

Once more to the hotel

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Abstract: William Lane Craig’s defence of the so-called ‘Hilbert’s Hotel Argument’ for the beginning of the universe seems to be in conflict with his own presentist views, as I argued in my earlier article ‘Heartbreak at Hilbert’s Hotel’ (2014). In response, Andrew Loke (2014) has defended a modified version of the argument which avoids this problem, and this defence has been endorsed by Craig (2018). After clarifying the dialectic, I argue in this article that Loke’s modification is not as straightforwardly successful as he and Craig seem to think, and that it in fact requires a controversial independent assumption – namely, that creation *ex nihilo* is possible. I show that some of the more obvious ways of supporting this assumption are either unsuccessful or unavailable to the proponent of the Hilbert’s Hotel Argument. Moreover, I show that accepting this assumption conflicts with a key premise in the Hilbert’s Hotel Argument. Hence, Loke’s modified argument has not successfully established that the universe – including time itself – began to exist.

The *kalām* cosmological argument relies crucially on the premise that the universe – including time itself – began to exist. Thus, proponents of the argument seek to establish that time is not past-eternal. One philosophical argument that is commonly used to establish this conclusion is that past-eternalism is precluded by the impossibility of the existence of an actually infinite number of things.¹ I call this the ‘Hilbert’s Hotel Argument’ (or HHA for short), because the impossibility of an actually infinite number of things existing is often demonstrated by appeal to David Hilbert’s thought-experiment about an infinite hotel. William Lane Craig, the leading proponent of the *kalām* cosmological argument, claims that Hilbert’s Hotel is intuitively impossible. From this, we are meant to draw the more general conclusion that it’s impossible for an actually infinite number of things (including past events) to exist. And Craig takes this to straightforwardly establish that past-eternalism is false.

A dispute has arisen in the literature as to whether or not such an argument should convince presentists. In my earlier article, ‘Heartbreak at Hilbert’s Hotel’

(2014), I granted for the sake of argument that an actually infinite number of things cannot exist, and proceeded to determine whether or not this admission is somehow incompatible with past-eternalism. I showed that the natural interpretation of Craig's argument is ineffective against the presentist. And this is especially problematic, given that: (i) Craig is himself a presentist, and (ii) Craig is committed to thinking that the *kalām* cosmological argument, on the whole, relies on presentism.² Loke (2014) has responded to my critique by defending a modified version of the HHA, and Craig (2018) has endorsed that response. Loke's version of the argument seeks to establish the falsity of past-eternalism in a way that is effective against presentists and non-presentists alike. In this article, the arguments will be further clarified, and I will show that the falsity of past-eternalism has still not been established by the modified HHA.

First, I will clarify the standard HHA in such a way that its incompatibility with presentism is apparent, and I will illustrate how Loke has sought to avoid this problem by appeal to a modified version of the HHA. Second, I will show that the modified HHA is problematic because it crucially relies upon several controversial independent assumptions – among which is the assumption that creation *ex nihilo* is possible. I will then go on to show that some of the more obvious ways of supporting this assumption are either unsuccessful or unavailable to the proponent of the HHA. Third, I will show that the assumption that creation *ex nihilo* is possible is incompatible with a key premise in the Hilbert's Hotel Argument. The upshot is that even Loke's modified HHA has not established that past-eternalism is false.

Presentism and the HHA

Craig's usual defence of the HHA is problematically obscure. He formulates the argument as follows:

- (1) An actually infinite number of things cannot exist.
- (2) A beginningless series of events in time entails an actually infinite number of things.
- (3) Therefore, a beginningless series of events in time cannot exist.³

One reason this formulation of the argument is obscure is that the conclusion Craig seeks to establish ('the universe – including time itself – began to exist') is not obviously identical to the conclusion of the HHA ('a beginningless series of events in time cannot exist'). Craig simply assumes that by proving the latter conclusion he has thereby established the former. Another reason this formulation of the argument is obscure is that premise (2) is ill-phrased. I take it that the expression 'a beginningless series of events in time' is roughly synonymous with what I have been calling 'past-eternalism'. When Craig says that past-eternalism 'entails an actually infinite number of things', what he apparently means to say is that

past-eternalism entails that an actually infinite number of things *exist*. Hence, past-eternalism entails something that is incompatible with premise (1) of the HHA.

The argument that I think Craig is really making here can be stated more straightforwardly as follows:

- (4) If the universe didn't begin to exist (i.e. if past-eternalism is true), then an actually infinite number of past events exist.
- (5) It's false that an actually infinite number of past events exist.
- (6) Therefore, the universe began to exist (i.e. past-eternalism is false).

On this formulation of the argument, premise (5) is allegedly entailed by the broader principle that an actually infinite number of things cannot exist, which is itself based upon intuitions we have when we think about Hilbert's Hotel and related thought-experiments. But this formulation of the HHA has an obvious downside for Craig, as premise (4) is clearly presupposing the falsity of presentism, which is the thesis that only present objects and events exist. Since Craig is himself a presentist, he would presumably not be willing to endorse this straightforward formulation of the HHA. Yet, upon examining Craig's writings and debates, it's hard to avoid thinking that this is a fairly accurate interpretation of the HHA that he has actually defended, albeit in a more obscure formulation.

For instance, consider what Craig says in defence of premise (2) above:

This second premise is pretty obvious. If the universe never began to exist, then prior to the present event there have existed an actually infinite number of previous events. Thus, a beginningless series of events in time entails an actually infinite number of things, namely, events.⁴

Now it is pretty clear that a 'beginningless series of events in time' *involves* an actually infinite number of events.⁵ But the other premise of the HHA does not rule out anything that *involves* an actually infinite number of things; rather, it rules out anything that entails the *existence of* an actually infinite number of things. So, what Craig needs out of this ill-phrased premise is something that links past-eternalism with the existence of an actually infinite number of things. If past-eternalism leads to the real existence of an actually infinite number of things, and if the real existence of an actually infinite number of things is impossible, then past-eternalism is false.

In his debate against Stephen Law, Craig said the following: 'If the universe never had a beginning, that means that the number of past events in the history of the universe is infinite. But the *real existence* of an actually infinite number of things leads to metaphysical absurdities.'⁶ The natural way to make sense of what he's saying here is, then, something like (4)–(6), with the absurdities of the actual infinite being the support for premise (5). So when Craig says that past-eternalism 'entails an actually infinite number of . . . events', what he apparently means is that past-eternalism entails the *existence* of an actually infinite number

of past events, since this is the sort of claim that can be combined with premise (1) to rule out past-eternalism.⁷

In my earlier article, 'Heartbreak at Hilbert's Hotel' (2014), I demonstrated that this argument is incompatible with Craig's presentism, and suggested that Craig should therefore reject the argument even by his own lights. Moreover, if Craig is right that the *kalām* cosmological argument relies crucially on an A-Theory of time, and if he is right that presentism is the only viable version of the A-Theory, then his defence of the HHA is in conflict with the *kalām* cosmological argument. Thus, although I granted for the sake of argument that an actually infinite number of things cannot exist (i.e. that an actual infinite is impossible), I showed that it doesn't straightforwardly follow from this that past-eternalism is false.

Andrew Loke (2014) helpfully provided an alternative route to the conclusion that the universe began to exist which applies to presentists and non-presentists alike. He writes:

This is how a modified HHA would go. Suppose this is how Hilbert's Hotel is constructed: there exists a 'hotel room builder' who has been building hotel rooms at regular time intervals as long as time exists. Suppose there also exists a 'customer generator' which has been generating customers who checked in the hotel at regular time intervals as long as time exists. Suppose that the hotel rooms and the customers continue existing after they have been built and generated respectively. Now 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.⁸

Whereas presentists have recourse against the earlier version of the HHA by denying that past events exist, this kind of response is avoided by Loke's thought-experiment. If hotel rooms and customers were created and generated in the way he imagines, then past-eternalism would entail that an actually infinite number of things exist. Even the presentist would have to admit that such a hotel existing presently would constitute a counterexample to the principle that an actually infinite number of things cannot exist.

Although Loke doesn't frame it this way, I think his version of the HHA can be helpfully summarized as follows:

- (7) If the universe didn't begin to exist (i.e. if past-eternalism is true), then it's possible for an actually infinite number of things to exist.
- (8) It's not possible for an actually infinite number of things to exist.
- (9) Therefore, the universe began to exist (i.e. past-eternalism is false).

In this formulation, premise (8) is just the metaphysical principle that Craig was already relying on (and that I was already granting). In the present dialectic, then, the argument relies crucially on whether or not Loke has established premise (7). The novelty here is that Loke's thought-experiment aims to show that past-eternalism entails the possibility of an actually infinite number of things existing, and it does this without assuming the real existence of past

events. Therefore, Loke thinks, granting the principle that an actually infinite number of things cannot exist *does* lead to the conclusion that the universe began to exist – or, alternatively, that past-eternalism is false.

A deeper look at Loke's version of the HHA

Craig suggests that Loke's defence of premise (7) is 'unproblematic'.⁹ Nevertheless, although I think Loke's contribution results in an obvious improvement on Craig's defence of the HHA, he has not truly established premise (7) with his thought-experiment. To see this, recall where we are in the dialectic. We are assuming that an actually infinite number of things cannot exist, and we are examining whether past-eternalism is in conflict with this assumption. The possible existence of an infinite hotel is clearly incompatible with the assumption that an actually infinite number of things cannot exist, and so Loke's thought-experiment aims to show that past-eternalism entails the possible existence of an infinite hotel.

Let's examine the thought-experiment a bit more closely. Since it's already granted that an infinite hotel itself would be impossible, let's set aside Loke's proposed 'customer generator' and just focus on the proposed 'hotel room builder'. Suppose that some hotel room builder has built a new hotel room every hour for the entire history of the world. If the world were only twenty-four hours old, then there would be twenty-four rooms in the hotel. Now Loke asks us to suppose that past-eternalism were true. How many hotel rooms would exist? Loke and Craig insist that an actually infinite number of hotel rooms would exist. However, there's a lack of detail in the setup here that prevents us from answering the question.

Consider this hotel room builder, steadily constructing room after room. Does the builder have an infinite supply of materials or a finite supply? Since we are already assuming that an actually infinite number of things cannot exist, we need to imagine that the builder only has a finite supply of materials. (In any case, if we were supposing that the builder had an infinite supply of materials, then we would already be imagining a scenario that is granted to be impossible without any construction needing to take place.) Having only a finite supply of materials to work with, the builder can only construct a finite number of hotel rooms before running out of materials. And since we are supposing that the entire world consists of only a finite number of things, the builder would only be able to build a finite number of hotel rooms even if it used all of the contents in the world as its construction materials. Eventually, the builder would only be able to add on new rooms by tearing down old rooms and reusing the materials. But then, at no point would an infinite hotel exist, even if past-eternalism were true.

Thus, on a rather straightforward understanding of the thought-experiment, Loke and Craig are incorrect in inferring that an actually infinite number of hotel rooms would exist given past-eternalism. It appears that past-eternalism

itself does not entail the possible existence of an actually infinite number of things – or, at least this sort of thought-experiment fails to establish that. In other words, premise (7) of the modified HHA has not been established.¹⁰

Loke does have some recourse here to specify the thought-experiment in such a way that something like premise (7) can be established. Perhaps the postulated hotel room builder has the ability to create new materials *ex nihilo* – out of nothing. When the builder runs out of materials, it simply says the magic words and – *poof!* – new materials pop into existence. Of course, Loke would need to imagine that the builder could carry out this process continuously, at regular intervals of time. And we also need to assume some kind of object permanence, so that hotel rooms can persist for arbitrarily long periods of time. With these auxiliary assumptions in place, Loke apparently has what he needs to establish a variant of (7). If the universe didn't begin to exist, and if an unlimited amount of creation *ex nihilo* of hotel rooms obtains, and if the created hotel rooms continue existing permanently, then an actually infinite number of hotel rooms would exist. But since that's impossible, the conjunction of all of our assumptions must also be impossible.

Consider what has really been established here. Once the details of Loke's thought-experiment are spelled out, we see that he can derive the conclusion that the conjunction of past-eternalism and these auxiliary assumptions is impossible.¹¹ But it does not follow from this that past-eternalism is impossible, or even that past-eternalism is false. Loke might try to argue as follows: since this conjunction of assumptions is impossible, it follows that at least one of them must be impossible. But this would be a mistake, since it doesn't follow from the fact that some set of claims is not compossible that one of those claims is impossible.¹²

Nevertheless, I propose for the sake of argument that we grant to Loke what he has not really proven: that either past-eternalism is impossible or else one of his auxiliary assumptions is impossible. He could then salvage an argument against past-eternalism by showing that each of his auxiliary assumptions is possible. There are far too many complications to attempt to unravel them all here, so I want to focus our attention on one key assumption that Loke is making: that creation *ex nihilo* is possible. We need to determine whether we have good reasons for accepting this assumption. Not having detected this implicit assumption in the argument, neither Loke nor Craig anticipated any need to support it. Consequently, we will just evaluate a few of the more obvious ways that one might try to show that creation *ex nihilo* is possible.

For starters, one might try the following sort of argument. It's possible for God to exist, and for God to be the postulated hotel room builder. God obviously has the power to create things *ex nihilo*, and so, given a past-eternal universe, God would have been able to build an infinite hotel by creating new parts *ex nihilo* at regular intervals of time.

That sort of argument would surely be illegitimate.¹³ Even setting aside the various arguments which purport to demonstrate that God's existence is

impossible, there is a common view in the philosophy of religion literature which maintains that God's existence is either metaphysically necessary or metaphysically impossible. This is apparent when we consider modal versions of the ontological argument, such as the formulation defended by Alvin Plantinga.¹⁴ According to such arguments, God's possible existence logically entails God's actual existence. Thus, atheists are committed to thinking that God's existence is not even possible. Given that proponents of the *kalām* cosmological argument are seeking to prove that God exists, then, it won't do to rely in that argument on an assumed premise that entails that God exists. To put the point slightly differently, the atheist can refuse to grant the assumption that God's existence is possible on the grounds that such an assumption already gives the game away to the theist.

We can perhaps avoid this problem by filling in the details of Loke's thought-experiment in a different way. Instead of assuming that the hotel room builder is God (which may be impossible, for all we know), we can simply assume that the builder is omnipotent.¹⁵ The argument would then be that it's possible for there to be an omnipotent builder, and anyone who is omnipotent can create things *ex nihilo* (and then ensure that those things are sustained in existence indefinitely). Such a person could have existed at every past moment of time, and could have been creating a new hotel room *ex nihilo* every hour.

Unfortunately, things are not so clear. It isn't obvious that omnipotence entails the ability to create things *ex nihilo*. It is widely assumed that omnipotent beings cannot do every set of tasks that can be described. For instance, an omnipotent being cannot create a square circle. For all we know, it may be that creating things *ex nihilo* is just another kind of task that, although it can be described, is not the sort of ability that is included under the umbrella of omnipotence. In any case, this argument faces an even more fundamental problem. If omnipotence *is* taken to include the ability to create things *ex nihilo*, then this would just push our question back one step. Rather than asking what reason there is for thinking that creation *ex nihilo* is possible, we would have to ask what reason there is for thinking that omnipotence (so understood) is possible. So it does not seem to me that we make any progress here by insisting that omnipotent beings can create things *ex nihilo*. What we seem to need are broader reasons for thinking that creation *ex nihilo* is possible.

One might think that creation *ex nihilo* is possible on the grounds that it's conceivable, and anything that's conceivable is possible. One problem with this proposal is that Hilbert's Hotel is (apparently) conceivable, but the parties in this dialectic are agreed that it's impossible. Perhaps one could spell out the relevant notion of conceivability in such a way that we are not *truly* conceiving of Hilbert's Hotel when we consider the thought-experiment. For instance, maybe we *think* we're conceiving of an infinite hotel, but all we're really doing is conceiving of a really large hotel. But a similar worry would seem to apply to the conceivability of creation *ex nihilo*. Maybe we *think* we're conceiving of creation *ex nihilo*,

but all we're really doing is conceiving of creation out of a previously undetected material.

One might try to argue that creation *ex nihilo* is possible on the grounds that it doesn't involve a contradiction, and that anything that doesn't involve a contradiction is possible. At this juncture we should note a technicality that has been lingering under the surface in this discussion. The relevant modality when we're wondering whether creation *ex nihilo* is possible is that of 'metaphysical possibility', which is narrower than logical possibility. The fact that something does not entail a contradiction probably *does* entail that it's logically possible, but it would be insufficient to entail that it's metaphysically possible. Moreover, Hilbert's Hotel does not involve any contradictions, but Loke and Craig would deny that it is therefore possible in the relevant sense. So the lack of a contradiction cannot be our guide to possibility here.

Finally, perhaps one could argue as follows. We should grant that creation *ex nihilo* is possible on the grounds that there should be a broad presumption of possibility. Unless there's some specific reason to think that something is impossible, the presumption of possibility would tell us to assume that it's possible. This might be problematic for the proponent of the *kalām* cosmological argument insofar as it might lead us to presume that Hilbert's Hotel is possible, or that God's non-existence is possible (and therefore actual). But a deeper problem with this approach is that the general presumption of possibility would have to be applied to past-eternalism. If the argument against past-eternalism relies on an assumption that only has a presumption of possibility going for it, then that would presumably be cancelled out by the presumption of possibility in favour of past-eternalism.

What we've seen in this section is that, although Loke and Craig took the hotel room builder thought-experiment to straightforwardly demonstrate the falsity of past-eternalism, it in fact only does so when we make a handful of auxiliary assumptions - including the controversial assumption that creation *ex nihilo* is possible. And when we examine the reasons for thinking that this assumption is true, we find that they are inadequate. Without a good reason to accept this assumption, Loke's argument fails. In the next section, we will see a reason for thinking that the assumption is in fact false - or, at least, that it conflicts with a key premise in the HHA.

The impossibility of creation *ex nihilo*

Suppose we go along with Loke's attempt to link past-eternalism with the possible existence of an actually infinite number of things by supposing that it's possible for some person to have existed for every past moment of time and for that person to create things *ex nihilo* and sustain them in existence permanently. It seems to me that these auxiliary assumptions would lead to the possible existence of an actually infinite number of things even if past-eternalism is false.

After all, if it's possible for a person to create one thing *ex nihilo* at a particular time, it seems that it would be possible for a person to create two things *ex nihilo* at a particular time. For that matter, there doesn't seem to be any non-arbitrary finite limit for the number of things that might be created *ex nihilo* at a particular time. That is to say, for any natural number, n , it would be possible to create $n + 1$ things *ex nihilo* at a particular time. To put the argument a bit more formally:

- (10) If there is no finite limit for the number of things that can be created *ex nihilo* at a particular time, then an actually infinite number of things can be created *ex nihilo* at a particular time.
- (11) There is no finite limit for the number of things that can be created *ex nihilo* at a particular time.
- (12) Therefore, an actually infinite number of things can be created *ex nihilo* at a particular time.

For my part, I find it hard to see how premise (10) could be rejected. If we want to deny that an actually infinite number of things can be created *ex nihilo* at a particular time, it looks like we've got to say that there is some (perhaps unknowable) finite limit for creation *ex nihilo*.¹⁶ But it seems to me that, once we accept the possibility of creation *ex nihilo*, we have no grounds for denying premise (11). Any proposed finite limit would be completely arbitrary and unmotivated. Apparently, the only non-arbitrary cut-off point here is to say that creation *ex nihilo* is not possible at all.

To avoid the undesirable conclusion (12), then, it appears that we should after all say that there is a finite limit on the number of things that can be created *ex nihilo* at a particular time – and that limit is zero. Hence, if we accept that creation *ex nihilo* is possible at all, it looks like we should accept that Hilbert's Hotel could be created *ex nihilo* at a particular time. If this is right, then it isn't past-eternalism that leads to a conflict with our metaphysical assumption that an actually infinite number of things cannot exist; rather, it is creation *ex nihilo* that leads to a conflict with that metaphysical principle. If we hold fixed our commitment to that principle, then we should reject the possibility of creation *ex nihilo*.¹⁷

This is not, of course, an unassailable argument for the impossibility of creation *ex nihilo*. For one thing, it relies on the view that an actually infinite number of things cannot exist. Although proponents of the *kalām* cosmological argument often endorse that view, and I have been granting it for the sake of argument, there is nothing even approaching a consensus among philosophers that it's actually true.¹⁸ It is only when we hold that view fixed in this dialectic that the above argument gives us a reason to reject the possibility of creation *ex nihilo*. Thus, we might say that the more neutral conclusion to be drawn here is merely that there is an incompatibility between the view that creation *ex nihilo* is possible and the view that an actually infinite number of things cannot exist. Since the modified version of the HHA seems to require both of these views, it is internally inconsistent.

Conclusion

The Hilbert's Hotel Argument defended by Craig contradicts his own presentist views. Loke's attempt to circumvent this problem by offering a modified version of the argument implicitly relies upon a host of unsupported assumptions, including a controversial metaphysical view – namely, that creation *ex nihilo* is possible. We have seen in this article that there is no obvious justification for this view that will be acceptable to the parties in the dialectic about the HHA. Moreover, there is good reason to think that the possibility of creation *ex nihilo* contradicts a key premise in the HHA. Therefore, a successful case against past-eternalism by recourse to a version of the HHA has still not been established.¹⁹

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Notes

1. Craig & Sinclair (2009), 103–117. Note that by 'past-eternalism' I mean to refer to the view that time did not have a beginning, and not to any view which assumes that past events and objects are just as real as present events and objects.
2. This is because he thinks that the *kalām* cosmological argument relies on an A-Theory of time, and he thinks that presentism is the only viable version of the A-Theory. See Hedrick (2014), 34–36.
3. Craig (2008), 116. For discussion of an alternative formulation of the argument that Craig sometimes uses, see Hedrick (2014), 29.
4. Craig (2008), 120.
5. At least, so long as events have a finite duration. I suppose one might think (perhaps incoherently) that a single event that lasts for an eternity constitutes 'a beginningless series of events,' but we'll set this sort of consideration aside.
6. See Craig (2011). The emphasis on 'real existence' is mine.
7. I do not mean to suggest here that Craig has intentionally or knowingly been defending an argument that conflicts with his own considered views. I just mean to suggest that this is the best interpretation of the confusing argument that he has been making. As we will see, Loke (2014) is a bit more careful in specifying the argument in such a way that the problem is avoided, but I do not detect this more careful argument in Craig's earlier work.
8. Loke (2014), 48.
9. Craig (2018), 307.
10. I want to flag another issue worth considering. Loke is apparently imagining his hotel room builder to inhabit a spatially infinite universe of some sort. Otherwise, one might respond to his thought-experiment by arguing that the universe would be completely filled up with hotel rooms after a finite amount of time,

and that the hotel room builder is constrained by spatial considerations from building an infinite hotel. So when we are imagining Loke's thought-experiment, I suppose he wants us to think of the universe as spatially infinite. It isn't clear to me whether or not this is consistent with our assumption that an actually infinite number of things cannot exist, since I don't know the correct theory of the ontology of space. Alex Malpass suggested to me in correspondence that the builder might make progressively smaller hotel rooms, so that an infinite hotel could fit into a finite space. But going this route would apparently require other controversial metaphysical assumptions – such as the assumption that matter is infinitely divisible. This would be to postulate what philosophers call 'gunk', and it isn't clear to me whether gunk is possible or whether a chunk of gunk would constitute an actual infinite all by itself. If Loke wants to run a gunky version of his argument, he's free to do so, but it would only serve to highlight my point that the argument ultimately rests upon tenuous metaphysical assumptions.

11. Formally, the argument would go like this (where *PE* stands for 'past-eternalism', *C* stands for 'creation *ex nihilo* obtains', *K* stands for something like 'the process of creation recurs continuously', *P* stands for 'objects persist permanently', *I* stands for 'an actually infinite number of things exist', and the \Diamond symbol stands for 'it is possible that':

- i. $\Diamond (PE \ \& \ C \ \& \ K \ \& \ P) \rightarrow \Diamond I$
- ii. $\sim \Diamond I$
- iii. $\sim \Diamond (PE \ \& \ C \ \& \ K \ \& \ P)$

12. That is to say, Loke might try to derive the following disjunction from the conclusion of the argument spelled out in the previous note: either *PE* is impossible, or *C* is impossible, or *K* is impossible, or *P* is impossible. But without further argument, he's not entitled to derive this conclusion. Thanks to Christopher Gibilisco for his extensive comments in correspondence on this point.
13. Craig himself recognizes the problem in his response to a separate argument, where he notes that his interlocutor's argument 'requires theistic assumptions to get off the ground, assumptions which make the *kalām* cosmological argument superfluous as a piece of natural theology'. See Craig (2018), 308.
14. Plantinga (1974), 196–221. Note that Craig (2008) endorses Plantinga's argument, including the view that God's existence is either necessary or impossible.
15. Strictly speaking, we'd need to also assume that the omnipotent hotel room builder is omnitemporal – or at least that the builder existed for every past moment of time. Otherwise it couldn't have built an infinite hotel at the rate of one room per hour, even given past-eternalism.
16. It might be tempting to resist this point by arguing that the lack of a finite limit for something does not imply the possibility of an infinite amount of it. For instance, a future-eternal being could start counting at a steady pace today, and although there is no finite limit for how far the being will get, it will never have counted an actually infinite number of integers. Rather, such a being's count will always be at some finite number. Likewise, a hotel room builder that started construction a finite time ago and worked at a steady pace will always only have created a finite number of hotel rooms. Such a being can't build an infinite hotel in this way for the same reason that one cannot count to infinity by starting at zero and working at a steady pace. Thus, the lack of a finite limit does not entail the possibility of an actual infinite. I have no quarrel with this example, but I don't think it succeeds in undermining premise (10). There's an independent reason in this case why the number of hotel rooms cannot become actually infinite: it would take an infinite amount of time. Such a being might overcome this inability to create an actually infinite number of hotel rooms by speeding up the process and performing a so-called 'hypertask': suppose it creates one hotel room at the beginning of an hour, a second hotel room halfway through the hour, a third hotel room three-fourths of the way through the hour, and so on. At the end of the hour, the builder would have created an actually infinite number of hotel rooms. Maybe hypertasks aren't possible because time is not infinitely divisible, or something like that, but no matter. Creating all of the hotel rooms at a particular time – simultaneously – avoids both worries. It doesn't take an infinite amount of time, and it doesn't require time to be infinitely divisible.
17. We can frame this as a dilemma for Loke: either creation *ex nihilo* is impossible, or an actually infinite number of things can exist. Since we are assuming that the latter disjunct is false, we have to accept that creation *ex nihilo* is impossible. In that case, Loke's modified HHA fails.
18. In fact, most of the philosophers whom I've ever asked about the issue have either denied that it's true or have stated that they are unpersuaded by the arguments for it.

19. The basic contours of this article started taking shape in 2012, and I benefited back then from correspondence from various individuals - notably, Wes Morriston, Richard Field, and especially Christopher Gibilisco. In the intervening years, as I shelved this project to work on other things, I benefited from discussions with my students when I taught the *kalām* cosmological argument, and (as I recall) a nice discussion with Matt Horrell on Facebook. When I finally got around to redrafting the article, I was assisted by helpful comments and correspondence from Matt Carp, Tim Loughrist, Caleb Mahlen, Alex Malpass, Steven Swartzer, and Adam R. Thompson.