if the future is infinite, then the arguments against the impossibility of an actual infinite would be

undermined.

In this way, if the proponent of the kalam fails to explain why we may treat a beginningless past as actually infinite while treating the future as only potentially infinite, then trouble arises for their argument. Specifically, if Craig and Metcalfe cannot provide what Malpass and Morriston call a 'symmetry breaker,' then Morriston's objection stands, and one can doubt the efficacy of these absurdity arguments (at least on the grounds provided by the absurdity arguments). Furthermore, since these arguments are rooted in the absurdity of an actual infinite existing in reality, as are the primary defenses for the second premise of the kalam, any doubt placed on them is also doubt placed on how the second premise of Kalam is defended. Consequently, Morriston's objection poses a serious challenge to the justifications offered in defense of the second premise of the kalam.

§5 A-theoretic Replies

Craig can, at this point, offer a symmetry breaker that warrants treating the past differently than one treats the future. According to the tensed theory of time to which Craig subscribes, known as presentism, temporal becoming is an objective feature of reality such that there are *no future events*. So on presentism, there are no future events about which one can speak, let alone an infinite number of such events. This feature of presentist ontology allows Craig to identify a salient difference between the past and the future that blocks the parallel absurdity argument against an endless future. At the same time, it will allow the absurdity argument for a beginningless past to go through. Namely, the series of events from any point going in the later than direction is *potentially* infinite.

In contrast, the series of events going in the earlier than direction from any point in time is actually infinite or finite. In the first instance, any arbitrary point in time traveling along the later than direction will always be potentially infinite, since it will always be finite and yet approach

infinity as a limit. In the second instance, for the past series of events to be a potential infinite would mean that it must remain finite and yet increase in the earlier than direction, which clashes with the notion of temporal becoming. Therefore, given the plausibility of a tensed theory of time, which Craig (2000b,c) has defended, it seems as if an A-theorist may offer an asymmetry between the past and the future that undermines Morriston's objection.

Moreover, an A-theorist may also construct a symmetry breaker by adopting a growing block theory of time, as defended by Michael Tooley (1997), Peter Forrest (2004), and Fabrice Correia and Sven Rosenkranz (2018). According to the growing block theory, only past and present events, as opposed to future events, are actual. The growing block theorists seem able to provide a symmetry breaker that distinguishes the actuality of the past from the unreality of the future. Any A-theorist inclined to accept the growing block theory can, it seems, easily escape Morriston's bind.[4]

Bearing this in mind, the A-theorist is well situated to offer a symmetry breaker that would distinguish the past from the future. First, Craig provides a symmetry breaker by noting that one may regard an endless future, unlike the past, as only potentially infinite. Because the past must be either actually infinite or not, while the future is only potentially infinite, there exists a difference between the past and the future. Second, the growing block theorist offers a symmetry breaker by providing an ontology that treats past events as actual, and future events as unreal. Since past events are ontologically distinct from future events on the growing block theory, it is clear why there would be a symmetry breaker distinguishing the reality of past events from the unreality of future ones.

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[4] We will explore independent issues that the growing block theory faces later in this dissertation.

The A-theorist, therefore, may be able to disarm Morriston's objection by noting, through either strategy, that parallel absurdity arguments cannot be generated to prove a finite future, as a beginningless past is distinct from an endless future. With Morriston's objection deflected, the A-theorist appears well prepared to declare that their absurdity arguments stand despite Morriston's attempts to refute them.

§6 The B-theorist's Bind

However, despite Craig's and the growing block theorist's clever rebuttals, it appears that the B theorist cannot offer a similarly effective response and is thus uniquely vulnerable to Morriston's objection. Specifically, if one adheres to the B-theory, one cannot provide a symmetry breaker between the past and the future. After all, all events in time in the B-theory are equally real as they share the same positive ontological status. Because the B-theory cannot provide a relevant symmetry breaker, Morriston's objection would go through and thus successfully show that the future must end according to the B-theory.

Surprisingly enough, both sides of this debate agree on this point. Providing his commentary, Craig (2018) writes: "On a B-Theory of time it is perspicuous why arguments against a beginningless series of earlier events would be equally good arguments against an endless series of later events" (p. 393). Echoing this sentiment, Morriston (2010) notes that: "given eternalism, there is no relevant difference between the Gabriel/Uriel scenario with no beginning, and the one with no end" (p. 445).

Beyond the apparent consensus, there are robust reasons, as detailed above, for thinking that the B-theorist cannot provide a symmetry breaker to extricate themselves from

Morriston's objection. Consequently, the B-theorist remains vulnerable to Morriston's objection, which could threaten AA, and to that extent, their primary philosophical defense of the B-theoretic kalam's second premise. Thus, although critics have previously launched Morriston's objection against Craig's A-theoretic kalam, it has gone largely unremarked that Morriston's objection poses a more significant threat to the B-theoretic kalam.

In particular, the B-theorist faces a dilemma from which there is limited hope for escape. On the one hand, if Morriston's objection goes through and the future is finite, then the notion of an eternal afterlife is untenable. If time in the actual world must end and heaven is part of the actual world, then time in heaven must also come to an end. And an endpoint to time in heaven would seem, however, to contradict its eternal nature. A B-theorist may not shrug off this problem by suggesting that heaven is separate from the actual world since transworld transportation is impossible. Every human destined for a heavenly existence must surely travel to that divine abode. The necessity of heaven's residents to travel home after death would prevent one from counting heaven as only a possible world. Therefore, not only does Morriston's example weaken AA, but it also severely undermines a cornerstone of Christian theology, namely the notion of an eternal afterlife.

Furthermore, B-theorists are ill-equipped to defend themselves against Morriston's objection. On the B-theory, future moments in time are as real as all earlier points in time. It follows then that all of Gabriel and Uriel's praises later than now would exist. The B-theorist could not offer any symmetry breaker differing moments earlier than or later than now, since they all exist equally. Since there is no symmetry breaker between moments on the timeline and that such a symmetry breaker is required to rebut Morriston's objection, it follows that Morriston's objection goes through. Consequently, Morriston's objection significantly undermines both the strength of AA and the plausibility of eternal life on a B-theory of time.

On the other hand, if Morriston's objection fails and the future is infinite, then the future series of events constitutes an actual, as opposed to a potential, infinity. Without any notion of temporal becoming, events on the B-theory exist tenselessly. In this sense, the events described by the B-theory either constitute an actual infinity, or they do not. They cannot form a potential infinite since events are not growing towards the future, so they could not grow in a particular direction towards infinity as a limit. As Loke states: "On a static theory of time, the future cannot be a potential infinite; it would be either finite or actually infinite" (Loke, 2016, p.59). The B-theory, therefore, suggests that the future is either actually infinite or it is not. So if the parallel version of AA fails, and the future is not finite, then it is actually infinite. The failure of the parallel version of AA would thus suggest, on the B-theory, that time is actually infinite in the future direction.

However, the essential premise of AA is that a whole and essentially ordered actual infinite of this kind cannot exist. In this way, even if Morriston's objection did not work, one would have a powerful defeater for the fundamental premise of AA. AA would, subsequently, collapse as a compelling argument demonstrating the impossibility of an actual infinite for the B-Theorist

The dilemma therefore vitiates the B-theorist's defense of the kalam's second premise. In the first case, Morriston's objection damages AA and the notion of an eternal afterlife, which is critical to Christian theology. In the second case, the failure of Morriston's objection still disquieted the B-theorist as the series of events later than now constituted an actual infinite, which provided a powerful counterexample to AA's critical premise. In either case, the B-theorist's defense of the kalam's second premise is undermined if not refuted. For these reasons, I regard the B-theorist's defense of the kalam's second premise as weak.

From this analysis, one can see that proponents of the B-theoretic kalam cannot hold fast to this trio: eternal life, the B-theory, and the typical philosophical defenses for the kalam's second premise. In other words, these three items form an inconsistent triad. For instance, when Metcalfe endorses his preferred argument in defense of the kalam's second premise, he is, in the context of the B-theory, thereby disproving eternal life. Three main options stand out as possible ways in which Metcalfe may escape from this bind. First, he may abandon the B-theory and subscribe instead to the A-theory. Second, he may retire his belief in eternal life which is central to Christian theology. Or third, he may abandon his philosophical defense of the kalam's second premise in search of new arguments. However, in the absence of further support for that second premise, which, for reasons mentioned in §1.2.1, may not be found in cosmology, it looks that, in practice, the kalam depends on the A-theory. Specifically, in practice, no one who wants to offer the kalam will draw back from eternal life. Practically speaking, we may say that the kalam depends upon the A-theory until alternative arguments substantiate the kalam's second premise.

Part One Conclusion:

In part one of this dissertation, we have looked at the kalam in general and B-theoretic versions of the argument in particular. We have also found that the kalam does not work on the B-theory of time because it falls into what we have called the "B-theorists bind." Either the future is finite, in which case belief in eternal life is misplaced, or the future is infinite, in which case an actual infinite is possible. Neither option proves desirable for the B-theorist, as it becomes clear that they cannot consistently hold to eternal life, the B-theory and the usual philosophical defenses for the second premise of the kalam.

Like Craig, the B-theorist may try to appeal to scientific evidence to establish their second premise. But, as §1.2.1 showed, the big bang is consistent with several cosmological

models that do not entail an absolute beginning. Reputable cosmological models, such as the

Carroll-Chen (2004) model, take the big bang seriously and are past-eternal. So the big bang

does not serve as definitive evidence proving an absolute beginning. Furthermore, the BGV

theorem, as indicated by the authors, *does not* suggest that the universe must have begun to

exist. Much to the chagrin of the theist, the BGV is not correctly interpreted as supporting the

idea that the universe had an absolute beginning.

Stripped of philosophical and scientific defenses for their second premise, the B-theorist

is at a loss to remedy their argument. The B-theorist who seeks to defend the B-theoretic kalam

cannot simultaneously hold their inconsistent set of commitments to eternal life, the B-theory,

and the defenses mentioned above of the kalam's second premise. Meanwhile, scientific

evidence does not establish the universe as having an absolute beginning. For these reasons,

we may see the kalam as, in practice, relying on the A-theory because the argument faces an

insurmountable objection when formulated in terms of the B-theory.

Part Two

Part Two Introduction:

After showing how the kalam is incompatible with the B-theory of time, I will shift the discussion to the A-theory. Unlike the B-theory, the A-theory has several variants, all of which have been defended at varying lengths. To determine whether the kalam is compatible with the A-theory, we must first assess whether any variant pairs nicely with kalam. If such a pairing emerges, the kalam will rest comfortably within an A-theoretic context. Of course, the next question will then be whether the variant upon which the kalam rests is viable. In this vein, the remainder of this dissertation will be divided into three chapters.

First, in Chapter four , we will explore two main variants of the A-theory and whether they are compatible with the kalam. This part will find that the growing block theory of time nicely corresponds with the kalam. Second, in Chapter five, we will investigate the merits and demerits of the growing block theory of time. Third, in Chapter six, we will uncover a novel objection to growing block varieties of the kalam. In particular, this objection will center the physics and metaphysics of time travel.

In the end, we will see that the growing block theory of time is commendable in its ability to capture some of our intuitions but ultimately lacking in its inability to achieve its theoretical ends. For these reasons, we will come to regard the growing block theory of time as unsatisfactory and not robust enough to support the kalam.

The kalam left without any support is then vitiated. Neither the A-theory nor the B-theory provides the requisite support for the argument to get off the ground. To the extent that no theory of time can support the kalam, the kalam is either insupportable or needs a new theory of time. Since the prospects of a new theory of time emerging seem limited, one can safely say that the kalam is refuted.

IV. Chapter Four: Hilbert's Hotel and Presentism

Naturally, one may start by determining whether the kalam agrees with Craig's presentism. After all, Craig sees presentism as undergirding the kalam. For Craig, past and future events are unreal; only the present exists. Presentism is, in this way, a symmetrical view of time, since the past and the future are treated as equally unreal. However, this may spell trouble for both of Craig's arguments in defense of premise 2. In what follows, we will explore how presentism impinges on both the HHA and the SAA.

§7 HHA and Presentism

Presentism, in the view of some critics, may be immune to the deductive force of the HHA. Specifically, presentists cannot affirm that an eternal past implies an actual infinite, since they believe that the past does not exist. If the past does not exist for the

presentist, then *a fortiori* an infinite number of past events cannot exist. Therefore, whatever absurdity is intended to motivate Craig's conclusion is not available to the presentist.

Suppose, for example, that the collection of events so far is represented by marbles dropping daily in a jar.[5] For every day that passes, another marble is placed in the jar. For Craig, an eternal past would imply that an infinite number of marbles would find themselves in the jar, an implication that is too absurd to consider as palatable. For instance, the even number of marbles in the jar would equal the total number of marbles in the jar such that if we subtracted the even-numbered marbles, the same amount would remain. This is, *mutatis mutandis*, what Craig attempts to show with Hilbert's hotel. Namely, one can chastise the mathematician for performing transfinite arithmetic, but one cannot stop a flesh-and-blood person from removing marbles from a jar, which would result in unacceptable absurdities. For Craig, we are required to accept that actual infinities cannot exist. As Craig (2001) himself phrased it:

> While we can slap the hand of the mathematician who attempts such
> operations with infinite numbers, we cannot in reality prevent people from
> checking out of a Hilbert's Hotel with all the attendant absurdities. (p.224)

Because nothing hangs on the analogy involving hotel guests, Craig presumes that we can attribute the resultant absurdities to the concept of the actual infinite. Thus, the past

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[5] Although this example is used for the SAA, it suffices to illustrate what Craig is trying to say about actual infinities. Namely, that actual infinities cannot instantiate themselves in reality.

cannot be infinite, since, like the guests in the hotel, there can never be an actually

infinite number of things instantiated in reality due to the resulting absurdities.

However, critics may argue that this analogy fails to capture the presentist

ontology. Recall that for presentists, as events fade into the past, they also fade out of

existence. So even if one agrees that an infinite number of past events have preceded

the current one, that still would not imply, on a presentist ontology, that an actual infinite

number of things *exist*. Such past events would not exist even if time passed through an

infinite number of them. So *even if* a presentist accepts a beginningless past, they are

not *also* committed to an infinite number of past events since such events would not

exist. To use the case of the marbles, there would be no marbles in the jar to generate

any absurdity. Of course, this spells trouble for Craig's argument, since it is based on

the idea that an infinite number of things cannot exist (Hedrick, 2018, p.191). So, a

presentist can, without worry, hold both that the past is eternal and that an actually

infinite number of things cannot exist since past events do not exist. Morriston (2010)

summarizes this point well when he writes:

> Note also that presentism is a double-edged sword, since it implies that
>
> *past* objects and events don't exist. If the non-existence of future events
>
> made any real difference to the question we are concerned with, you'd
>
> think the non-existence of past events would make the same difference. If
>
> the non-existence of future events entailed that an endless series is not an

actual infinite, the non-existence of past events should have precisely the same unwelcome implication. (p.448)

Presentism, therefore, does not equip one with enough resources to generate the absurdities required to make the HHA. Eternalist models of time may be congenial to these arguments, as they would regard past events as real, but presentism is antithetical to such models (Hedrick, 2018, p.190). Presentists should, in this sense, look askance at Craig's HHA since it depends on absurdities that one cannot produce on a presentist ontology. Hedrick (2018) offers one final hope for Craig's HHA when he suggests that Craig may revise his argument as follows:

(D1) There cannot be a world in which an actually infinite number of things has been actualized.

(D2) If the actual world is one in which the universe is past-eternal, then there is a world in which an actually infinite number of things has been actualized.

(D3) Therefore, the actual world cannot be one in which the universe is past-eternal. (p.307)

Although Hedrick omits explaining why this formulation avoids his previous objections or why Hilbert's hotel does not apply to (D1), one may attempt to offer an explanation. On one reading, Hilbert's hotel only precludes the existence of certain infinities from

existing in actuality. Infinities in which members of the infinite set can be manipulated and shuffled around are ruled out as metaphysically impossible. A scrupulous eye will notice that trouble arises in Hilbert's hotel once guests are allowed to swap rooms. No absurdity would arise if such exchanges were prohibited and each guest was locked in their room permanently.

Importantly, the supposed infinite string of past events also shares this feature. In other words, one is not free to manipulate past events to his liking. Although, for example, guest one in Hilbert's hotel may be able to move to room two without any hassle, my first birthday may not take the position of my second birthday in the A-series. Such a reorientation would run against how A-theorists and B-theorists conceive of time as functioning. Morriston (2003) made this point especially clear in a passage worth quoting at length.

> A hotel is a collection of *co-existent* objects (rooms and guests) whose
> physical relationship to one another can be *changed*. It is only when these
> features are *combined* with the property of having infinitely many rooms
> and guests, that one can draw the Absurd Implication. If the rooms and
> guests did not exist simultaneously, the idea of the hotel's being "full"
> would lose all meaning. If it were metaphysically impossible to change the
> physical relationship between guests and rooms - if the guests were not
> the sort of thing that could be moved from one room to another, then they

would exist immutably in their immutable rooms, and the Absurd

Implication would again not follow. (p. 296)

In this way, because Hilbert's hotel bars only *certain* infinities from existing, it cannot be relevant to prove the claim that *all* infinities cannot exist. Infinite possible words, sets, and propositions could still exist since they do not share the characteristics that prevent Hilbert's hotel from existing. More importantly, as mentioned previously, Hilbert's hotel would also not prevent an actually infinite past from existing since, like numbers in a series, one cannot change or manipulate past events to one's liking.

Given that Hilbert's hotel is ineffective at demonstrating that all infinities cannot exist, one is justified in considering it as largely beside the point where (D1) is concerned. As Oppy (2006) notes:

… there are good reasons for claiming that the puzzles to which Craig adverts – primarily Craig's Library and Hilbert's Hotel – actually show no such thing. Apart from the errors that Craig makes in his assessment of the puzzle cases that he discusses, the key point to note is that these puzzle cases simply have no bearing on, for example, the question of whether the world is spatially infinite, or the question of whether the world has an infinite past. At most, it seems that one might suppose that these puzzles show that there cannot be certain kinds of actual infinities; but one

could hardly suppose that these puzzles show that there cannot be actual

infinities of any kind. (p.140)

To the extent that Hilbert's hotel only demonstrates that certain infinities cannot exist, is

also the extent to which it is not relevant to the claim that *all* infinities cannot exist. Even

in this modified version that is considered more favorable for Craig's purposes, Hilbert's

hotel is still irrelevant in defending the key premise of the argument.

All in all, one may see HHA as impotent against presentists. On the one hand,

HHA seeks to establish that a past-eternal universe eventuates in absurdities because it

entails the existence of an actual infinite. On the other hand, presentism holds that past

events are non-existent, meaning that an infinite number of events that have elapsed

would not entail an infinite number of events that exist. The presentist can, therefore,

simultaneously believe that the past is eternal and that an actual infinite does not, and

perhaps even cannot, exist. However, this combination of views should not be possible

if the HHA works on presentism. Yet, since these views are compatible with presentism,

there is reason to think that the HHA does not work on presentism. For these reasons,

presentism is detrimental to HHA.

§8 Hilbert's hotel and (D1)

Although Morriston and others may illuminate Hedrick's otherwise opaque

reasoning, it is still unclear whether Hilbert's hotel is unrelated to (D1). Recall that Craig

is arguing on a theistic background in which God creates everything. In his endless omnipotence, God is capable of producing anything that is logically possible. Of course, as one might expect, this precludes God from creating nonsensical entities such as round squares or Penrose triangles. However, outside of this domain, God's power is limitless. With his power in mind, one may consider the relevance of Hilbert's hotel to (D1) as follows:

P1: If something is actualizable, then it is actualizable by God.

P2: Hilbert's hotel is not actualizable by God

C1: Hilbert's hotel is not actualizable

P3: If Hilbert's hotel is not actualizable, then there is at least one actually infinite collection of things that God cannot instantiate

C2: There is at least one actually infinite collection of things that God cannot instantiate

P4: If there is at least one actually infinite collection of things that God cannot instantiate, then that thing is relevant to whether actually infinite collections of things *simpliciter* can be instantiated

P5: Hilbert's Hotel is an instance of an actually infinite collection of things that God cannot instantiate

C3: Hilbert's Hotel is relevant to whether actually infinite collections of things *simpliciter* can be instantiated.

Despite the length of this argument, it is worth going through in detail. As classical theism would imply, all actualizable entities are actualizable by an omnipotent God. Bach, beer, and bacteria are all logically possible entities that God could actualize given his unlimited power. This premise is largely uncontroversial.

Premise two is perhaps the lynchpin of the argument. Hilbert's hotel is not actualizable by God because, in short, the all-at-once creation of an infinite set would involve an illicit modal operator shift fallacy. Just because, for instance, I can put *any* color duvet on my bed does not mean that I can put *every* color duvet on my bed. In the same way, just because God can produce *any* number of finite hotel rooms does not mean that he can make *every* hotel room in one go. To suggest that God has this capacity because of his omnipotent ability to create every hotel room would be to commit such a fallacy.

Logically speaking, we can represent this argument in the following way. Suppose, for the sake of argument, someone argued that because I can name my child any name, I can name them every name. We can represent their argument in the following way, where N=Is named.

P1: $\forall x \exists y (Nxy)$

C1: $\exists y \forall x (Nxy)$

The takeaway here is that one may not shift around nested quantifies if they are of a different type in this way. In this case, moving the existential and universal quantifiers is *not* truth-preserving.

Similarly, more to the point in question, we can model the argument that God could actualize Hilbert's hotel, as Cohen (2015) argues, quite simply. First, let us recall that Cohen argues that: "(b) For any object *o* that comes into existence at some past time or future time, God can bring about the existence of *o* at the present time" (Cohen, 2015, pp.179-180). From this, Cohen argues that God can snap an infinite number of hotel rooms into existence (Cohen, 2015, p.180). To model this, let H=is a potential hotel room, and G=is presently actualized by God. We can represent the argument accordingly:

P1: $\forall x(Hx \rightarrow \Diamond Gx)$, 0

P2: $Ha \land Hb \land Hc$, 0

C1: $\Diamond(Ga \land Gb \land Gc)$, 0 (Craig, 2018, p. 316)

Like our last example, this argument is logically invalid. Just because God can create *any* particular hotel room does not mean that it is logically possible for him to create *every* hotel room at once.[6]

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[6] Cohen here subscribes to an implausible principle concerning the possibility operator. Namely, it seems that he thinks it can move from narrow to wide scope quantification while preserving truth, i.e., $\Diamond A \land \Diamond B \models \Diamond(A \land B)$. However, this is not true. For instance, it is possible for me to be in Paris and it is possible for me to be in Dundee, but it is not possible for me to be in Paris and Dundee.

Clearly, it does not follow from God's omnipotence that it is logically possible for him to create Hilbert's hotel. That being said, P2 of my original argument is validated. C1 follows trivially from P1 and P2 via *modus ponens*. P3 and C2 are largely uncontroversial and therefore do not merit extensive coverage and defense.

P4 is more contentious and can, I think, receive a ready-made justification. For starters, if it is logically impossible for God to create infinite concrete entities in the same way that it is logically impossible to have an every-colored duvet, then there is reason to think that something about concrete infinities may not be actualizable. Of course, one may contest this evidence and point to continuous space as instantiating an actual infinity, but contesting the quality of the evidence does not contest its relevance.

Whether God can actualize Hilbert's hotel serves as a microcosm of whether he can instantiate any actual infinite as Craig would conceive it; after all, if God cannot create Hilbert's hotel due to paradox, God presumably could not create Bernadette's book or Craig's library due to the same paradoxes. No doubt, one can dispute whether Hilbert's hotel serves as a *good* piece of evidence supporting (D1), but for the reasons mentioned above, it is less clear if one can say that Hilbert's hotel is irrelevant *tout court*. For these reasons, P4 is reasonably supported.

With P4 defended, the rest of the argument follows naturally and unproblematically. As a result, I believe that Hedrick is best suited to revise his position on the relevance of Hilbert's hotel to (D1). Rather than dismiss Hilbert's hotel as

irrelevant to the premise in question, Hedrick should provide an argument for why it fails as an adequate piece of evidence in support of (D1). In the preceding, I have argued, along with Hedrick and Morriston, that time is too dissimilar to hotel guests to make any worthwhile analogical argument.

In what follows, we will analyze Loke's foray into this debate. His attempt to strengthen the analogy between Hilbert's hotel and the A-series will draw considerable attention as we move forward. If successful, Loke will show that HHA works on a presentist ontology and is thus a perfectly valid foundation upon which the argument can rest. In discussing Loke's argument, we will continue our analysis of the SAA given Loke's emphasis on infinities formed through gradual accumulation. With that said, we will now look at Loke's 'Customer Generator' argument.

§9 Loke's Customer Generator

Loke attempts to underscore the relevance of Hilbert's hotel to (D1) through a thought experiment. In this thought experiment, the hotel generator produces one new room per day that a new customer subsequently occupies. The newly minted rooms remain in existence, as do their designated guests. In Loke's estimation, this strengthens the analogy between our temporal experience and the features of Hilbert's hotel. Time has a forward-facing progression as moments pass from the future to the present to the past. Likewise, this new hotel orients itself and progresses toward the

future as one room after another comes into being. Temporal becoming, in this sense, is a shared feature of what we might call Loke's Hotel and the A-Series.

Loke's hotel is designed to satisfy each of Hedrick's revised premises. To start with (D2), a past-eternal hotel with Loke's characteristics would undoubtedly have an infinite number of guests and *mutatis mutandis* for a past-eternal universe with an infinite number of events. As Loke states:

> ...if the actual world is one in which the universe is past-eternal, then there would have been an actual infinite number of time intervals, and an actual infinite number of hotel rooms and customers occupying the rooms. In other words, if the actual world were one in which the universe is past-eternal, then there would be a world in which an actually infinite number of things have been actualized (premise D2). (Loke, 2018, p.203)

Loke's hotel does not have problems substantiating (D2). If Loke's hotel was past-eternal, then it follows that infinitely many hotel guests would occupy its infinitely many rooms. The metaphysical absurdities that follow from having infinitely many hotel guests rule out such a hotel from actually existing. These absurdities substantiate (D1), which states that there cannot be a world in which an actually infinite number of things have been actualized. Naturally, Loke will refer to Loke's hotel as evidence of why there cannot be a world in which infinitely many things have been actualized. With (D1) and

(D2) supported, Loke happily concludes (D3), or that the universe cannot be past-eternal.

In summary, Loke uses his imagined hotel to demonstrate that the past is not beginningless. Loke makes his case by first assuming the possibility of a beginningless past. Given this possibility, one can surmise that God could create finitely many hotel rooms *ex nihilo* every day without destroying any of his created rooms. Given these two assumptions, it follows that there would now exist an infinite hotel of the kind that Hilbert envisioned. But Hilbert's hotel is metaphysically unpalatable for Loke, as we have previously explored, so one premise must be false. And God surely is capable of creating finitely many hotel rooms *ex nihilo*, so that premise cannot be false. Subsequently, the premise that the past is infinite must be discarded due to this reductio. Therefore, the beginningless past is not possible. Although Loke has not placed his brief argument into more formal terms, Malpass and Morriston (2020) phrase it thus:

> 1. If time had no beginning, then a [Hilbert's hotel] would be metaphysically possible.
> 2. A [Hilbert's hotel] is metaphysically impossible.
> 3. Therefore, time has a beginning. (p. 844)

One may initially object to how much this argument depends on one's intuitions about Hilbert's hotel. Loke hinges much of his argument on distinguishing logical from metaphysical possibility. Although space prevents us from exploring this matter further, one could question whether metaphysical possibility identifies anything distinct from

logical possibility. In other words, critics are justified in having reservations about how Loke and Craig invoke the difference between metaphysical and logical possibility to defend P2 against potential critics, as previously mentioned. Loke, as a result, must first justify a meaningful distinction between metaphysical and logical possibility before predicting an argument on such a notion. Before that, potentially impossible proof is provided, critics are not obliged to follow his premises inescapably to their conclusion. For these reasons, skepticism about Loke's argument may have been justified from the outset.

Although discussions surrounding metaphysical possibility repay further study, considerations of scope preclude further investigations. It is sufficient for our purposes to note that one may not unproblematically tear metaphysical possibility and logical possibility asunder. We will investigate how Loke's argument serves as a potential symmetry breaker.

§9.1 Loke's hotel and symmetry breakers

Furthermore, one may question whether Loke's argument is similarly susceptible to the bind of the B theorist or, in this case, the A theorist. To Loke's credit, his thought experiment is seemingly inoculated against such an objection and may have created the desired symmetry breaker by Malpass and Morriston. Only a beginningless past, rather than an endless future, in other words, eventuates in metaphysical absurdity for Loke's hotel.

On the one hand, if construction, for example, began today in Loke's hotel, then an infinite number of hotel rooms would never be constructed. Consequently, no absurdity concerning an infinite number of guests would emerge. Instead, the number of guests in Loke's hotel would only be *potentially infinite*; that is, they would increase toward infinity as a limit without ever getting there. Loke's hotel would then only ever have a finite number of guests. But there is nothing contradictory about a hotel with finitely many guests. In fact, *every* instance of a hotel we have ever encountered is a hotel with finitely many guests. So, an endless future does not generate Hilbert's hotel-style absurdities for Loke's hotel.

On the other hand, as mentioned above, a beginningless past ensures that Loke's hotel will produce metaphysical absurdities. Like in the Hilbert Hotel, identical quantities can be subtracted from identical quantities and yield different results. Every absurdity rendered in Hilbert's hotel is shared by Loke's beginningless hotel. Loke's beginningless hotel, then, unlike his endless hotel, produces absurdities similar to Hilbert's hotel.

The primary reason why Loke's beginningless hotel is analogous to Hilbert's hotel is that in both cases an actual infinity is being quantified over. And since only Loke's beginningless hotel models a past-eternal universe, while Loke's endless hotel does not, one can quickly identify the culprit of the absurdities. Namely, one can

reasonably say that a past-eternal universe causes the absurdities since absurdities only arise when such a universe is modeled. As Loke himself states (2018):

> [...] it is obvious that in the modified scenario, if the actual world is one in which the universe is past-eternal, the absurdity will persist, but if the actual world is one in which the universe is not past-eternal, then no actual infinite number of hotel rooms and customers would have been built and generated and there would be no absurdity. Therefore, the absurdity can be shown to be due to a past-eternal universe. (p.204)

Simply put, Loke argues that accumulating guests from eternity past would eventuate in an existing actual infinity, while accumulating guests from now into the endless future would never result in an actually infinite number of guests. Ergo, the endless future is not symmetrical to the beginningless past.

It seems like Loke has constructed a robust thought experiment to fortify Hilbert's hotel against recent critiques. By imagining a customer-generator, Loke strengthens the hotel's resemblance to how time functions on the A-series. Now imbued with dynamic properties such as temporal becoming, Loke's hotel aims to illustrate why a beginningless past, as opposed to an endless future, is absurd. In this key respect, Loke appears to offer a unique symmetry breaker not thought of by Craig.

In addition, because presentists concede that past events *have* been actualized, Craig can presumably utilize Loke's argument to provide Malpass and Morriston's desired symmetry breaker. If true, then the presentist will remain unperturbed by the bind of the A-theorist, and the endless future will not threaten the kalam. In the next section, we will explore whether Loke's hotel is a successful symmetry breaker.

§10 Loke's Hotel and Presentism: An initial worry

Although Loke's hotel is more formidable than Hilbert's hotel as a persuasive device and, by extension, as a symmetry breaker, one may wonder if it is amenable to a presentist ontology. After all, presentists hold that past events are non-existent. So if Loke's hotel is analogous to how presentists treat time, then every room generated by the hotel generator would become a reality and then become non-existent once it left the present moment.

Far from having infinitely many hotel rooms, Loke's hotel, by this interpretation, would have one hotel room on his model: the present one. On presentism, there is simply no sense of 'accumulation' wherein a collection of events is formed by successive addition. Without the ability to accumulate events in this successive fashion, the presentist is forced to concede, in the words of Malpass, that (2021): "the mere passing of time is not enough to constitute the forming of a collection of events by successive addition, because the *Accumulation* condition (crucial to successive addition) is never satisfied" (p.16).

Therefore, tacking on room after persisting room as time progresses is not representative of how presentists conceive of time. If anything, for Loke's hotel to accurately represent the treatment of time by presentism, then the hotel room must arise and then disappear almost immediately as time progresses.

So, Malpass and Morriston's concern regains the spotlight. If neither past hotel rooms nor future hotel rooms exist, how can Loke's hotel be said to provide a symmetry breaker in a presentist ontology? The number of endless-future hotel rooms and the number of beginningless-past hotel rooms are both zero for the presentist. There is just not enough fuel to generate the kind of paradox required to provide Loke's hotel with enough argumentative force.

Loke has responded by arguing that, in the language of (D1), presentists still affirm that past events *have* been actualized. So long as they can claim that past events have actualized, is insofar as they can distinguish them from future events, which have not been actualized. To take the example of Loke's hotel, the generator has actualized all past hotels, while it has not actualized any future hotel room. In fact, the number of future hotel rooms that have been actualized is zero. Meanwhile, the number of hotel rooms that have been actualized is *infinite*. In this respect, Loke thinks his argument could retain its status as a viable symmetry breaker. Loke (2018) writes:

[...] the modified HHA is free from this worry. For on the presentist ontology, events in the future have not yet been actualized, whereas events in the past have already happened and been actualized (Craig (2010), cf. Morriston (2010)). Thus, a universe that is past-eternal would entail the actualization of a hotel with an actual infinite number of rooms and customers, with the resultant absurdity. However, the number of rooms and customers built and generated in a universe that is moving from now into the not yet eternal future is always finite (i.e. the number would be increasing towards infinity as a limit but never gets there), hence there is no resultant absurdity. (p.204)

Loke hones in here on the idea that past events and future events differ because the former is actualized and the latter is not. Only actualized events are a part of the actual world, and thus can be considered as extant on a presentist ontology. Bill Clinton's inauguration, Michael Jackson's death, and Princess Diana's marriage have all been realized and thus represent actualities rather than potentialities. By contrast, future events are only potential and thus, unlike past events, cannot be counted, since there are none of them. Craig (2010) makes this argument as well when he writes:

Everything that has happened has been actualized. As the medievals put it, these events have exited from their causes and are therefore no longer in potentiality. The actual world thus

includes both what does exist and what did exist. But events which have yet to take place, being pure potentialities, are, on a tensed view of time, not part of the actual world. (p.456)

If past events have "exited from their causes" while future events have not, then perhaps Craig and Loke are bringing a key symmetry breaker to light. Past events, unlike future events, have been actualized, which differentiates the former from the latter. As a result, one ought to treat an infinite string of past events and its concomitant absurdities as distinct from an infinite string of future ones, whose worries are immaterial by comparison. The endless future, therefore, should be treated differently than the beginningless past, and, say, Craig and Loke, the symmetry breaker is validated. Now we will turn to objections that can be leveled against Loke's hotel to salvage the argument of Malpass and Morriston before considering whether Loke's hotel stands despite these criticisms.

§11 Inverting Loke's Hotel

One potential response is to invert this argument so that its status as a symmetry breaker narrows to the point of vanishing. To set this up, one may start by noting that it is undoubtedly within God's omnipotence to destroy a finite number of hotel rooms on a given day without creating any additional rooms. Supposing that the future is endless and God fills the future with such destruction, then an infinite hotel must exist now; otherwise, he would eventually exhaust the number of hotel rooms he could destroy. So,

provided that he does not build any new hotel rooms, this implies that there is a Hilbert's hotel now. But since Hilbert's hotel is metaphysically unpalatable, one premise must be eliminated. God can destroy finitely many hotel rooms without creating new ones, so the other premise that the future is endless and infinite must go. The conclusion, therefore, is that the future must come to an end.

Notice that the structure of this argument mirrors, with reasonable fidelity, the structure of Loke's original argument. Both are reductios arguing against the possibility of an infinite time series. One argument employs, for its purposes, the case of God creating hotel rooms indefinitely, while the other uses the case of God destroying hotel rooms indefinitely. Having made the necessary changes, the mirror of Loke's argument is, *mutatis mutandis*, parallel to Loke's original formulation. Unless and until the kalam supporter can identify a reason for rejecting the parallel formulation of Loke's argument, the critic is justified in concluding that Loke's argument itself can be mirrored and thus does not serve as an adequate symmetry breaker.

At this point, a Kalam supporter may note that God can only destroy hotel rooms endlessly if there is now a Hilbert's hotel, but there is no reason to grant such a possibility. God cannot destroy hotel rooms indefinitely into the endless future. So, when considering the two premises, that the future is endless and that God can destroy finitely many hotel rooms forever, it is the second premise that one must discard. The problem for the Kalam supporter is that we are making assumptions that make a Hilbert's hotel possible now. Because the mirror of Loke's reductio makes mistaken

assumptions of this kind, while Loke's original argument does not, the kalam supporter will argue that the former argument is unsuccessful while the latter proves its conclusion unproblematically.

However, the kalam supporter appears to overlook that their response to the mirror of Loke's argument is equivalent to the critic's reply to Loke's original argument. Namely, in the case of Loke's hotel, God cannot *create* finitely many hotel rooms indefinitely. If Hilbert's hotel is impossible, then God could not spend all of the past creating hotel rooms because then there would be a Hilbert's hotel. The supporter of the kalam cannot have it both ways.

On the one hand, kalam supporters want to dismiss the mirror of Loke's argument because it makes assumptions that would imply, for the purposes of reductio, the existence of an actual Hilbert's hotel. On the other hand, kalam supporters, at least those that support Loke's argument, want to utilize assumptions for the purpose of reductio which would imply the present existence of Hilbert's hotel.

These two moves cannot be made simultaneously; thus, one must be abandoned. Either choice is undesirable as renouncing the refutation of the mirror of Loke's argument would render that mirror argument unrefuted and thus problematic for the kalam supporter. Alternatively, but still painfully, the kalam supporter could reject those assumptions underlying the kalam that result in the actual existence of a Hilbert's hotel. Still, then much of the intuitive force of the kalam would vanish.

So, the kalam supporter's reply to the mirror argument is not successful; therefore, it seems that Loke's argument can be mirrored. All one must do is change the past tense to the future tense and switch from creating to destroying in Loke's original argument, and then we have a mirror argument. Therefore, Loke's argument is not a symmetry breaker of any consequence and can be dismissed at least on these grounds.

However, Loke can understandably accuse his critic of being misguided. Every day is such that God could create a room because it does not matter how many rooms exist on a given day. Fundamentally, nothing is stopping God from adding another hotel room. However, it is not symmetrical with respect to destroying hotel rooms since one cannot destroy rooms unless there are rooms to destroy. So, the correct claim would be that 'on any day in which there is a room, God could destroy a room', but not literally that 'God can destroy on any day.'

Loke might say that, given that Hilbert's hotel cannot exist in the present, then, however many hotel rooms exist, God can destroy any of them when they exist, but if God were to do that every day, then eventually the rooms would run out and that would have to stop. So, there is nothing convincingly showing that the fact that God can destroy any room that exists entails the possibility of a Hilbert's hotel. As a result, Loke can successfully rebut the inversion of his argument. In what follows, we will analyze the objections presented in various ways by Malpass and Morriston against Loke's hotel.

§12 The Impossibility Objection

Of the replies Malpass and Morriston have made to Loke, one is particularly noteworthy. Unlike the rest, it suggests that Loke's hotel is metaphysically impossible. Provided that God cannot snap infinite hotels into existence, as most theists would concede, Loke's hotel, the thought goes, becomes impossible. This is because a Hilbert's hotel could only happen if it were already in place. As our discussion with Avicenna's beams illustrates, one cannot, after all, add a finite amount to a finite amount and produce an infinite length. Therefore, since God cannot do the same, the only way Loke's hotel would become a Hilbert's hotel would be if Hilbert's hotel already existed. However, ex hypothesi, Hilbert's hotel is impossible. Thus, Loke's hotel, for Malpass and Morriston, is ineffective as a symmetry breaker, since it is metaphysically impossible. As Malpass and Morriston write (2020):

> What 'prevents' God from adding hotel rooms one at a time and arriving at a HH is that this is already a *metaphysically impossible situation*. … If at t_{-1} God creates a single room, and then later at t_0 there is a HH, it follows that there already was a HH at t_{-1}. After all, the addition of one hotel room (or any finite number of hotel rooms) cannot ever be enough to change a finite hotel into an infinite one. (p.847).

Here, Malpass and Morriston stress that Loke's hotel is doomed. By asking us to imagine a metaphysically impossible scenario, Loke's hotel has no hope of being a successful symmetry breaker. If all God can do is add one hotel room per day and it is impossible to traverse an actual infinite, then Loke's hotel could not produce an infinite hotel unless it was already one to begin with. As a result, Malpass and Morriston believe that they have provided us with further reason to discount the argumentative force of Loke's hotel.

However, it is unclear whether this reasoning is persuasive. After all, to make their point, Malpass and Morriston make a critical concession. They concede that one cannot form an infinite set through successive addition. Only on the basis of this assumption, in other words, is it possible for them to dismiss Loke's hotel as metaphysically impossible. However, making this concession for the sake of argument involves conceding the main premise of the SAA. Recall that the SAA states that:

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

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

3. Therefore the temporal series of events cannot be an actual infinite. (Craig, 2000, p. 103)

The point of Malpass and Morriston, therefore, is directly related to the truth of premise 2. If, as they say, one cannot traverse an actual infinite in finite steps, then premise two is substantiated. No number of finite steps, such as rooms being added to a finite hotel, could ever produce something that was actually infinite, according to Malpass and Morriston. As Malpass and Morriston state (2020): "After all, the addition of one hotel room (or any finite number of hotel rooms) cannot ever be enough to change a finite hotel into an infinite one. One cannot, as it were, traverse an actual infinite in finite steps" (p.847).

But this is what Craig wants to argue. That is, Craig seeks to establish that one cannot form an actual infinite through successive additions. Unfortunately, by responding to Loke, Malpass, and Morriston accidentally concede to the second premise of SAA. This is an unfavorable result. Consequently, this objection fails to refute Loke's hotel.

§13 The Tense Logic Objection

Malpass and Morriston offer a second objection that may prove more effective than their first. To preface their point, Malpass and Morriston seek first to refocus the debate on what they see as the question at issue. That is, unlike Craig, the question that Malpass and Morriston are concerned with is not the number of future events that *will have* been actualized at any point in time.

Malpass's expressed interest is in how many future events will be realized. Once properly framed, the answer to the question of how many hotel rooms will be created if the generator starts now and never stops is infinite. In terms of symmetry, then, just as infinitely many hotel rooms have been actualized in a beginningless past, infinitely many hotel rooms will be actualized in an endless future.

Importantly, neither of these past or future rooms exists anymore, so they remain symmetric ontologically as well. So the nonexistence of future events is not a symmetry breaker for presentism since both past and future events do not exist. But Craig and Loke argue that, even though they do not exist, past events have occurred, which is the differentiating factor. However, future events, even though they do not exist, will occur, so the situation is symmetrical.

In this way, claiming that the countability of actualized past events suffices in differentiating the actuality of a past infinity from the mere potentiality of a future one will not work. Future events, like past events, both (a) do not exist and (b) can be counted on a presentist ontology. Together with Morriston's angels, we can use the following example to illustrate this point.

> *Marco Pierre White: White let the Michelin Guide know that on the 23 of December 1999, he was cooking his last dinner service and would subsequently retire as a chef. He performed 2 other dinner*

services on 21/12/99 and 22/12/99 before his last service on the 23rd.

Now, if someone were to ask Craig, who presumably knew White's future schedule, how many dinner services he would cook from now on, he would surely be able to answer with a resounding 'three'. Although these future dinner services are merely potential rather than actual, it stands to reason that one can count the number of services. And if it stands to reason that one can count three such events, then it also stands to reason that, if White were to cook for eternity, the number of dinner services that will be cooked is infinitely many. For any positive integer n, in other words, White will cook n dinner services. And if n is the set of positive integers and that set is infinite, then White will cook infinitely many dinner services. As Malpass and Morristion (2020) state:

> Again, we can think of this as a series of 'pure potentialities', each of which will be actualised. And again, we can ask for the number of potential 'counting events' that will – at *some time or other* – be actualised. It is easily proved by mathematical induction that for every positive integer n, Counter will actualise an nth potential act of counting. Here, then, we have an *infinity of potentialities* – which (note well!) is *not* to be confused with a *potential infinity.* (p.840)

Just as White's endless cooking would represent an infinite number of potentialities, Loke's hotel would represent an infinite number of actualities. Both instances represent situations in which there is an infinite, countable string of events subject to temporal becoming. Each case is symmetric in that the events that constitute the infinite sets can be counted: the number of rooms in Loke's hotel and the number of services in White's restaurant.

Here, Craig may interject that there *are* no such future services in Marco's restaurant, so it is nonsensical to say that one can count them. As Craig (2018) states in response to Hedrick:

> There never will occur an actually infinite number of events, since it
> is impossible to count to infinity. The only sense in which there will
> be an infinite number of events is that the series of events will
> increase toward infinity as a limit. Therefore, it is not the case, as
> Hedrick claims, that the events in an endless future can be put into
> a 1-1 correlation with the events in an endless past, for the number
> of future events is 0, while the number of past events is *ex
> hypothesi* ℵ0. (p.394)

White's restaurant can hardly be regarded as constituting an actual infinite because every future service that he will perform does not exist in the present, and the present is all that exists. Therefore, since this actual infinite does not exist in the

present, it cannot be admitted by definition into the presentist ontology. Craig can then settle for claiming that because the future number of services in White's restaurant is zero, while the number of hotel rooms in Loke's hotel is infinite, there is a relevant asymmetry between the past and the future.

However, this objection will not wash for Malpass and Morriston since, as briefly explored earlier, both past and future events do not exist for Craig. On this basis, one can hardly claim that future events are unique in their non-existent status, since past events share that quality as well according to presentism. Of course, Craig still agrees that there *have been* and *will be* future events.

However, this concession allows one to generate Malpass and Morriston's argument. The series of future events, for Malpass and Morriston (2020), is represented by the "B(x) function" (p.834). The output of this function is everything greater than its input, or "{y | x < y}" (p.835). Importantly, the number of elements in this set, or its cardinality, does not change across inputs. Given that there is no highest natural number, the cardinality of 10,11,12... is equal to the cardinality of 100,101,102... Malpass and Morriston (2020) note that an important point follows from this, which is that: "For every input value of B(x), its output is actually infinite" (p.835). Reflecting on this function draws out critical points related to Craig's response and also Loke's.

First, asking how many praises Morriston's angels will sing is asking about the *cardinality* of the praises said. The answer, as our analysis of the B(x) function showed,

is infinitely many. So Craig's answer that Morriston's angels will sing 'potentially infinitely many' praises is confused on two counts. In the first instance, the cardinality of this set does not 'grow' in any meaningful sense. Morriston's angels are not tasked today with singing an infinity of praises, only to be tasked tomorrow with singing even more praises. The cardinality of how many praises will be sung remains the same. The cardinality of how many praises will be sung remains the same. Craig's insistence that the number of praises would increase toward infinity as a limit is, in one particular sense, mistaken (Malpass & Morriston, 2020, p.835).

In the second instance, Craig seems to equivocate here between the B(x) function and what Malpass and Morristion (2020) call the A(x) function (p.834). The A(x) function is one in which the output is 'everything less than or equal to the input' (p.834). For example, A(5) = 0,1,2,4,5. When speaking of events that have occurred, one seems to refer to the A(x) function. Considering that Craig includes within his ontology all those effects that have been exited from their causes up to the present, it is safe to say that the A(x) function represents what Craig would regard as existing.

Keeping that in mind, one is well equipped to understand why Malpass and Morriston see Craig's appeal to non-existent future events as unsatisfactory. The question regarding Morriston's angels has been how many praises will be said. Craig's answer that Gabriel and Uriel will then utter a potentially infinite number of praises refers to the A(x) function. That is, at any finite point, only a finite number of praises will

have been sung, just as in Loke's hotel, there will only be only finitely many hotel rooms constructed.

However, the question of how many praises will be sung has remained unaddressed for Malpass and Morriston. Craig has managed to only change the subject from what was under consideration. What has been their focus is how many praises Gabriel and Uriel will sing, which can only be infinitely many. If God is omnipotent and if the future is endless, then the question of how many praises Morriston's angels will sing is actually infinite, which would refute Craig's arguments against actual infinities. Answering a separate question about how many praises will have been received does not rescue Craig from this objection.

If one asks, at any time, how many marbles will I have put in a jar, the answer will be potentially infinite, as represented by the A(x) function. But if I never stop putting marbles in the jar, then there will be an infinite number of marbles placed in the jar, as represented by the B(x) function. And it is the B(x) function that is of concern since it more accurately models future events. As defined, the output of said function cannot be zero, and Craig would admit that; there will be future events according to most versions of presentism. If the B(x) function accurately models future events, then one is justified in saying that the number of future events will be infinite. After all, any input-output of the function yields a denumerably infinite output. Summarizing this point, Malpass and Morriston (2020) write:

The issue concerns the number of events, each of which *will* happen, not the number of events that *will have* happened as time passes. That is, the issue concerns the value of the B(x) function, and the output of that function is certainly not zero! To the contrary, for *any* input of B(*x*), the output is denumerable infinity. (p.839)

The bizarre nature of numbering non-existent future events may, at this point, hinder some from accepting this reply. Common sense dictates, or at least it seems, that we may only count events or things that genuinely exist. Books, tables, pens, and desks are all countable due to their instantiation in physical reality. Our minds can count the number of guests at Jay Gatsby's parties, but only speculatively and presumably without reference. Modal realism may provide ample metaphysical support for such counting, but modal realism has notoriously involved defending extravagant metaphysical theses. If simplicity is a theoretical virtue worth upholding, one may justifiably forbid enumerating non-existent entities.

However, importantly, this is not the belief to which Craig subscribes. Craig (2016) instead argues that we may refer without issue to non-existent events because "one might simply reject the view that existential quantifiers and singular terms are devices of ontological commitment" (p.103). On this view, I may refer, for instance, to my 16th birthday without committing myself to what Craig sees as the stronger claim that my 16th birthday actually exists. Craig can, in this sense, make true statements about past events, even though those events are omitted from his ontology. Referring to

and enumerating non-existent past events is thus unproblematic for Craig since such references are not ontologically committing. To illustrate this point, Craig uses the example of US presidents. Craig (2016) writes:

> For example, it seems indisputably true that 'There have been forty-four US presidents'. The non-existence of most of them is no impediment to our quantifying over past US presidents. To infer from the truth of such statements that time is, in fact, tenseless and that past and future individuals are on an ontological par with present individuals would be to draw a breathtaking metaphysical inference on the basis of the slim reed of the neo-Quinean criterion of ontological commitment. (p.117)

Craig directs his comments here towards those who standardly assume that assenting to the truth of past events requires an ontological commitment to their existence. In the language of this more general debate, the 'truthmaker' objection to presentism is being addressed. In simple terms, the truthmaker objection holds that something— i.e., a truthmaker, must make statements about past events true. So, if statements about past events are true, which surely they are, then past events must exist. And if past events exist, then presentism must be false. Critics at this point sometimes suggest that presentism adopts a fictionalist stance towards past-tense statements such that they are treated only as if they were true.

However, in Craig's eyes, presentists are not required to make such a concession. Instead, Craig encourages presentists to challenge the standard assumption, namely that regarding statements about past events as true is ontologically committing. The problem for Craig is more what he calls the "neo-Quinean" metaphysics that is baked into our reading of such past statements rather than the past statements themselves.

That is, he does not feel as though one ought to assume the existence over what existential or simple sentences quantify over. As long as one maintains the truth of a statement, in Craig's (2016) eyes, then the neo-Quinean criterion holds that one must believe in the existence of those objects referred to by singular terms (p. 96). Proponents of the truthmaker objection are accused by Craig of smuggling in, without justification, this neo-Quinean criterion to make their argument. Craig, in this light, regards this presupposition as suspect and criticizes the argument accordingly. In Craig's own words (2016):

> ...in debates over presentism, tenseless time theorists tend simply to presuppose without argument that quantification is ontologically committing, and so our ability to quantify over past/future individuals in true sentences is taken to commit us to their existence…. the only person in a predicament here is the presentist who also accepts the neo-Quinean criterion of ontological… [But] it is far more obvious that, for example, the

statement 'Some medieval theologians wrote in Latin' is true than that the neo-Quinean criterion of ontological commitment is true. (pp.117-118)

The upshot here is that for Craig, statements about past events as true need not ontologically commit one to those past events actually existing. One need not accept the neo-Quinean criterion that furnishes us with the intuition that ascriptions of veridicality to statements about past events *should* be ontologically committing. Only when such a criterion is adopted is the truthmaker objection palatable, but for Craig, one need not accept the criterion, and so the objection is vitiated.

In short, Craig believes that one can refer to and make true statements about past events without issue. Numbering past events or saying true things about the past does not require one to believe in their existence, since our use of existential quantifiers and singular terms is not ontologically committing. With no ontological commitment to past events, Craig is nonplussed about numbering and referring to non-existent events. As Craig and Sinclair (2009) state: "nonexistence of such things or events is no hindrance to their being enumerated" (p.116).

If Craig's account is correct, then the endless future, like the beginningless past, would be actually infinite. That is, suppose, as Craig does, that referencing and numbering non-existent past events is enough to demonstrate that there *have been* an actually infinite number of them, despite their non-existence. In that case, we have *carte blanche* to claim that referencing and numbering non-existing future events is enough to demonstrate that there *will be* an actually infinite number of them.

Provided that this much is true, it is also true that the number of events in a beginningless series equals the number of events in an endless series. Craig cannot here block this objection by arguing that there *are* no such future events since, symmetrically, there *are* no such past events as well, and those past events have already been cited in an attempt to illustrate the absurdity of an actual infinite. Once considered in this light, Malpass and Morriston believe that the case regains its symmetry and the non-existence of future events appears unproblematic.

§14 The Concrete Infinity Reply

Despite these points, one can argue that Craig's case remains unsullied. To illustrate this point, consider the case of Morriston's angels, in which infinitely many praises are yet to come. As explored earlier, Morriston's angels are supposed to instantiate an infinity formed by successive addition. Yet, Craig could presumably remain unbothered by Morriston's angels, since that is not an actualized infinity. We are talking, for Craig, about the real concrete world. Abstract infinities, such as those represented by mathematical sets or Morriston's angels, are irrelevant to the case in question.

Concerning the marbles in the jar, an infinite number of marbles will go through the jar, but it is not the case that there is an infinite number of marbles such that each

one of them will go through the jar. Craig denies that latter part because he does not think the marbles exist, they are in the future, and the future does not exist yet. Given Craig's presentism, this response is, at least at first glance, entirely consistent. Furthermore, Malpass and Morriston face an uncomfortable dilemma. Either their argument arrives at its conclusion but is unproblematic for Craig, or it arrives at a problematic conclusion for Craig but in an improper fashion.

First, Malpass and Morriston establish that infinitely many events will become actual as time progresses, but this is anodyne for Craig. Central to Craig's argument is the notion that an infinite number of things cannot be instantiated in reality. Craig wants this to mean that no possible world exists where an actually infinite number of things are actualized.

With this thought in mind, Craig frames the argument so that the past gives rise to a problematic, actualized, infinite, whereas the future does not. Craig can thus concede that the future is actually infinite. However, this concession does not require Craig to say that an actual infinite will be instantiated at any time in the future. On this first point, then, Craig can attend to formulations of the argument that do not generate the symmetry objection. For these reasons, Craig may remain unbothered by the first interpretation of the argument of Malpass and Morriston.

Second, one might interpret Malpass and Morriston as arguing that, at some time, there will be a point at which infinitely many things are actual. But, admittedly, this

does not follow from their argument. No matter how many marbles are dropped into the jar, there will never be *infinitely many* marbles inside. Malpass and Morriston admit this when they argue that the number of marbles in the jar represents the past, and the past is *potentially infinite.* Without arriving at the more contentious conclusion that an actual infinite will instantiate itself, Malpass and Morriston are at risk of not sufficiently engaging with Craig's argument.

Malpass and Morriston here could potentially offer a reply. Although it may sound counterintuitive, perhaps Malpass and Morriston are not required to suggest the existence of infinitely many marbles at some future point. To see this, imagine that Craig's hypothetical response is successful. Craig is, in this way, unperturbed by infinitely many things that will be, and Malpass and Morriston have not shown that there is a future point at which infinitely many things will be.

Yet, this response would not break the symmetry. Infinitely many past events would not entail the present existence of an actual infinity. Just as infinitely many future events do not constitute an actual infinity due to their non-existence, so do infinitely many past events not constitute an actual infinity due to their non-existence. A beginningless past also does not entail that there was some point in the past in which infinitely many things were instantiated, which is what Craig would need to say to generate the resulting absurdities. Because an actual infinite does not follow as naturally from a beginningless past as Craig may have hoped, the reply by Malpass and

Morriston may be correct. Put another way, there is reason to suppose that, pace Craig, a beginningless past does not constitute an actual infinity.

In fact, given presentism, one might ask what exactly it is about the infinity of past events that creates an issue for Craig. To illustrate this point, suppose the story is that the facts accumulate. So there are infinitely many facts about the past, and that is true of reality right now, but there are not infinitely many facts about the future. Despite this apparent asymmetry, why should there be a problem with infinitely many facts? The crux of the HHA and so on is that there are not supposed to be actualized infinities within concrete reality. But suppose presentism only has it that there are these infinitely many facts. In that case, it is not clear that a beginningless past would furnish one with an actualized infinity in concrete reality.

However, if there were an actual logical inconsistency about the actually infinite past, then perhaps there would be some logical inconsistency among the facts about the infinite past. Craig, in this sense, might hold that the present cannot be such that there are logical inconsistencies about the past. But recall that one does not get logical contradictions from Hilbert's hotel. According to Craig, Hilbert's hotel is not contradictory; it is simply metaphysically absurd. So, as long as it is mathematically in good standing, it is less obvious what the force of the objection will be.

Although these responses to Craig's arguments may appear decisive, it is imperative to determine whether Craig can refute his critics. To envisage Craig's point,

suppose that one had a way of diagramming the world where according to the presentist view, there was the present moment, and all future moments are colored purple. The purple moments do not exist, but they will exist. And all past moments are colored orange, and those are things that have been present.

So there is a sort of process here, where things are being turned from being purple to being orange (even though this is slightly misleading since we are speaking colloquially as if the purple and orange things exist). Craig's claim is that there cannot be an infinite number of orange things, but there can be an infinite number of purple things. The justification for that claim is not mathematical since the number of purple things and the number of orange things are entirely symmetric. So the question is, what is the candidate for orangeness that would support Craig's argument?

If orangness is existence, then one would have the growing block theory. So, if orangeness is existence, then one could get a version of the kalam going by saying that reality cannot contain an infinite number of real existing things. One way, then, of looking at what Craig is doing by defending presentism is to see him searching for a substitute for existence that could nevertheless do the work in the argument.

As a presentist, reality is just the present, so for Craig to make his point, there must be something in that reality that is unextended in time that causes the problem with actualized infinites. So what is in our unextended reality that constitutes the actual infinity? Suppose that each event as it becomes present leaves something behind, i.e.,

it leaves a trace. As the purple things turn to orange things, they leave traces of themselves in the present or residue. That residue would accumulate. So, if we could make sense of what that residue would be, then we can perhaps read Craig as saying that there cannot be an infinite number of those things in reality. The question then is what those things might be.

§15 Actualization and Potential in Differentiating the Past from the Future

One candidate answer is that the present contains traces of the past, whereas it does not contain traces of the future. In this model, the past is *actualized,* while the future exists only *in potential*. One cannot experience future events since they have yet to materialize, whereas, at least according to the special theory of relativity, one can experience traces of past events. For instance, observing the scintillating aftermath of an exploded star is commonplace in astrophysics. Craig concludes from these perceptual asymmetries that there is a marked difference between the past and the future. Namely, the past is actual, since it has been actualized, while the future is simply potential. In Craig's (1991) own words:

> "According to the A-theory, the past is actual in a way the future is
> not: the past is actualized while the future is merely potential. …
> When it is remembered that the relativity of simultaneity depends
> on the reception of light rays reflected by some object, we can see

that this difference between the past and the future amounts to saying that while there exist traces of past events (reflected light rays) there cannot exist any traces of future events, which are purely potential.' (p.152)

Here, Craig clarifies that the present contains traces of past events, but not future ones. Presumably, a beginningless past would yield an actual infinity since each actualized moment would leave a trace of itself in the actual world. As these traces accumulated into the present moment, an actual infinity would have been instantiated.

In the case of Loke's hotel, hotel rooms would accumulate one after another as each room was actualized. If this accumulation is beginningless, then at any point during this accumulation, the number of hotel rooms would be *actually infinite*. But, as explored earlier, the number of hotel rooms would only be finite if their construction started today and continued indefinitely. The 'traces' Craig speaks of could never accumulate into an actual infinity in an endless future, as they would in a beginningless past.

The past is actualized and thus is part of the actual world, while the future is not, and is merely potential. The difference between the actualized past and the merely potential future illustrates their asymmetric relationship. More importantly, this difference explains why a beginningless past would constitute an actualized infinity while an

endless future would not. For these reasons, Craig may maintain that despite the objections of his critics, we may treat the beginningless past differently than the endless future.

Two objections plague Craig's attempt to salvage his symmetry breaker. To contextualize the first objection, think of fossils: fossils are something in the present that is a trace of the past. So that is one sense in which the past might leave traces in the present. Suppose, for instance, that there was a beginningless world where there was one fossil left per year, every year, and that the fossils never decayed.

In that case, there would have to be infinitely many fossils in the present, which would possibly lead to some problems. But that is not how the world is: fossils decay over time. So there will not be infinitely many concrete traces of things of this kind. In other words, there will never be anything like a fossil of which there are infinitely many. So, what kinds of things could these traces be such that there would be an infinite number of them in the present but such that they would also generate problems given their infinite quantity?

Here, a dilemma confronts Craig's argument. Either Craig has to suggest that these are concrete traces, but then there seems to be no good argument for there being an infinite number of concrete traces in the present just because there were an infinite number of past times. It does not follow that every past time will leave an everlasting trace after it has passed. Therefore, this horn of the dilemma is not appealing to Craig.

The other horn of the dilemma concerns the kinds of traces that would be everlasting and, therefore, would accumulate to infinity. Yet, only abstract entities or immaterial facts seem capable of accumulating or existing in infinite quantities. However, the existence of an infinite number of abstract objects seems unproblematic. As our study of Hilbert's Hotel illustrates, even Craig admits that there is no logical problem in supposing that a hotel with infinitely many guests could exist. So it is not clear why, if we are talking about abstract things like facts, there should be any problem with there being an infinite number of those.

The second problem facing Craig's argument is yet another dilemma. Either his argument equivocates on the meaning of 'actual' and 'potential', or his argument assumes a growing block ontology. In either case, a full-blooded presentist rendering of the kalam is implausible.

One can start unpacking Craig's response by asking if a past-eternal universe is one in which infinitely many events have been *actualized*. Intuitively, this seems plausible enough. Despite this intuition, one must ask whether Craig has provided us with ample reason to support this intuition. After all, Craig here shifts from events being *actualized* instead of events *existing*. Noting this shift is important given Craig's ontology, where the past is actual in that it has been actualized, so it is part of the actual world, while the future is simply potential. From this, one can see that when Craig uses

actual and potential in that context, it is easy to equivocate and say that the past is actually infinite while the future is potentially infinite. However, it is unclear whether actual and potential mean the same thing in those two different contexts.

Drawing on this issue further, one cannot reach conclusions about the instantiation of actual infinities from the supposed impossibility of infinitely many actualized events. Recall that Craig's main idea states that infinitely many things cannot exist. Yet, there is no explicit contradiction between accepting that infinitely many things cannot exist and rejecting that it is impossible for infinitely many events to be actualized. So, Craig has not proved that *actual* infinities cannot exist by appealing to the supposed impossibility of infinitely many *actualized* events.

In addition, Craig and Loke's issue becomes particularly acute when considering the conditional they must defend. At bottom, their argument is based on defending the claim that if the universe is past-eternal, then it would be possible for Hilbert's hotel to exist. But it is unclear what defense Craig may offer of this conditional. His argument is based on an actualized past differing from a potential future, but these terms are misleading. Actualized events, in terms of Aristotelian causation, have a different sense from the 'actual' that appears in an 'actual' infinity.

In this sense, an actualized entity and an actual infinite are two logically distinct terms. So even if a beginningless past involved infinitely many *actualized* events, it does not follow that it would involve an *actual* infinity. Assuming, as a presentist would, that

these actual events cease to exist as time passes, one could hold that infinitely many events *have been* actualized, but that not *actual infinity* exists. The strong link between *actualization* and *actual* infinities evaporates upon closer analysis.

Further, a potential infinite is not a potential infinite because it *could be* actually infinite. So Craig may be seen as repurposing a particular word for an unrelated concept. In this vein, actual and potential infinities have no relation to the Aristotelian concept of actualization and potentiality. Because Craig's argument relies on flipping between these distinct senses of actual and potential, one can conclude that, in one sense, Craig may be equivocating on the key terms in his argument.

The second horn of the dilemma is that Craig appears to smuggle in a growing-block ontology to support his argument. Recall the example of the technicolored timeline: all future events are purple, and all past events are orange. Just as before, the question is what is the candidate for orangeness that would support Craig's argument and sufficiently differentiate it from purpleness.

If orangeness is existence, which may seem natural, then one appears to have the growing block theory. So, if the differentiating factor is existence, then Craig can get his argument going on the growing block theory of time. The existence of past events in the ontology of a growing block theorist would allow them to consistently say that an endless past would, at least in Loke's hotel, involve an accumulation resulting in actual infinity. Morriston and Malpass (2020) make this point well when they write:

... Craig's account bears considerable resemblance to the growing block theory of time. The past may not 'exist', but it is nevertheless a continually growing block of actualised potentialities. The future, on the other hand, consists in potentialities that have not yet been actualised. In this way, Craig apparently thinks that he has provided a symmetry breaker that is relevant for our problem. That is to say, he thinks that the distinction between the actuality of the past and the potentiality of the future is the thing in virtue of which a beginningless past is a true actual infinite and an endless future is merely a potential infinite. (p.840)

Here, Craig's reliance on a growing block ontology becomes abundantly clear. That past events are treated as actual while future events are treated as potential, is emblematic of the growing block theory of time. Of course, acknowledging this relation does not refute the kalam. Our intention in this section is to determine whether Craig's presentism can adequately support the kalam.

However, from this dilemma, it seems that Craig's presentism does not support the kalam. In the first instance, Craig trades on equivocation to supply an intuitive force for his argument. In the second instance, equivocation notwithstanding, Craig appears to rely on a growing block ontology to make his argument.

One may say that one cannot square Craig's presentism with the kalam. Yet, this does leave open the possibility of a growing block theorist making the kalam. The growing block theorist can, after all, provide a symmetry breaker because for them the past is actual while the future is merely potential. In what follows, we will determine whether the kalam can succeed on a growing block theory of time.

V. Chapter Five: The Growing Block Theory and the Kalam

§16 The Growing Block Theory

Before exploring the compatibility of kalam with the growing block theory of time, it would be beneficial for us to explain the theory briefly. According to the growing block theory, the past and the present are real, while the future is not. The passage of time involves the accrual of events onto the block as the totality of what exists increases as time passes. Second, tenseless facts come into existence as the privileged present moves into the future, leaving behind bona fide versions of ourselves in the past. The present is thus defined as the boundary point between that which is real, the past, and that which is not real, the future. Fabrice Correia and Sven Rosenkranz (2018) summarize the growing block theory well when they write:

As a first rough approximation, [The growing block theory] is the view according to which what there is increases as time goes by, with new

things being added along the way, all the while nothing is lost in the process. (p. v)

In this sense, growing block theorists stake out a middle position between eternalism and presentism. On the one hand, growing block theorists like Tooley agree that the past is real and fixed. In other words, just as you are reading this sentence, Christopher Columbus is sailing the ocean blue in 1492. On the other hand, however, growing block theorists agree with presentists in suggesting that there is a privileged present around which all other times are ordered in a tensed fashion. Thus, the growing block theory combines aspects of eternalism and presentism to produce a theory that regards only the past and present as real.

For the topic at hand, the growing block theory seems compatible with the kalam. Time is treated asymmetrically in growing block theory, which is needed to avoid Malpass and Morriston's symmetry breaker. The impossibility of an infinite past, in other words, would not commit Kalam defenders to the impossibility of an infinite future. Future events do not exist according to the growing block theory, and therefore Morriston's angels would not apply.

To be more specific, take, for instance, Malpass and Morriston's example of heaven. Heaven supposedly is made up of an infinite series of pleasant experiences for those who are admitted. If kalam supporters are committed to the reality of this infinite future series, then, according to Malpass and Morriston, they should be in trouble. That is, their arguments against the possibility of an actual infinite should preclude them from

believing in this key Christian tenet. And with this, as my previous analysis showed, Malpass and Morriston pass the buck to kalam supporters to develop a symmetry breaker. In other words, kalam supporters are enjoined to provide an account for why an infinite series of past events is impossible while an infinite series of future events is possible.

To the chagrin of Malpass and Morriston, the kalam supporters appear to have a symmetry breaker in the form of the growing block theory. The past, unlike the future, is real. So kalam supporters can remind critics that an infinite series of actual events is impossible because it would entail the existence of infinitely many things. After all, according to the growing block theory, things remain in existence once they have lapsed into the past. A timeline stretched infinitely backward would thus involve a metaphysically unacceptable ontology in which infinitely many past things generated an actual infinite in the real world. Not unlike an infinitely large hotel with infinitely many guests, an infinitely long timeline with infinitely many events could generate similar paradoxes since we are stipulating that an actual infinite would exist in reality. A growing block theory would thus allow kalam supporters to secure their desired conclusion that an infinite regress of events is metaphysically impossible.

Additionally, and crucially, the growing block theory of time allows Kalam supporters to believe that an infinite series of future events is possible. Future events are, after all, unreal and therefore cannot generate the metaphysical problems that are unique to actual infinities. There may be potentially many events that lie ahead for the

growing block theorist, but the actual number of future events is zero. Subsequently, there is an ontological asymmetry between the actuality of past and future events that allows Kalam supporters to provide a symmetry breaker and extricate themselves from the bind in which they were initially placed.

§17 The Epistemic Objection

As demonstrated in the previous section, the vindication of the kalam is crucially dependent on the viability of the growing block theory. In that case, showing the inadequacy of the growing block theory would negatively impinge on its prospects of rescuing the kalam. To this end, I dedicate this portion of my paper to presenting and defending the "epistemic objection" to the growing block theory.

The central concern of the epistemic objection, as has been expressed by Craig Bourne (2002), David Braddon-Mittchell (2004), and Trenton Merricks (2006), is quite simple. The growing block theory curtails our ability to determine whether we are occupying the present moment. For example, it seems clear that Ronald Reagan's presidency is long gone. However, denizens of the 1980s would beg to differ as for them, qualitatively speaking, Reagan's tenure feels present. But we know that they are wrong. And yet, how do we know we are in the objective present? Perhaps the objective present is in 2050, and I am cobbling these sentences together in the past. Or maybe even the objective present is in ten years. Regardless, it is clear that on the growing block view that while we may rest assured that Nero is not residing in the objective

present, we may not remain sure of whether some point in the future is the objective present (Braddon-Mitchell, 2004, p.200).

To make matters worse, given that the present exists only instantaneously, the likelihood that we are occupying the present narrows to the point of vanishing. As Trenton Merricks (2006) puts it:

> After all, given growing block, once you have a thought, you continue to have that thought forever. That thought is on the growing edge of being for just the briefest moment and is thereafter and forever not on the growing edge. As a result, the probability that your thought is on the growing edge is vanishingly small. Thus if Nero is wrong, then so— almost certainly—are you…. That is an unwelcome result. (p.106)

The argument seems simple enough. The growing block theory disables us from knowing whether we occupy the objective present. In doing so, the growing block fails to accomplish its primary end: carve out a privileged space for the present in which we may reside. However, instead of clarifying matters, the growing block theory has lent itself only to further skepticism about whether we occupy the objective present. And in the words of Chris Heathwood (2005): "Any view that allows such scepticism is unacceptable" (p.249).

The growing block literature abounds with responses to this line of argument, so space limitations will preclude our ability to fully survey every objection. However, a prominent objection worth exploring has been presented in various ways by Peter Forrest (2004, 2006) and Graeme Forbes (2015), who have called it the 'dead past reply.' According to Forrest, the growing block theory is immune to epistemic objection because consciousness occurs at the edge of being.

The fact that our actions are coated with conscious awareness indicates that we cannot lie in the past because causation cannot occur in the past. Pains, pleasures, and other sentient states are, for Forrest and Forbes, activities, not states. Only present entities that exist on the precipice of being have causal potency. Forrest (2004) explains this concept in more detail when he writes:

> It goes like this. Life and sentience are, I submit, activities not states. Activities only occur on the boundary of reality, while states can be in the past. … If x causes y then in the normal case y is after x. If there is a precise moment at which x ends then y begins only after that moment, not at it. At the precise moment of the end of the cause there is as yet no effect. Hence there is neither the state of affairs of x causing y nor the state of x having failed to cause y. In that situation, x has, however, a causal property, the tendency to generate an event of type Y where Y is the type to which y will belong. By causal activity, I mean the occurrence of such tendencies at a time too early for it to be the case that there has

been a causal relation or to be the case that there has not been one. (p.359)

Forrest here clarifies that only present times can possess these causal properties or "x-properties." Bona fide causation occurs only at the present since that is where temporal becoming causes things to come into existence based on what occurred in the past (Prosser, 2016, p.6). Our assurance that we reside in the objective present, therefore, lies in knowing that we are conscious, since consciousness can only occur in the present moment.

Consciousness must occur in the present, since it is an activity instead of a state. Only activities straddle the line between the fixed past and the potential future. My conscious decision to write this paper is actual in that it has begun and potential in the sense that it is unfinished. As Forbes (2015) states: "Ongoing (i.e. present) events … are precisely those that have some fixed actuality (i.e. they have begun) and some potentiality (i.e. they are unfinished)" (p.705). Consciousness, in this view, is an ongoing process that is not fixed like events of the past. Unlike the 2012 presidential election, our consciousness is now unfixed and ongoing; our conscious decisions have begun and are ongoing. With this, the growing blocker may seem to escape the epistemic objection.

§18 Defending the Epistemic Objection

However, for reasons first presented in Heathwood (2005), Forrest's argument will fail. Suppose that there is a light on a detector, and that is going to represent there being an experience, which, if it occurs in the present, makes it an experience of the present. So here we are, according to the growing block theory, in the present moment, at the edge of being, and there is this light on the detector. As time passes, more of the block comes into existence, so that detector is now in the past. Now the question is: is the light on or off? If the light is off, that means that in the past, the light was off.

However, this means that when the light was present, it was off. But we stipulated that it was on. So, Forrest's line of reasoning seems contradictory. What is further down the block is supposed to be the past, and those events should be the things that happened. So, if we had conscious experiences at the present time, should it not be the case that, when that moment becomes past, that we were having conscious experiences ten minutes ago?

Does that not mean that ten minutes down the line, we are having conscious experiences? Now somehow, Peter Forrest has to deny that and say that is just a B-theorist's way of understanding the issue; in other words, for Forrest, reality must somehow change. But does that then mean that the facts about, for instance, Wednesday change whether someone was having a conscious experience on Tuesday? To suggest that they would seems deeply implausible.

In this way, Forrest's reply problematically leaves open the question of what other parts of the block beside the present are supposed to be like. Put another way, what is happening with that consciousness back there? So if you think of a lamp in the past part of the block, there is still an electric current running through it. In other words, the lamp is still on. Suppose that we think of the current flowing through the lamp as an analogy for neurons firing that are the supervenience base for conscious experience. In that case, all of those things would still be occurring in the past, but according to Forrest, the conscious experience has gone missing. Metaphysically speaking, this seems like an uncomfortable result.

In general, there is something very problematic, for Forrest, about saying that that section of the block is the past, and ten minutes ago, I was conscious. Specifically, it should follow that the ten minutes-ago version of me is conscious, and yet Forrest denies that. So, Forrest's theory here appears to raise significant problems that are not easily resolvable.

So perhaps the complaint is that to have Peter Forrest's view, one must somehow separate consciousness from the physical world and be a presentist about consciousness while being a growing block theorist about everything else (Heathwood 2005). In order to say, when you describe reality as a whole, that there is consciousness at only one moment in time, which is what Forrest has to say, but all of the facts besides consciousness are extended in time, one must have an inelegant metaphysics. That is,

one must provide a different metaphysics for consciousness than they do for everything else.

To see this more clearly, suppose that one is an identity theorist about consciousness, so they think that every time there is a certain firing of neurons, that is consciousness. Well, in the past, one would have that firing of neurons, but they would not have the associated consciousness. So, it seems that Forrest's view would commit one to a very strange view of the relationship between the mental and the physical. His view seems to hold that consciousness certainly is not identical to anything physical, but it is identical to things genuinely happening in consciousness where that is something that only occurs at the edge of being; however, it is unclear what this means.

Perhaps the opaqueness of Forrest's response is attributable to its use of spatial notions to think about time. So perhaps the following analogy captures how we might think of the growth. Suppose that we have a physical block of matter. And imagine that at one end, we put corrosive acid that eats away at the block gradually. Then imagine that process in reverse, so that is done something that makes the block increase. The block has grown, and it has grown because of something occurring at the edge of the block. There is an antithetical process to corrosion that occurs at the edge of the block which allows it to grow. Deep inside the block, that is not happening anymore, it is only happening at the edge. Everything described thus far is perfectly intelligible. One can make sense of the idea that there is this block where, for things inside it, there was this kind of activity there, but now there is not.

However, the problem is that Forrest wants to think of the whole of reality in this way. The problem is that this analogy describes something happening in time; something, in other words, that is perfectly compatible with the B-Theory. Once you start to think about how reality itself could grow and it is in time that it is growing, it becomes unclear what that process is supposed to be. It is not the sort of process that B-theorists could recognize the existence of, like the corroding or growth of a block.

Of course, one can distinguish that kind of activity from a state if they so desire. Yet, at best, this could only be a kind of analogy for what Forrest is discussing. So when one starts to think about what Forrest actually imagines when he discusses this activity at the edge of the block, it is unclear what it could be. Forrest seems to think of it as a spatial process, like a growing block, and imagining that reality is like that, but not noticing that he is imagining something where it is not really time that this block is growing in. There is actually something occurring over time, and the block is growing in space. One can certainly imagine a block growing spatially as time progresses, but that is not what the growing block of time is supposed to be.

The particular thing that is being highlighted by the corrosive block is this notion that there is activity at the edge of the block, whereas what is going on inside the block is not an activity anymore. In the spatial case, we can make sense of that, if you think of growing as the opposite of corrosion. In particular, we can think of corrosion as this process that is going on just at the surface of the block. But then, inside the block,

nothing like that is happening anymore since it already happened. If you think of consciousness as something that depends on that kind of activity, then it seems like that can make sense. But transitioning this example from the spatial case to the temporal case is difficult to do.

To illustrate this point further, suppose that there is this substance that, when it is exposed to the air, grows like mold. Suppose that it is only exposed to air at one end, so that the new mold is always growing. The growth only occurs when it is exposed to the air, which is equivalent to being at the edge of the block. So, the stuff on the inside of the block is no longer growing because it is not exposed to air.

But previously, in the past, because the block was smaller, it was exposed to air and then it was growing. So what makes it the case that it was growing is that when the block was smaller, it was exposed to the air. This spatial analogy seems to encapsulate how Forrest thinks of time and the accretion of new events onto the growing block. Prima facie, this reasoning hangs together in that one can tell a perfectly consistent story about mold accruing onto an existing mold pile.

The problem, however, is that the mold is growing spatially in a process that takes place over time, but it is hard to see how it could work when it is growing in time, and the different positions in the block are different positions in time. Presumably, the whole thing would work if there were two different time dimensions and the block was

growing in one of them relative to different moments in the other time dimension. However, then one would not be talking about time anymore; instead, one would be talking essentially about another dimension of space. Because Forrest's reply not only invokes mysteries about the nature of past moments in the block but also seems to require another dimension of time, it is safe to say that it is inadequate.

§18.2 The Nature Objection

Worse still, Forrest has not sufficiently motivated the suggestion that adding layers to the growing block would change the nature of past events. To illustrate this point, think about geological strata. Sedimentary rocks have been laid down over time such that they have accumulated. Right now, at the surface layer, the sediments are accumulating. Nothing is accumulating further down. What makes it the case that things were accumulating one million years ago is that one million years ago, much of the current strata was not there, and that was the surface then. And for the strata to accumulate, it has to be such that there is nothing on top of it.

As soon as there is something on top of it, it is no longer accumulating. Forrest is essentially iterating this point: that the growing block theory is like something that is accumulating, and real processes like consciousness are a matter of things actually accumulating rather than having accumulated. Once they have accumulated, they are not accumulating anymore; it is only things that are accumulating that count as

consciousness. But whether this makes sense metaphysically is an open question since one does not change the nature of something by adding another layer on top of it.

In the case of the block, the future is sort of growing out of what exists so far, being created by what is at the edge of being. But we still need to know a lot more about why, when the next layer has been created, this layer now has a different nature. What is it that makes this old layer have a different nature such that it is not conscious anymore? There is a relational difference between the layers; once you are not at the edge of being, then there is something in your future, but why should that relation make a difference to consciousness? It seems like as soon as there is something ahead of you down the timeline, that switches off consciousness.

However, apart from the pure metaphysical stipulation, however, we have no independent reason for thinking that someone's relation to the objective future would change whether they are conscious. Not to mention that Forrest has provided a theory explaining what the metaphysics of consciousness is such that all of these relational properties would apply to it. Thus, a key claim about how the block's growth alters the nature of past events has gone unsupported.

§18.3 The Phenomenological Objection

However, this issue with Forrest's reply is symptomatic of an additional but similar problem facing the growing block theory more broadly. Namely, if we think about what the growing block theorist thinks, the passage of time consists of just new bits of the block coming into being. So, in that case, it seems that at each moment, a new part of me comes into being complete with my experiences. And it is unclear how that would, in any sense, allow my experiences to constitute an experience of that process of the growth of the block (Dainton, 2011, pp. 382–419). It seems that if one is a growing block theorist who is aware of the passage of time, then it is unclear how merely the fact that new bits of their timeline pop into existence would allow them to have that character whereby they constitute an awareness of that very process.

Think about that very bit of the block when it is further down the block. It seems that if temporal passage consists of new pieces of the block coming into existence, then the character of each instantaneous slice of the block does not change while that goes on. So if a bit down the line is not aware of the being at the edge of being, it is unclear how the being at the edge of being would be any more aware of it. For these reasons, there are conceptual problems that plague the coherence of the growing block theory.

VI. Chapter Six: The Time Travel Option

§19 Time Travel Introduction

One need not look far to find philosophers disputing the possibility of time travel. An exciting iteration of this question is the following. Is time travel possible according to the growing block theory? The last part of this dissertation is dedicated to analyzing the two central answers to this question: yes and no. Notably, there are several choice points in this discussion such that, no matter which choice one takes, one always hits a dead end as far as the kalam is concerned.

Bracketing philosophical considerations, we will explore whether time travel to the past is physically possible. Although Einstein had reservations about time travel, his contemporary Kurt Godel in 1949, for instance, found solutions to Einstein's field equations that allowed time travel (Kaku 2008).

Going in order, we will first see how the growing block theory can affirm the possibility of time travel. We will see the first family of views as responses to the following question. When time travel occurs, is the traveler going to the middle of the block? For starters, we will explore a Peter Forrest-inspired view that time travelers make excursions to the middle of the dead past.

§20 Traveling into the block: The Dead Past Option

The view inspired by the dead past is that traveling to the past involves forfeiting one's conscious states. No time in the past, in other words, is a time during which one has conscious experiences. The primary question then becomes, for the sake of

discussion, is someone who travels into the past conscious? For simplicity, we suppose that $Susan_1$, who exists in 2022, travels back to 1950 and is regarded as $Susan_2$. Despite the different names, we are assuming that they are the same person, considering these are genuine instances of time travel. For pragmatic reasons, the monikers $Susan_1$ and $Susan_2$ are designed to distinguish between Susan pre-travel and Susan post-travel.

We will now explore two options: is $Susan_2$ conscious or not? To illustrate these two options, we will use a thought experiment.

Imagine that you have the following scenario, which I will call *Return*:

It turns out that time travel is possible because scientists have developed machines that enable humans to time travel. Suppose that $Susan_1$ is sent on one such machine and is sent into the past. So $Susan_1$ gets in the machine and vanishes. Soon after, her husband Rick hears a knock on the door. Confronting him at the door is an older-looking $Susan_2$ who attests to a successful time-traveling excursion. Due to a malfunction in the time machine, she could not utilize the machine to fast forward to the present day, and instead was forced to live and age normally from her arrival point in the past. $Susan_2$ testifies to vivid conscious experiences that she underwent during her travels into the past and appears to speak truthfully.

So what do you now say if you believe that the past is dead? It seems like *Return* could happen, so must the proponent of this view argue that Susan$_2$ is mistaken about her conscious experiences? After all, the dead past is devoid of any conscious states. Therefore, suggesting that Susan$_2$ is conscious might undermine the broader theory of the dead past. For these reasons, Susan$_2$ being conscious is not a viable option.

Perhaps Forrest would suggest that Susan$_2$ had overlooked her zombie-ness during her travels. However, this sounds implausible. If one knows that they are conscious in the present, how could one fail to have similar knowledge when all of the phenomenological facts relevant to that claim are of a similar kind?

Making matters worse, the attractive feature of the growing block theory was its ability to give us knowledge that we are in the present. The key takeaway was that our conscious experiences give us the knowledge that we are not stuck in the past and that the epistemic objection fails. Supposing that Susan$_2$ does not know whether or not she is conscious, something interesting follows. That is, in that case, she cannot know whether or not she is in the present. Thus, the epistemic objection returns with just as much force.

In the typical case of reporting past consciousness and in *Return*, the person under consideration cites their inner awareness of particular actions as evidence of their conscious experience. In either case, the subject's evidence is identical, so the dead-past proponent must answer why it is valid in one case but not in the other.

However, such an answer seems elusive, given that the physical facts upon which consciousness may plausibly supervene would be present, and the associated mentality would also be present. So, if the dead-past proponent argues that Susan$_2$ was *not* conscious in the past, then a host of issues arise.

To see the problem, imagine yourself as a time traveler. It seems that if everything in the past is dead, you become a zombie as soon as you travel into the past. Importantly, there is nothing in Forrest's original view that suggests that anyone would ever become conscious like that. Ordinarily, we live at the edge of the block and are conscious, according to Forrest's view. So, there is something very strange about the idea that along someone's personal timeline, they can suddenly lose consciousness. If one thinks about it in terms of space-time's structure, they really are branches that just loop back around.

To take matters further, one can raise concerns about the plausibility of one's qualia turning off so suddenly. As David Chalmers famously argued, it is odd that the time traveler's qualia could switch off, and they would not be disposed to remark on it. This situation is *mutatis mutandis*, very similar to Chalmers' Suddenly Disappearing Qualia (Chalmers, 1995, pp.309-325). For example, imagine that Susan has each of her neurons replaced with functionally identical neurons until she turns into an unconscious robot.

The worry with Susan's qualia suddenly vanishing is that any threshold for her qualia turning off seems arbitrary. Therefore, psychophysical laws would become woefully discontinuous. Given that this result is so problematic in the philosophy of mind, why should we think the problem would be any less severe in the case of time travel? The growing block theorist has transposed their argument to the same position and thus is susceptible to the same devastating critique.

Additionally, if the dead past proponent is consistent, traveling to a bit of the block while all the block stays there is not going to the past. After all, in the past, all of that part of the block does not exist. So when you are at that place, if it is really in the past, then they have got to have gone back to a point in time where that part of the block did not exist. This worry puts a strain on whether this block is the past. The idea that one can travel to a part of the block, but it is not the past because some later part of the block is still there seems to press the question of whether it is the past or not.

Thus, riddled with problems, the dead-past-inspired view of time travel will not work. The question is whether $Susan_2$ is conscious when she travels back into the block. If she is, that would undermine the dead-past view upon which this time travel theory is predicated. If she is not, then the *ad hoc* and strange issue of consciousness supervening on temporal location kicks in. Also, standard objections about the dead past return with as much force as before. Either way, whether $Susan_2$ is conscious or not, one cannot salvage the dead past theory of time travel.

§21 Not Traveling into the Dead Past: Hypertime or not

Now that we have evaluated the dead-past option for time travel, we will now survey a different set of views. According to this family of views, time travelers do not travel to the middle of the block. Instead, time is reversed depending on the specific view, or the traveler hops across hyper-times. To systematize this discussion, we will divide our analysis into those views that invoke hyper-time and those that do not. We will start by looking at views that do not invoke hyper-time.

§21.1 Not traveling into the Dead Past: No to Hypertime

If one does not invoke hyper-time, then time travel is simply time *reversal* (Inwagen, 2010, pp.3-28). The block shrinks back to some earlier point at which that moment will have been present. However, everyone stuck in the interim period between the origin point and the destination would die. To see this worry, consider the diagram below. T_2 represents the present. T_1 represents our temporal destination.
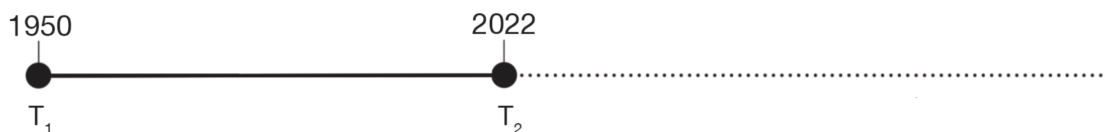

Figure 1

Suppose that Susan is traveling from T_2 to T_1. On the growing block theory, her travel involves discarding all moments between the two times. Put simply, every moment after T_1 is obliterated. The problem here is that everyone living in that time

span would perish. According to the growing block theory, those individuals in the past are real, flesh-and-blood people who occupy the static past. So, removing their temporal home is akin to removing them *tout court*. Naturally, this would render time travel morally impermissible, given that we think mass murders are generally impermissible. Ultimately, the question then becomes whether the defender of this view can skirt around this moral quandary while preserving the growing block theory. In either case, this result comes across as woefully counterintuitive.

If that result is insufficient, we may add the following consideration. Consider the details of Susan's travels. Susan toils away at her time machine in 2021 until it is finished in 2022. Upon completion, she travels back to 1950. However, at 1950, all subsequent times are erased. The time at which she built her time machine is also erased. So there is no time for her to have constructed the time machine. And if there is no time for her to have constructed the time machine, then she could never have gotten in the time machine and traveled to the past. Nevertheless, by stipulation, *she has* gone to the past.

So we have arrived at what looks like a fatal tension. On the one hand, Susan has traveled to the past. On the other hand, she cannot have traveled to the past because there was no time for her to build a time machine, let alone enter one. This tension is strong enough to undermine this option for time travel altogether. Therefore, time travel that does not go to the dead past and does not invoke a hyper-time does not work.

§21.2 Not traveling into the Dead Past: Yes to Hypertime

      A growing block theorist may invoke hypertime to argue that time travel is

possible. Roughly, hypertime is a second dimension of time in which clock time is

embedded (Craig, 2001, p.146). We can understand the block's "growth" by viewing it

as "temporal expansion along the hypertime dimension" (Wasserman, 2018, p.91). To

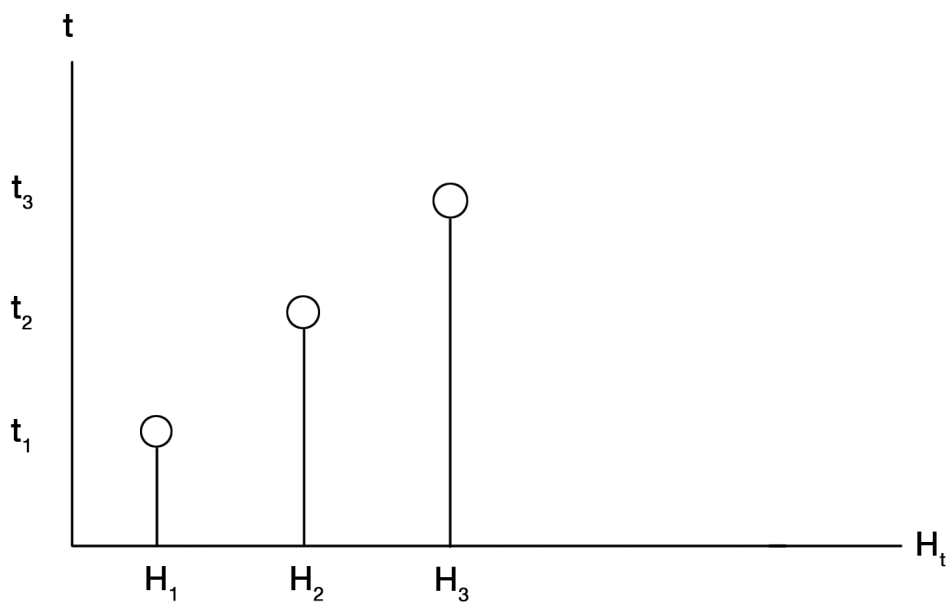illustrate this point, consider the following diagram.

Figure 2

The x-axis represents hyper-time, while the y-axis represents normal clock time. With each successive hyper-moment, different moments in normal time become successively present. For example, at H_1, T_1 becomes present, at H_2, T_2 becomes present, and so on. Hyper-time equips growing block theorists with a seemingly robust account of why some moments in ordinary time are objectively present. They map onto present moments in hypertime, which are objectively present. As Craig (2001) explains:

> In this way one can make sense of, say, t_1's not only being present at t_1 but also being absolutely present. For this absolute present is the present of hyper-time, in which all the moments of time are embedded. (p.146)

Regarding time travel, the hyper-time model resolves classic bugbears for time travel, such as the grandfather paradox. To illustrate this point, imagine the classic grandfather paradox. Robert turns on his time machine in 2022 to kill his grandfather in 1950. By the sequence of events, we have the grandfather's birth, the father's birth, the son's birth, the creation/entry of the time machine, and the grandfather's death.

Focusing on the year 1950, there is no inconsistency in the hyper-time story. At one hypertime, namely, the one where 1950 is reached without a time machine, the grandfather lives. Alternatively, on another hypertime, specifically, when a time machine is used, the grandfather is murdered. Critically, there is *no single hypertime* at which the grandfather is both killed and not killed.

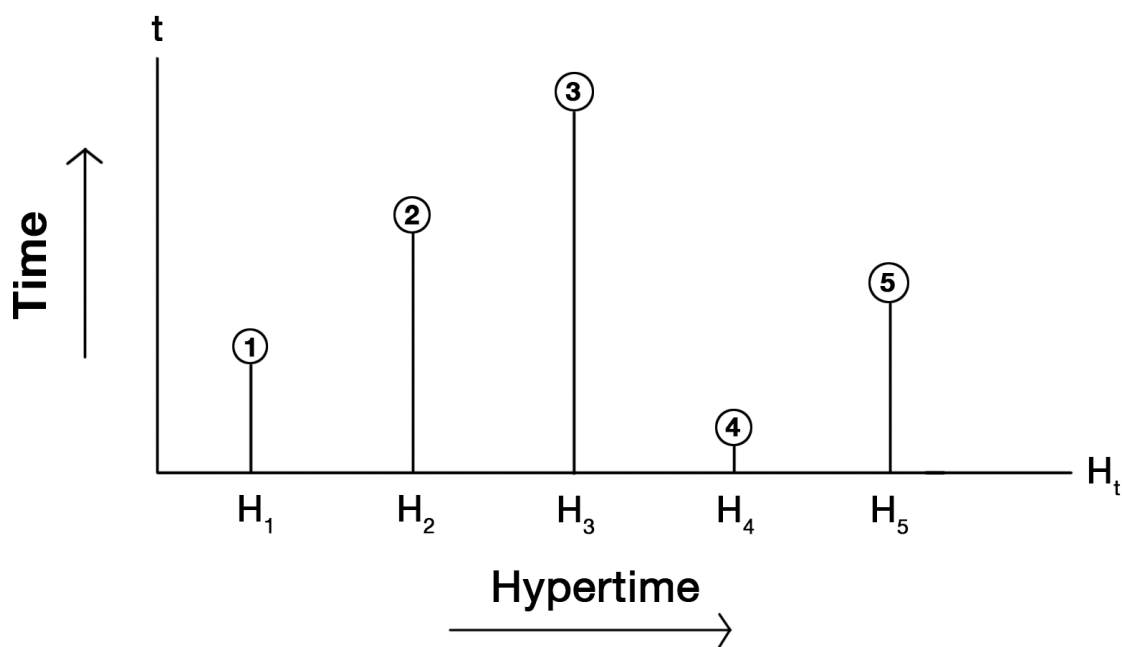Returning to our original example, we may model Susan's case.

Figure 3

This diagram shows time moving along at a normal hyper-time pace until H_3, which is hyper-time moment three. At this point, Susan enters the time machine and travels back to a place where the block is smaller, namely, H_4. Time then progresses as it normally would, and no paradox arises here. The erasure of past persons does not occur, since Susan has bounced to a different hyper-time altogether. T_0 in H_4 is different from T_0 in H_3.

This difference is due to one simple reason: Susan is present at T_0 in H_4 and there is a younger version of Susan at T_0 in H_3. With a few swift moves, the growing block theorist may potentially save the hyper-time view from paradox. Due to this key advantage and others that time precludes us from exploring, thinkers such as Peter van Inwagen (2010) and Geoffery Goddu (2003) have defended versions of this view.

Here are a few objections that one may raise; I will deal with each of them in turn.

§21.2.2 The Classic Hypertime Objection

For one, hyper-time appears to beget further hyper-times *ad infinitum*. This problem with hyper-time originates from one of its more attractive features. Age-old questions about the rate at which time passes have been answered by appealing to a second time dimension. Philosophers have invoked hyper-time to clarify a meaningful rate at which time passes. Saying that time passes at one second per second, for instance, will not suffice, since it is uninformative. To acquire a reasonable answer, we must have some ratio that compares two quantities, e.g., miles per hour or joules per coulomb. These answers are informative since they let us know, for example, how far something goes over what length of time.

In this vein, some thinkers have argued that hypertime passes at one second per hyper-second. The idea here is to present a ratio with two distinct quantities that can

express the rate of temporal passage meaningfully. However, there is one critical issue. At what rate, for instance, does hyper-time pass? In the case of hyper-time, one is at a loss to provide a similar answer.

One could claim that time passes at one second per tick-tock if hyper-time exists. In that case, saying that hyper-time passed at one tick-tock per tick-tock is trivial, which is uninformative. For this answer to have meaning, there must exist some further quantity that one can compare the passage of tick-tocks, as our miles per hour example showed.

So, naturally, the option would be that hyper-time would pass according to some hyper-hyper-time, which, say, passes at 'ding-dongs' instead of tick-tocks. Now hyper-time would pass at one ticktock per ding dong. But clearly, this has just delayed our initial worries because then we can ask at what rate hyper-hyper-time passes, and so on. J.J.C Smart (1949) expressed this worry well when he wrote:

> Furthermore, just as we thought of the first time-dimension as a stream, so will we want to think of the second time-dimension as a stream also; now the speed of flow of the second stream is a rate of change with respect to a third time-dimension, and so we can go on indefinitely postulating fresh streams without being any better satisfied. Sooner or later we shall have to stop thinking of time as a stream. Our difficulty, of course, is that at present we do not see very clearly just how we are to stop. (p.484)

The thrust of this objection is that, eventually, we must regard hyper-times as unsuccessful long-term explanatory devices. Far from achieving their explanatory ends,

they delay the task of explanation indefinitely and so should be viewed as unsatisfactory.

§21.3 The Hypertime Dilemma

At this juncture, there is a two-pronged attack one may level against invoking hyper-time. One may set the scene by asking whether there are an actually infinite number of hyper-times. Regardless of whether one answers yes or no to this question, the kalam supporter will end up with an unfavorable result. To start, we will look at views that say that hyper-time is not actually infinite.

§21.3.1 Hypertime Dilemma: No- Hypertime is not actually infinite

The question in this section is whether we can believe in hypertime, support the growing block theory, and think that the world does not extend infinitely along the hypertime dimension. This tripartite position is deeply problematic. For one, it looks like what we mean when we say that the growing block theory is true, i.e., that there is a block of time that grows, is the following. Specifically, it means that at one point in hypertime, the block is *this* size, and at another point in hyper-time, it is *that* size, and so on.

But how can we make sense of that not being infinite in extent? Presumably, it would have to grow somehow because time did not end. So the whole temporal edifice

would have to grow. The idea here is that hyper-time cannot be infinite, so perhaps it is just *potentially* infinite. In this way, if hyper-time is not actually infinite, then we must make sense of it growing.

Here is one problem. Suppose that our idea of what it means for the block of reality to grow is that it grows larger along the hyper-time dimension. If this reality is a block of reality that grows not only in time, but also in hypertime, then it looks like we will need another dimension. For instance, at point one in hyper-hyper-time, the growing block looks like *this*, at point two in hyper-hyper-time, it looks like *that*, and so on *ad infinitum*. This infinite regress is not appealing, theoretically or otherwise.

Perhaps a critic may argue that this solution should work without hypertime. Two worries arise immediately here. First, it is unclear how such growth could occur without hypertime. Second, if hypertime is not needed, it is questionable why the critic did not stick to a single time dimension.

Also, we can have further concerns here. Recall, for example, Forrest's story about how the growing block theory works. The present is the edge of being, and that is where consciousness occurs. But look at Figure 2. Whole blocks of time are coming into existence at once. In the next instant, the whole block will instantiate itself *plus* an incremental moment that represents now.

There is a metaphysical sense in which *the whole block* came into existence all at once, right now. So imagine someone in that block, such as Emily Bronte. There is a sense in which Emily Bronte was never presently writing *Wuthering Heights*. And because the whole block is coming into existence, it is not clear how the causal nexus is only at the edge of being. The Forrest story, in which occurrences at the block's edge bring things into existence, is undermined. So, it does not seem like this is a good way of capturing what the growing block theorist was looking to capture in the first place. For these reasons, this option does not seem viable.

§21.3.2 Hypertime Dilemma: Yes- Hypertime is actually infinite

If there is not actually infinite hypertime, then what options are there besides time coming to an end, which the kalam supporter would not support? To avoid this issue, kalam supporters may hold that hypertime is actually infinite. But, for reasons explored earlier, this is not viable for kalam supporters. Unless the future came to an end with respect to hypertimes, an infinite number of future hypertimes would be problematic. Recall Figure 2. There is a region of reality there that is represented five dimensionally. The question is: How far does that hyper-time axis extend? More to the point, does it go on infinitely? If it does, then there is an actually infinite number of growing blocks, each at a different location in hyper-time. The totality of infinite blocks would constitute an actualized infinity, which would be a problem for kalam defenders.

Specifically, each of these infinite hyper-times would contain objects, such as hotels. The worry then is that there would still be an infinite number of blocks of reality there, so there is an infinite number of hotel rooms in this case. Yet, this infinite number of hotel rooms is not metaphysically possible for the kalam supporter. As a result, a fatal tension arises. The most likely resolution for the Kalam supporter is to reject the possibility of time travel altogether. I will explore this option next.

§22 Time Travel is Not Possible: Introduction

The last resort, and some might say the most plausible resort, for growing block theorists who support the kalam is to deny the possibility of time travel. There are two options available here for those who take this route. First, they could make empirical arguments suggesting that time travel is not physically possible. Second, they could present philosophical arguments arguing that time travel is not possible. In the last section of this dissertation, I will address each in turn.

§22.1 Time Travel is Not Possible: Physics is Wrong

To begin their case, kalam proponents could argue that the kinds of closed time-like loops required for time travel are not feasible (Loke 2017, 2022). Temporally moving from place to place is not *strictly speaking* physically something that has been confirmed. Instead, prerequisites for what appears like time travel have been assented

to by physicists. But one could still contest these results, as kalam supporters such as Loke have.

However, leading physicists regard time travel as a complex yet not impossible task. The exact science may be several eons away from viability, but there are no physical factors that prevent time travel from occurring. As Richard Gott (2015) states:

> Time travel is difficult. If almost all intelligent observers in the universe did it, since you don't, that would make you special. That doesn't mean that time travel is impossible, just that it must be rare at best. (p.238)

What this passage shows is that time travel is at least physically possible. Although space considerations preclude us from examining these arguments further, it is enough to say that traditional objections to the physical possibility of time travel are suspect at best.

§22.2 Time Travel is Not Possible: Our Metaphysics is Wrong

At this point, disenchanted with the other options, a growing block theorist may just argue that $Susan_1$ is not identical to $Susan_2$ full stop. Namely, they could argue that Susan's case is not a case of genuine time travel. Borrowing from Ned Markosian (2020), these growing block theorists could suggest that $Susan_2$ is not the same person as $Susan_1$ (pp.137-163).

According to this account, we should portray *Return* as follows. $Susan_1$ walked into the time machine and disappeared. In her place, $Susan_2$ emerged in the past and exited the time machine. $Susan_2$ is a distinct person from $Susan_1$, and they are not identical. During the transition, $Susan_1$ faded into non-existence.

However, by some coincidence, a person that looks just like $Susan_1$, namely $Susan_2$, appeared in the past spontaneously out of nothing. Following her spontaneous creation, $Susan_2$ lived her everyday life until she reached the present. Upon witnessing this elderly $Susan_2$, these growing block theorists would note that $Susan_2$ is just someone who lived in the past and is just like anybody who exists now and remembers being conscious in the past. At first blush, these theorists sidestep worries about how to square time travel with the growing block theory by making this move.

In addition, there are two additional benefits to this view: one scientific and one phenomenological. Scientifically speaking, this view does not conflict with our existing science. Nothing within existing physically explicitly renders this view unpalatable. In this sense, empirically speaking, this view may be favorable. Phenomenologically speaking, your experience of encountering $Susan_2$ in 1950 would have been identical had $Susan_2$ spontaneously popped into existence with the appearance of age. In either case, phenomenologically speaking, the situation would have been the same.

With this thought in mind, these theorists may say that they can explain $Susan_2$'s sudden appearance without committing themselves to genuine time travel.

Subsequently, they avoid concerns about how time travel can negatively impinge on the growing block theory. To a certain degree, they circumvent worries that befall those attempting to make the growing block theory compatible with time travel. With clever maneuvering, these theorists seem to have extricated themselves from the previous objections.

§22.2.1 What's Wrong with Our Metaphysics Being Wrong: The Final Nail

Here, then, is the *pièce de résistance*. Recall that an essential commitment of kalam supporters is that everything that begins to exist has a cause. This is the first premise of the kalam. However, if the growing block theorist claims that someone could spontaneously pop into existence, it seems that we have violated the first premise of the kalam. In other words, to save potential problems with time travel, the growing block theorist has unwittingly abandoned the causal principle that underlies the kalam. Sacrificing the principle that underlies the kalam makes the argument unsound, since the first premise has been refuted.

After all, a person spontaneously popping into existence without a cause openly violates the principle that everything that begins to exist must have a cause for its existence. So, we may concede that growing block theorists can save themselves by giving up on time travel, but this comes at the expense of surrendering the kalam. Moreover, since the shift of kalam supporters to the growing block theory was prompted

by an attempt to make the kalam work, it seems that their entire motivation to be a growing block theorist has been undermined.

With these considerations in mind, we now arrive at a position where there is no viable option for the kalam defender. If my argument has shown that the kalam supporter must adhere to the growing theory, and the growing block theory refutes the kalam, then the kalam is in dire straits.

I may now present the fatal dilemma for the kalam supporter that subscribes to the growing block theory, which takes the form of the question: "Is time travel possible?" The first option for the kalam supporter is to say that time travel to the past is possible, but then unsavory consequences follow, as we have explored above. The second option for the kalam supporter is to deny the possibility of time travel, but then they are either at loggerheads with contemporary physics or undermine the kalam altogether. And so, perhaps, there is just no sustainable way to support the kalam. We may summarize our findings in the following diagram.
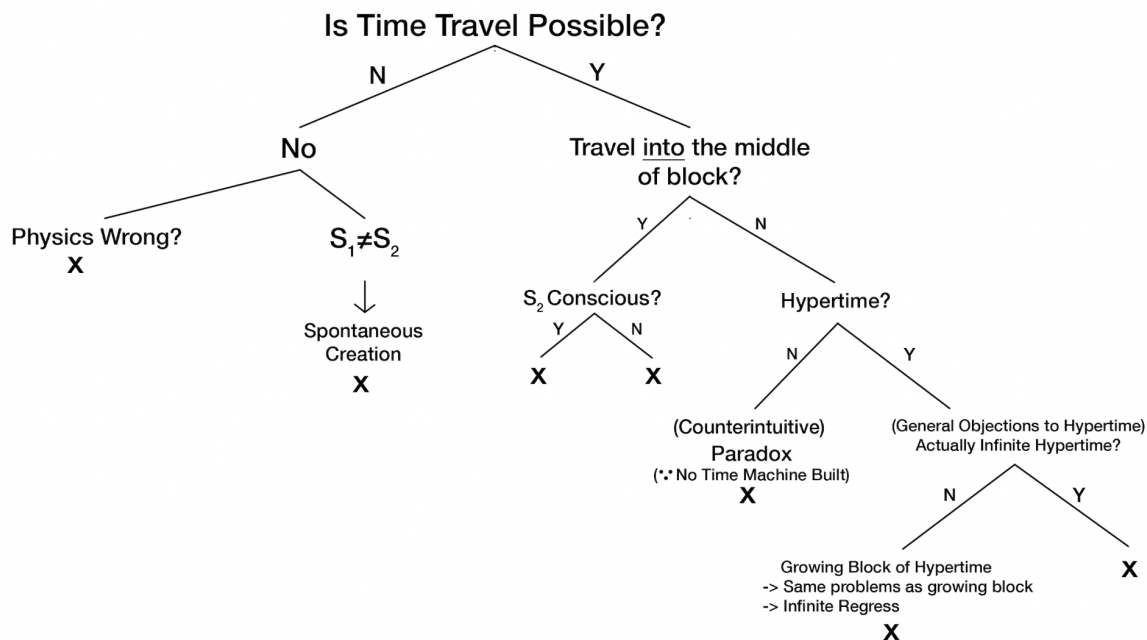
Figure 4

As indicated earlier, the kalam is undermined no matter how the growing block theorist answers this question. With nowhere to go, the kalam, as the title of this dissertation suggests, is running out of time and may not be salvaged.

§22.2.2 Objection

As a growing block theorist, a critic may say that their denial of spontaneous creation and retrocausality immunizes them to the fatal dilemma. In particular, the critic does not regard *Return* as metaphysically possible. So, no question arises for them as

to who Susan$_2$ is because Susan$_2$ is a metaphysical impossibility. In summary, it seems that the critic is saying the following.

In my earlier discussion of Hilbert's hotel, I make specific concessions for the sake of argument. But if my argument is to have more persuasive force, then it is ideal to show that even if one concedes to Craig's intuitions, then it still turns out that the kalam fails. However, the critic thinks that I cannot make this move. In other words, if I have not already rejected the claim that there cannot be spontaneous creation and retrocausality, then my opponent can deny that these Markosian-type "time-travel-in-name-only" scenarios are possible because they are metaphysically impossible. Namely, they are impossible because they involve spontaneous creation, which the critic deems metaphysically impossible. If this is the critic's only point, then it seems that they have a solid response to my argument.

§22.2.2.1 Physics Reply

But it seems to me that there is a crucial difference. That is, here, you would have to say that metaphysical claims can override claims about physics, and that strikes me as problematic. The critic here is not making the more modest claim that *return* is not genuine time travel. This more standard response would involve arguing that physics just tells us how matter fills out space-time and the structures and dynamics of other forces.

Part of this explanation might accommodate for one person to appear at time t and then for them to disappear into a time machine at t+50. Metaphysically speaking, the more modest critic could then make metaphysical statements about what is identical to what. Given considerations concerning personal identity, the critic could deploy arguments about what constitutes personal identity to reject that, for instance, $Susan_1$ is $Susan_2$. These moves are de rigueur in contemporary metaphysics.

However, the critic mentioned earlier is making a different move. Specifically, they argue that space-time cannot be filled out in that way because it is metaphysically impossible. In contrast to the more modest critic, this objection seems to go against physics more evocatively because this critique is not saying that physics is contradictory or would lead to a contradiction. Instead, this objection relies on a contested principle of metaphysics to say that something that is physically possible, i.e., consistent with the laws of physics, nevertheless cannot happen.

Generally speaking, allowing metaphysics to dictate physics in this way is problematic. As mentioned earlier, findings in quantum mechanics and relativity theory contravened our metaphysical intuitions, so surely metaphysics is not an arbiter, per se, of what can and cannot occur in nature. So there could be physical instantiations of metaphysically counterintuitive realities that would warrant us updating our metaphysical intuitions.

To this extent, this reply makes the kalam defender susceptible to empirical fortune. The critic is betting that physics will forbid some of the prerequisites for backward time travel. But scientists such as Michio Kaku, Kurt Godel, Richard Gott, and W. J. van Stockum have all attested to the physical possibility of time travel. Worse still, Stephen Hawking ultimately failed to find the scientific law, or "chronology protection conjecture," that would forbid time travel (Kaku, 2008, p.222). In particular, Robert Ehrlich writes: "My rating for the idea that time travel to the past is theoretically possible is zero cuckoos" (Ehrlich, 2002, p. 171). Theoretically speaking, the present evidence appears to favor the possibility of time travel. Space-time, in other words, could be filled out in a certain way such that there are closed time-like loops, which would permit time travel.

§22.2.3 Recentering the Dialectic

Although one can sympathize with the critic's point, I argue that he has not properly followed the dialectic. Namely, if, at this point in my dissertation, I argue that physics tells us that things can spontaneously pop into existence, then the kalam's first premise is immediately undermined. Supposing this is the move I am making, the critic is right to admonish me.

Crucially, however, I argue that I am not obliged to make such strong claims. For the sake of my argument, I do not need to take a side on the truth of the kalam's first premise. Keeping the structure of the dialectic clear rebuts the critic. Thus far, the

dialectic has gone as follows. We have started by noting that there are solutions to the Einstein field equations according to which there can be closed-time-like loops such that time travel is permitted.

So, space-time can be filled out in a certain way according to physics. If it cannot be filled out this way, then the laws of physics are incorrect. As I have argued, claiming that these laws are incorrect is a strong claim. It would be very unsatisfactory to rest one's argument on the supposition that the laws of physics, as they are currently accepted by most physicists, are incorrect.

All I need to argue then is that space-time *could* be filled out in this way with closed time-like loops. This is *not* the claim that something spontaneously popped into existence. One only claims that something spontaneously popped into existence given a bunch of metaphysics. If one is a B-theorist, then one would interpret that situation as time travel with nothing spontaneously popping into existence. $Susan_2$ getting out of the time machine did not spontaneously pop into existence; she traveled there from the future.

So the physics, per se, at least concerning time travel, does not say that anything spontaneously popped into existence. What I am arguing is that *if* the kalam defender goes down certain branches of the diagram above, then they arrive at a dilemma. Firstly, if they deny that time travel is possible by saying that $Susan_2$ popped into existence in 1950, then they would have to accept that things can spontaneously pop

into existence. But they cannot make this choice since it would undermine the first premise of the kalam. It is not *me* who is affirming spontaneous creation; rather, it is the kalam supporter who chooses to go down that branch of the diagram.

Secondly, if they deny the possibility of time travel by claiming that the laws of physics are incorrect because space-time cannot be filled out in that way, then that is quite an unsatisfactory result. Resting the success of one's argument on the prospect that the laws of physics are incorrect in this fashion, is perhaps too high a theoretical cost to pay for denying time travel. That is all I need to argue. In other words, I do not need to take a stance on the truth of the first premise of the kalam, which is perhaps an advantage of my argument.

For example, I can accept the kalam's first premise while maintaining that the B-theory is true. On this account, *Return* is a case of time travel in which things do not spontaneously come into existence. I can tell my whole story without any commitment to spontaneous creation. Instead, it is my opponent who is forced to accept spontaneous creation on one metaphysical interpretation of my return scenario. This exact shape of the dialectic is what my opponent is missing.

§23 The Master Argument/Conclusion

In the end, I may represent the overall master argument accordingly:

P1: If the Kalam works, then it must work on either the A theory or the B theory

P2: The kalam does not work on the B theory (Morriston's Angels)

P3: The A-theory's two main variants are presentism and the growing-block theory

P4: The kalam does not work on presentism (Morriston's Angels)

P5: The kalam does not work on the growing block theory (Problem detailed in Figure 3)

C2: The Kalam does not work on the A-theory or the B-theory (Conjunction P2, P3, P4, P5)

C3: It is not the case that the Kalam works (MT: P1, C2).

The first part of this dissertation demonstrates the truth of P1 and P2. P3 is not controversial. I illustrated the truth of P4 using the example of Morriston's angels: simply put, presentism's symmetrical time structure entails a finite future, which is problematic. I substantiated P5 in two ways. First, I challenged the growing block theory in general by presenting the epistemic objection, nature objection, and phenomenological objection.

Second, I raised objections against the compatibility of the kalam with the growing block theory of time. All in all, these points inescapably lead to C2. With C2 established, C3, which holds that the kalam does not work, follows necessarily and inevitably from the truth of the premises. Given that the truth of the premises has been defended robustly, we have a reason to believe in the conclusion. We thus have good reasons to reject the kalam as being unsupported by any major theory of time and that it is not the case that the kalam works.

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