# Can Causal Chains Extend Back Infinitely?
## Entailment, Determinism, and a Cosmological Argument

*Travis Dumsday*

ABSTRACT   I develop a new argument to the effect that past causal chains cannot extend back infinitely, but must instead terminate in a first uncaused cause (or causes). It has the advantage of sidestepping a historically prominent objection to cosmological arguments of this general type, one leveled by Aquinas and various other Scholastics.

## 1. INTRODUCTION

The question of whether a causal chain can extend back infinitely into the past has been one of considerable importance in natural theology, both recent and historical. For instance, the *Kalām* cosmological argument is centred around the idea that the physical universe, including any causal series within it, must have a beginning because time itself must have a beginning. Other arguments aim to show that any causal series extending back temporally into the past must have a first uncaused cause or causes since, without such an uncaused cause or causes, no member of the series would have an adequate causal explanation. By contrast, many have thought that such series are possible, and have argued that this possibility tends to the defeat of cosmological arguments, or (more commonly among partisans of natural theology) that this possibility calls for the employment of alternative first cause arguments, versions relying on the impossibility of infinite chains of *simultaneous* causal dependence rather than on the impossibility of infinite *past* causal chains. That is an approach taken by Aquinas, Scotus, and other members of the Scholastic tradition.

I want to try a new strategy for concluding to the impossibility of infinite past causal chains, and hence to the existence of a first cause or causes. Rather than arguing on the basis of the nature of time or facts about causal explanation in general, I will argue on the basis of entailment relations obtaining between states of affairs in causally closed deterministic universes. This strategy will allow for a cosmological argument from such chains that avoids a central critique made by Aquinas et al. I will also make the case that the argument can be broadened such that a theistic conclusion can be drawn even for non-deterministic universes.

The paper is divided up as follows: in the next section I review the aforementioned critique. Then in section three I formulate my argument, while section four sees a sampling of possible objections. In the final section I offer some brief remarks on the prospects for extending the conclusion of the argument beyond the positing of a first cause, to a being with additional attributes traditionally ascribed to God. For this cosmological argument is (like nearly every argument for the existence of God) incomplete; at best it gets part of the way to theism by establishing the existence of a being or beings possessed of one or a few divine attributes.

## 2. A Central Criticism of the "Infinite Past Causal Chains Are Impossible" Hypothesis

While a variety of criticisms of this hypothesis have been leveled over the centuries, within Scholastic natural theology the most influential critique arises from a distinction between two kinds of causal chain. On the one hand we have causal chains in which the ongoing causal activity of one member of the chain is a necessary condition for the causal activity of another member. On the other hand we have causal chains in which the continued causal activity of one member of the chain is *not* a necessary condition for the causal activity of another member. To use the medieval terminology, causes in the first sort of chain are essentially (*per se*) ordered to one another, while causes in the second sort of chain are accidentally (*per accidens*) ordered to one another.

As an example of the first, Aquinas often used the image of a man using a stick to push a stone along the ground. The stone would not keep moving were it not for the ongoing causal influence of the stick, and the same goes for the stick—it would not keep moving were it not for the ongoing causal influence of the man's hand.[1] The stick functions as an intermediate cause,

---

1. See for instance Aquinas' *Summa contra gentiles*, bk. 2, ch. 38.

relaying the causal activity of the hand to the stone. The motion of the stick is at once both an effect of the motion of the hand and a cause of the motion of the stone, thereby relaying causal activity. The example in this case is a finite causal chain where the causation involved is causation of motion; naturally the same point holds for causation of existence.

As an example of a chain whose members are merely *accidentally* ordered to one another, procreation was sometimes used.[2] Cain depends on the previous causal activity of Adam for his existence, but does not depend on the present existence or causal activity of Adam in order to exercise his own causality. Cain can be causally active, including in having his own children, even when Adam is long dead.

Now, the perceived import of this distinction is that with essentially ordered causal series, positing the removal of the first cause (such that all the purported causes are rendered intermediate) necessarily removes all causation from the picture entirely. Posit that the hand be removed, and the stick cannot move the rock. Multiply the intermediate "causes" as much as you like, and there will still be no actual causation; without a hand to serve as ultimate cause of motion, the stick(s) cannot move the rock. It / they depend for the exercise of causal activity on the concurrent causal activity of a first cause, the hand. Take away the latter, and the former is necessarily rendered inactive. With accidentally ordered series, by contrast, positing the removal of a (temporally prior) first cause need not impact the present causal activity of the subsequent members of the causal chain.

Summarizing the core insight underlying the *per se / per accidens* distinction, Brown writes that

> Aristotle and his followers held as a critically important thesis that the constituent relations in an essentially ordered series are *transitive*. . . . If, to use the standard example, the hand propels the stick and the stick in turn propels the stone, then the hand propels the stone by means of the stick.[3]

A bit later he continues:

> So, in an essentially ordered series of any type of cause, each member is supposed to be the cause of all those which follow on it, owing to the transitivity of the relations involved. And then, of course, if there is or must

---

2. Consult Aquinas' *Summa theologiae*, I, q. 46, art. 2, ad. 7.

3. Patterson Brown, "Infinite Causal Regression," *Philosophical Review* 75 (1966), 510–25. The quote is from page 517. Hereafter cited in text as *ICR*.

be a first member of such series, the transitivity would make it natural to say that the first member was the ultimate cause of every one of the others. . . . As a counterpart of the foregoing, the Aristotelians held that the constituent relations in an accidentally ordered causal series are *intransitive.* (*ICR*, 518–19)

Due to the transitivity inherent in essentially ordered series, we can properly say that the hand causes the rock to move. By contrast, while we can properly say that Adam begot Cain, and Cain begot Enoch, we cannot thereby say that Adam begot Enoch.[4]

So it was thought by Aquinas and many others that infinite past causal chains were not obviously impossible—their existence would not conflict with any empirically evident state of affairs, in the way that positing a lack of a first cause in the case of essentially ordered casual chains *would* conflict with empirically evident states of affairs, namely, present causal activity. Since causal relations between those *past* causes could be *in*transitive, there was no way to claim that a current instance of causal activity necessarily traces its causal import all the way back up the preceding chain, leading to regress. In theory at least, an instance of current causation could have been preceded by an infinite number of past such instances (though the actual truth of such a scenario was dismissed on the ground that it conflicted with Scripture).[5]

We have now reviewed a historically and philosophically significant criticism of the idea that past causal series require a first cause. In response, I would like to suggest a new way to defend the idea. Presupposing the truth of the standard Scholastic analysis of transitive causal chains—i.e., presupposing that transitive chains must have a first member—I will argue that the members of some past causal chains are related transitively, and hence must have a first member.

## 3. The Argument
Consider first what I hope will be an uncontroversial claim: entailment is a transitive relation. If A entails B and B entails C, then A entails C. This clearly holds in the realm of logic, underlying certain kinds of syllogistic

---

4. For further exegetical arguments to the effect that the central worry of Aquinas and other medieval Scholastics had to do with the *transitivity* of causal relations, rather than the *simultaneity* of causal relations, see Brown (*ICR*, 519–20), especially his interpretive remarks concerning the *Summa contra gentiles* book 2, chapter 38 (already cited above).

5. See the *Summa theologiae*, I, q. 46, art. 2, resp.

reasoning ("If p then q, if q then r, therefore if p then r"). It seems then that it should hold for metaphysics as well—if the existence of entity A entails the existence of entity B, and the existence of entity B entails the existence of entity C, then the existence of entity A entails the existence of entity C. For instance, if having shape entails having size, and having size entails having spatial extension, then having shape entails having spatial extension.

If it is granted that entailment is transitive, then in order to begin addressing the criticism laid out in the previous section, what one needs is an example of a past causal chain whose members are not merely causally linked, but linked by relations of entailment (hence transitively). Any past causal chain of that sort will, necessarily, not admit of an *infinite* past, and hence will have to have a first member. And I would submit that a clear case of such can be found in causal chains present within a causally closed deterministic physical universe.

In such a Laplacean world, complete knowledge of the states of affairs[6] at a time $t_1$ combined with a complete knowledge of the laws[7] operative in that universe allows for infallible prediction concerning the states of affairs obtaining at a later time, $t$. Given the laws, $t_1$ entails $t$. In such a world as this, the content of a state of affairs at some time is not merely *caused* by previous states of affairs—given determinism and causal closure, the content of a state of affairs is *entailed* by the previous states.

Now since, as we saw in the previous section, transitive chains must have a first cause—think again of the hand, stick, and stone—past causal chains in a causally closed deterministic universe must likewise have a first cause, since their members too are related transitively. Stated a bit more formally:

6. I will take "state of affairs" broadly to refer to some instance of an object's possessing some property or being engaged in some process. However, the argument does not require that I endorse a specific substance ontology (or even substance realism—the argument could run on certain sorts of eliminativist bundle theory), or any particular ontology of states of affairs. In particular, it does not require a commitment to reductionism or non-reductionism about states of affairs. I believe any (or just about any) alternative on the market could be plugged into the argument without detriment.

7. The argument can be run on any of the major ontologies of law except Humean regularity theory, given that that theory is inconsistent with determinism. (Insofar as a Humean cannot accept the reality of causation, he / she cannot accept the reality of causal determination.) It can however run on dispositionalism, which sees laws as merely descriptive of natural regularities grounded in causal powers, and also nomological necessitarianism, which sees laws as prescriptive of those regularities. (Thomistic philosophy of nature, of course, tends toward dispositionalism.)

Argument 1

Premise 1: All causal chains (including all past causal chains) in all causally closed deterministic physical universes are causal chains composed wholly of members related transitively.

Premise 2: All causal chains composed wholly of members related transitively have a first cause or causes.

Conclusion: Therefore, all causal chains (including all past causal chains) in all causally closed deterministic physical universes have a first cause or causes.

So it seems a sound first cause argument based on the impossibility of infinite past causal chains can be made, provided that the scope of the argument is restricted to causally closed deterministic physical universes.

Of course, even if the argument escapes the worry laid out in section 2, it still faces a scowling horde of objections all its own. Let us proceed to consider some of these.

4. Objections

Ten potential objections will be taken up in turn.

[1]   How can you be so sure that what is true of entailment in logic holds true of metaphysics?

Why would the rules change when, either way, it is still entailment?

[2]   By way of a counter-reply: in the case of metaphysics, perhaps that is not really entailment. Perhaps entailment is purely a logical relation, the terms of which must be propositions.

This would be disputed by those truthmaker theorists who hold to an entailment account of truthmaking, according to which one of the terms of the entailment relation is a real state of affairs.[8] Also, it seems there are perfectly sensible examples of entailment in metaphysics. Think again of shape and spatial extension: these properties are necessarily linked, linked in all possible worlds such that wherever there is shape there is spatial extension. And yet the relation between them is not causal. Nor is it merely

8. On this point see for instance John Fox, "Truthmaker," *Australasian Journal of Philosophy* 65 (1987), 188–207.

analytic, a relation by arbitrary definition (in the way that all bachelors in all possible worlds are unmarried). It seems instead to be a case of genuine entailment.

Still, I can grant for the sake of argument that the relation I have been calling "entailment" is not really entailment, strictly speaking. All I need for the argument of section 3 to go through is the claim that in a causally closed deterministic physical universe, one state of affairs follows another with absolute necessity, a necessity of the same force as that relation binding shape and spatial extension. For necessitation of that kind is also clearly transitive in nature, just as much as logical entailment. The important thing is not preserving the language of entailment but rather preserving the idea that one thing (whether proposition or state of affairs) follows from another necessarily. And causal processes in a causally closed deterministic universe have precisely that requisite necessity.

So I need not rely on the notion of entailment to carry the argument through; however, it remains my preferred formulation. This does run the risk of appearing to confuse logical and ontological realms of discourse; however, this difficulty can be overcome by reference to the *force* of the necessitation relation that determinists presuppose in their ontology. For determinists who hold to a causally closed universe, once the initial conditions, laws, and a temporally previous state of affairs are all specified, resultant causal relations are necessary in the strongest possible sense. The laws have no *ceteris paribus* clauses, nothing external can interfere with the subsequent unfolding of events, and indeed the history of the system could be modeled quite easily in the form of a modus ponens argument, with the initial conditions etc. forming the antecedent of the conditional. In other words: while strictly speaking the unfolding of those events is not a matter of logical necessity (since we are dealing in real states of affairs rather than abstract propositions, which abstracta remain the stuff of logic, as it were), but rather metaphysical necessity, the force of the necessitation relation is just as strong.

[3] The argument relies on the connection between one state of affairs and the subsequent state of affairs being necessary; i.e., given causal closure and the laws, there is no possible world in which the state of affairs obtaining at $t$ could fail to follow from the state of affairs obtaining at $t_1$. But this means that the first cause concluded to by this argument will have to be a cause that is within the physical order. It must itself be a physical entity / process / state of affairs rather than something transcending it and intervening in it (which would imply

the falsity of causal closure and hence the failure of the argument).
So how does this help theism?

  Right, the first cause or causes concluded to are bound to be physical:
perhaps a first physical being that popped into existence uncaused where,
previously, there had been no physical being, or perhaps an infinitely old
but previously causally inactive physical being which, uncaused, some-
how becomes active at a time and sets off the subsequent causal chain.
Someone wanting to draw a further, unambiguously theistic conclusion
from this first cause argument would have to then argue that the first sce-
nario demands a non-physical transcendent cause, since it is impossible
for something to pop into existence out of nothing without a cause; and it
would then have to be argued that the second scenario is also unworkable
since some external cause would be needed to explain the transition from
quiescence to activity.[9] Either in turn would demand a denial of causal clo-
sure, which denial would render my first cause argument unsound, strictly
speaking. The argument, in fact, functions as a ladder which can then be
kicked away in order to make further progress. That is, no theist believes
in causal closure. But an acceptance (for the sake of argument) of both
causal closure and determinism with respect to the physical world leads
to the conclusion that there is a first cause or causes. And that in turn un-
dermines a belief in causal closure (hence metaphysical naturalism), for
the sorts of reasons just alluded to.
  To put the point a bit differently: I take it that my argument shows that
any causally closed deterministic physical universe containing a causal
series or series must have a temporally first cause. That temporally first
cause is presumably a physical thing, on the continuing assumption of
closure. However, that temporally first cause will itself either be infinitely
old or will have had a temporal beginning. I argue that, on either scenario,
a non-physical cause will then be required as an explanatory posit, which
in turn undermines the assumption of causal closure. This first cause ar-
gument assumes causal closure for the sake of argument but then shows
how it can and indeed must be eliminated as an assumption, when all is
said and done. In the end then, with those further developments noted, we
do indeed have a cosmological argument for a non-physical first cause.

  9. For more on that second scenario, see William Lane Craig, "The *Kalam* Cosmological
Argument and the Hypothesis of a Quiescent Universe," *Faith and Philosophy* 8 (1991),
104–108; and Travis Dumsday, "Why Thomistic Hylomorphism Implies (Something Like)
Big-Bang Cosmology," *Proceedings of the American Catholic Philosophical Association* 85
(2012), 69–78, doi:10.5840/acpaproc2011857.

[4]   Let us say you have shown that infinite past causal chains in causally closed deterministic universes really are transitive in nature, such that they relevantly parallel the chains of simultaneous causation used by Aquinas et al. in their cosmological arguments. What if they were wrong in thinking that transitive causal chains need a first member? So far you have just taken their view on this for granted.

Naturally there is a large existing literature on this question, which I cannot explore thoroughly here. However, some indication of the reasoning behind the standard medieval view has already been made in section 2 above; moreover, Brown does a decent job of further explicating the Scholastics' take on this, which retains its force:

> Suppose further that *a* is moved by *b*, *b* is in turn moved by *c*, *c* in turn by *d*, and so on indefinitely. [Brown assumes that all these motions are simultaneous—TD.] The issue is whether this series can continue ad infinitum. We now ask, what moves *a*? Well, it has already been stated that *b* moves *a*; so it may be suggested that "*b* moves *a*" is the desired explanation of *a*'s motion, the desired value of "*x* moves *a*." But this would be an inadequate account of the matter. For *b* is itself being moved by *c*, which—owing to the transitivity of "*x* moves *y*"—thus yields the implication that *a* is moved by *c*, with *b* serving merely as an instrument or intermediate. But in turn *d* moves *c*; and so *d* moves *a*. But *e* moves *d*; therefore *e* moves *a*. And so on indefinitely. Now, as long as this series continues, we have not found the real mover of *a*; that is to say, we have not found the *explaining* value of the function "*x* moves *a*." The regress is thus a vicious one, in that the required explanation of *a*'s motion is deferred so long as the series continues. . . . Nor, it must be noted, is any such explanation given merely by asserting that there is an infinite regress of movers of *a*. "An infinite regress of movers move *a*" is not a possible value of the function "*x* moves *a*," for the variable in the latter ranges over individuals, not classes (and a fortiori not over series, finite or infinite). (*ICR*, 522–33)

The basic idea is that an infinite regress of "causes" just cannot do the requisite causal explanatory work. Since causation (of the temporally simultaneous sort Brown is thinking of here) is transitive, if there is no final term to which the causal chain is oriented / gets its start, there is nothing to anchor a genuine causal explanation—all "causes" become by definition intermediate causes, but intermediate causes devoid of causal force to relay. And so there can be no actual causation in such a circumstance. This

is even more clearly evident in cases where causation of existence is under consideration rather than causation of a change, since, absent a first cause, none of the intermediate causes could even exist, let alone exercise their own causal power.

I have argued that the same point applies in the case of past causal chains in causally closed deterministic universes. Since state of affairs A is entailed (or "necessitated," if one prefers not to use the language of entailment) by prior state of affairs B, which is itself entailed by prior state of affairs C, then A is likewise entailed by C; but if C is entailed by a still prior state of affairs, D, etc. ad infinitum, then, given the transitivity of entailment, A isn't ultimately entailed by anything at all. Brown's comments in the passage just cited will apply just the same in this supposed scenario: "Now, as long as this series continues, we have not found the real mover of *a*; that is to say, we have not found the *explaining* value of the function '*x* moves *a*.'"

Again, I realize that much more could be said here (and has been said), and that the need to posit a first cause in transitive causal chains remains controversial.[10] However, if one grants that a first cause is needed for transitive chains, then I believe I have shown that infinite past causal chains are impossible (at least in the context of causally closed deterministic physical universes). This is a noteworthy result, and one that goes contrary to a longstanding tradition of thought with respect to cosmological arguments.

[5]   Even if Brown is correct in his interpretation of Aquinas and other scholastics as to the importance of transitivity, isn't there still something to the idea that simultaneity of causation is, in and of itself, significant? Take away the hand and the stone cannot be moved, since the causally explanatory concurrent cause is removed. Posit the destruction of Adam, and his son Cain can still have Enoch.

10. For further relevant discussion see for instance Dennis Bonnette, *Aquinas' Proofs for God's Existence: St. Thomas Aquinas on "The Per Accidens Necessarily Implies the Per Se"* (The Hague: Nijhoff, 1972); W. Norris Clarke, *The One and the Many: A Contemporary Thomistic Metaphysics* (Notre Dame, IN: University of Notre Dame Press, 2001), in particular pages 216–19; Edward Feser, "Existential Inertia and the Five Ways," *American Catholic Philosophical Quarterly* 85 (2011), 237–67, doi:10.5840/acpq201185214; Hugo Meynell, *An Introduction to the Philosophy of Bernard Lonergan* (Toronto: University of Toronto Press, 1991), in particular pages 134–36 and 161–63; Michael Rota, "Infinite Causal Chains and Explanation," *Proceedings of the American Catholic Philosophical Association* 81 (2007), 109–22, doi:10.5840/acpaproc2007818; James Sadowsky, "The Cosmological Argument and the Endless Regress," *International Philosophical Quarterly* 4 (1980), 465–67; and Keith E. Yandell, *Basic Issues in the Philosophy of Religion* (Boston: Ally & Bacon, 1971), in particular pages 87–95.

But consider the situation from within the context of a causally closed deterministic physical universe. There, Adam's begetting Cain, combined with the constancy of the laws of nature (and any other relevant states of affairs obtaining) literally necessitates Cain's begetting of Enoch. The latter event is, in a way, pre-programmed in the former. It was bound to take place, just as the former event was already pre-programmed by its precursors. So while it may well be the case that Cain has Enoch long after the death of Adam, in a way Adam's causal influence is never absented from the later states of affairs—rather, his past actions entail them. In this respect, all causal chains can be qualified as transitive and hence *per se*: pick *any* temporal moment in the history of the universe, note the complete set of the states of affairs obtaining at that moment, and their obtaining (plus the laws) entails everything that happens for the entire future history of that universe.

At this point one might press a bit further and ask why the precursor causes cannot themselves extend in number into the past, ad infinitum. The reason is that the causes here are related transitively, and as Aquinas and others showed, there cannot be infinite regress of transitive causes.

[6]   All of this is moot, since, although we live in a causally closed universe, we do not live in a deterministic universe. So the argument has no application to our actual world.

The basis of this objection is that the broad consensus in contemporary physics is that our universe is not deterministic, or at least not on the quantum level. Rather than future states of affairs being wholly determined by present states of affairs, the latter only lay down probabilities for the former. The issue is not entirely settled, and hidden variables accounts, which would restore determinacy to the quantum realm, have had prominent advocates (like Einstein, de Broglie, and Bohm). Still, the idea has fallen on hard times, so does that mean the argument just provided is of no value?

Not necessarily, for some have argued that there is an intrinsic connection between being a first cause and being a necessary existent; i.e., any genuine first cause (the originator of a causal series which is not itself dependent on any prior cause) would have to be a necessary being. Aquinas proposes as much.[11] I do not intend to defend that connection here, but suppose for the sake of argument that it holds. Then, so long as one supposes

---

11. See the *Summa theologiae*, I, q. 3, art. 4, resp., where he argues that God's status as uncaused entails the identity of His essence with His existence.

that a deterministic universe containing a causal series is at least possible (which a physicalist has no *prima facie* reason to deny), then a first cause is possible, and hence the existence of a necessary being is possible. In other words, one can modalize the argument to weaken its premises and render it easier to defend.[12] And if a necessary being is possible then it is actual. So we would end up with the following subsidiary arguments:

Argument 2.1
Premise 1:  Causally closed deterministic physical universes containing a causal series are possible.
Premise 2:  If causally closed deterministic physical universes containing a causal series are possible, then a necessarily existent being is possible.
Conclusion:  Therefore a necessarily existent being is possible.

Argument 2.2
Premise 1:  A necessarily existent being is possible.
Premise 2:  If a necessarily existent being is possible, then a necessarily existent being is actual.
Conclusion:  Therefore a necessarily existent being is actual.

If these subsidiary arguments work, then my argument for the need to posit a first cause or causes when dealing with a causally closed deterministic physical universe can be extended to conclude to a necessarily existent being who is able to be a first cause of causal series, whether our own universe is deterministic or indeterministic.

Of course, someone already committed to theism (someone accepting the existence of a being that is both necessarily existent and omnipotent) will not accept premise 1 of argument 2.1—on theism, there is no possible causally closed physical universe. So this argument too has a "ladder to be kicked away" quality to it. It will function to motivate theism for a certain kind of physicalist, for someone who *initially* takes seriously the possibility of a causally closed deterministic physical universe; and it will do so precisely by prompting him / her to abandon that possibility in favor of accepting the reality of a necessarily existent being which, *qua*

12. Comparable modal strategies are popular in the broader cosmological argument literature—see for instance Brian Leftow, "A Modal Cosmological Argument," *International Journal for Philosophy of Religion* 24 (1988), 159–88; and Joshua Rasmussen, "From States of Affairs to a Necessary Being," *Philosophical Studies* 148 (2010), 183–200, doi:10.1007/s11098-008-9293-2.

necessarily existent, is clearly not a physical object (for reasons familiar from the Scholastic tradition)[13] and hence not a part of any causally closed physical universe.

[7]   Even if the argument can defeat the preceding objections, it will still be faced with a mass of general criticisms faced by all cosmological arguments (for instance, Hume's skeptical concerns surrounding causation etc.).

True. However, I think the standard objections admit of compelling replies, though I lack the space to lay these out here (which exercise would also be redundant, given the abundant existing literature).[14]

[8]   Let us say the argument of section 3 is sound. Even if so, it is also redundant, since its soundness presupposes the soundness of the standard Scholastic cosmological argument from the impossibility of infinite chains of simultaneous causal dependence. If that standard argument works, why bother formulating an additional argument from the impossibility of infinite past causal chains?

First, I take the following to be an interesting question in its own right: is it possible to formulate a sound first cause argument on the basis of the impossibility of infinite past causal chains (or at least a certain kind of infinite past causal chain)? Aquinas, Scotus, and many others in the Scholastic tradition thought that such an argument could not be formulated. If my argument works, this shows that they were mistaken. Second, I expect that for many beginning students in philosophy, the first cosmological argument they come across is some sort of argument from the impossibility of infinite past causal chains. J. L. Mackie rightly refers to it as a "popular line of thought,"[15] and its popularity is still reflected in textbook and online introductory discussions (even if these are often based on

13. For instance, physical objects are spatially extended and thus have parts (actual or potential). Anything with parts is a composite, and any composite requires a causal explanation for its structural integrity. Hence anything physical cannot be necessarily existent. For further details, see for instance Aquinas' *Summa theologica*, I, q. 3, art. 1 and art. 2.

14. See for instance Robert Koons, "A New Look at the Cosmological Argument," *American Philosophical Quarterly* 34 (1997), 193–211; see also Timothy O'Connor, *Theism and Ultimate Explanation: The Necessary Shape of Contingency* (Oxford: Blackwell, 2008).

15. J. L. Mackie, *The Miracle of Theism* (Oxford: Oxford University Press, 1982), pages 87 and 91.

a misreading of Aquinas' second way). It is a line of thought with some intuitive appeal, and I suspect that its rejection by many prominent theistic philosophers can for some students be a bit surprising / disconcerting. To be able to show that some version of this popular line of thought can actually be carried through is therefore not wholly unimportant.[16] Third, it may be that the argument I have presented has certain distinct advantages. For instance, the extension of the argument seen above via arguments 2.1 and 2.2 relies on quite a weak premise, namely the mere *possibility* of a causally closed deterministic physical universe containing causal series; this is a premise most metaphysical naturalists would likely admit, especially since the broad scientific consensus was for so long determinist.

[9]   Nevertheless, the modal argument (formalized above as arguments 2.1 and 2.2) remains redundant. Modal facts are accessed by intuition. Either you have the intuition that a necessary being is possible, or you do not. It is pointless to attempt to buttress this modal claim by reference to a prior modal claim concerning the possibility of a causally closed deterministic physical universe. After all, the epistemic source of both modal claims is the same (intuition), and if someone is unconvinced by the former modal claim (regarding a necessary being), then he / she is unlikely to be convinced by the latter.

This objection appears to suppose that modal intuitions are invariable across individuals, but this seems questionable. One person might take it as intuitively obvious that a necessary being is possible (without perhaps initially realizing what this entails, namely the reality of such a being), while another may not. Modal intuitions sometimes differ across individuals, both with respect to their content and their force (i.e., someone may be more or less confident in a modal intuition). Thus, there may be some for whom the truth of the claim that a necessary being is possible is not immediately obvious (or not *forcefully* obvious), but who are also not inclined to think the claim clearly false. For such an individual, showing how

16. Of course, other recent authors have presented arguments that tell against the possibility of infinite causal regress in *general* (whether simultaneous or past), including Rota and Clarke, cited earlier. And defenders of the *Kalām* argument aim to show that there cannot be infinite past causal series, based on facts concerning the nature of time. But few recent authors in the academic literature (as opposed to popular apologetics) focus specifically on the impossibility of infinite past causal series for reasons *not* having to do with the nature of time. So the argument of the present paper does manage to fill an unoccupied (if narrow) niche.

that modal claim is entailed by another, perhaps more subjectively plausible modal claim (in this case the claim that a causally closed deterministic physical universe is possible) could be one way of moving the discussion forward. Otherwise, we risk falling into a trap of conflicting modal intuitions with no means of adjudicating between them.[17]

[10] To take a standard example: is it not at least coherent to conceive of an infinitely long train, each of whose cars is moved by a rear car and simultaneously moves a forward car (and with no first car in the picture)? If such a scenario is possible, then it seems infinite past causal chains more generally (including such chains in a causally closed deterministic physical universe) are likewise possible.

   This is indeed a standard example, familiar from the literature. However, it seems a case whereby imagination is in a way conflicting with understanding. In fact the scenario is not possible (at least in a causally closed deterministic physical universe), for the reasons laid out above. Sometimes initial modal intuitions (or perhaps what *seems* like a modal intuition?) prove false upon further analysis.[18]

Conclusion

As noted in the introduction, even if the argument provided here is sound, it is at best a substantially incomplete argument for the existence of God. It establishes that there exists a first cause or causes. But it does not tell us much about what sort of being the first cause(s) might be. However, further reflection might allow elaboration on that point. As noted, it has been argued by Aquinas and others that any genuine first cause would have to be necessarily existent. He also argued that the first cause would have to be immaterial, devoid of contingently possessed properties, and ontologically good, and from these properties he then concluded to still further properties (e.g., intellect from immateriality). Moreover he argues that there can in fact only be *one* first cause.[19] Obviously it is debatable whether the

17. For an extensive discussion of the role of modal epistemology in cosmological arguments, see O'Connor, *Theism and Ultimate Explanation*.

18. My thanks to an anonymous referee for *Forum Philosophicum* for raising objections #9 and #10.

19. See the *Summa theologiae*, I, q. 3, art. 1, resp. (immateriality); q. 3, art. 6, resp. (being devoid of contingently possessed properties), q. 6, art. 1, resp. (ontological goodness); q. 14, art. 1, resp. (further properties); q. 11, art. 3, resp. (uniqueness).

status of first cause is really so fecund, even with this important histori-
cal precedent for thinking it might be. But in the interests of space and at
the risk of biting off far more than I can chew, I will leave these further
questions for another day.[20]

Bibliography

Bonnette, Dennis. *Aquinas' Proofs for God's Existence: St. Thomas Aquinas on
    "The Per Accidens Necessarily Implies the Per Se."* The Hague: Nijhoff, 1972.

ICR    Brown, Patterson. "Infinite Causal Regression." *Philosophical Review* 75 (1966):
    510–25.

Clarke, W. Norris. *The One and the Many: A Contemporary Thomistic Meta-
    physics.* Notre Dame, IN: University of Notre Dame Press, 2001.

Craig, William Lane. "The *Kalam* Cosmological Argument and the Hypothesis
    of a Quiescent Universe." *Faith and Philosophy* 8 (1991): 104–108.

Dumsday, Travis. "Why Thomistic Hylomorphism Implies (Something Like)
    Big-Bang Cosmology." *Proceedings of the American Catholic Philosophical
    Association* 85 (2012): 69–78. doi:10.5840/acpaproc2011857.

Fox, John. "Truthmaker." *Australasian Journal of Philosophy* 65 (1987): 188–207.

Feser, Edward. "Existential Inertia and the Five Ways." *American Catholic Philo-
    sophical Quarterly* 85 (2011): 237–67. doi:10.5840/acpq201185214.

Koons, Robert. "A New Look at the Cosmological Argument." *American Philo-
    sophical Quarterly* 34 (1997): 193–211.

Leftow, Brian. "A Modal Cosmological Argument." *International Journal for
    Philosophy of Religion* 24 (1988): 159–88.

Mackie, J. L. *The Miracle of Theism.* Oxford: Oxford University Press, 1982.

Meynell, Hugo. *An Introduction to the Philosophy of Bernard Lonergan.* Toronto:
    University of Toronto Press, 1991.

O'Connor, Timothy. *Theism and Ultimate Explanation: The Necessary Shape of
    Contingency.* Oxford: Blackwell, 2008.

Rasmussen, Joshua. "From States of Affairs to a Necessary Being." *Philosophical
    Studies* 148 (2010): 183–200. doi:10.1007/s11098-008-9293-2.

Rota, Michael. "Infinite Causal Chains and Explanation." *Proceedings of the
    American Catholic Philosophical Association* 81 (2007): 109–22. doi:10.5840/
    acpaproc2007818.

Sadowsky, James. "The Cosmological Argument and the Endless Regress." *In-
    ternational Philosophical Quarterly* 4 (1980): 465–67.

Yandell, Keith E. *Basic Issues in the Philosophy of Religion.* Boston: Ally & Bacon,
    1971.