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REGRESSES, SUFFICIENT REASONS, AND COSMOLOGICAL ARGUMENTS

PATRICK FRANCKEN
ILLINOIS STATE UNIVERSITY

HEIMIR GEIRSSON
IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY

ABSTRACT: Most of the historically salient versions of the Cosmological Argument rest on two assumptions. The first assumption is that some contingency (i.e., contingent fact) is such that a necessity is required to explain it. Against that assumption we will argue that necessities alone cannot explain any contingency and, furthermore, that it is impossible to explain the totality of contingencies *at all*.

The second assumption is the Principle of Sufficient Reason. Against the Principle of Sufficient Reason we will argue that it is unreasonable to require, as the Principle of Sufficient Reason does, that *any* given whole of contingent facts has an explanation. Instead, it depends on the results of empirical investigation whether or not one should ask for an explanation of the given whole.

We argue that if a cosmological argument invokes either of the two assumptions, then it fails to prove that a necessity is needed to explain the universe of contingent facts.

A variety of arguments fall under the label of the Cosmological Argument. We intend to focus on two underlying assumptions on which many, though not all, of the historically salient versions rest. The first assumption is that some contingency (i.e., some contingent fact) is such that a necessity is needed to explain it (in a sense explained below). The second assumption is the Principle of Sufficient Reason. We will start by discussing the first

assumption, arguing that such an explanation as is required by cosmological arguments cannot explain contingencies and furthermore that it is impossible to explain the totality of contingencies *at all*. We will then move on to evaluate the Principle of Sufficient Reason, arguing that it is unreasonable to require *just any* given whole of contingent fact to have an explanation as the principle does, and that it depends on the results of empirical investigation whether one should ask for an explanation of the facts. We will argue that if a version of the cosmological argument invokes either of the two assumptions, then it fails to force upon us the conclusion that a necessity is needed to explain the universe of contingent facts.

I

Since it is a variety of arguments that go by the name of the Cosmological Argument we should provide at the outset some characterization of what we mean to include under this head. Cosmological Arguments, in our sense, then, assume that there are a number of contingent events, beings, states of affairs—in sum, a number of contingent *facts*—and then argue that the only way to explain why these contingent facts exist rather than something else is to postulate a necessity (typically a necessary being, i.e., God). Provisionally, then, let us understand by a cosmological argument any argument that seeks to prove the following about what is required to explain the universe of contingent facts: namely, that the whole universe of contingent facts can have an explanation only if the explanation can be based somehow on necessities of some kind. This characterization provides the core of traditional cosmological arguments, which is the idea that some sort of necessity, something that necessarily obtains, is required as explanans in any explanation of the universe of contingent facts. This is more general than the typical object of such arguments, which is to show that it is a particular necessity—to wit, the necessary existence of a *deity*—that is required for the explanation of the whole of contingent reality. But it should be obvious that no cosmological argument could achieve this particular object unless it implied the more general and weaker conclusion that *some* necessity is required. Consequently our arguments apply to a wider class of arguments than just those that aim to prove the existence of a deity.

Let us consider a cosmological argument as follows. It assumes a form of the Principle of Sufficient Reason (PSR) strong enough to imply that every contingency has an explanation,[1] and it concludes that a necessity is required to account for all the contingencies. The argument, in other words, concludes that the totality of contingencies must have an explanation whose explanans $L_1, \ldots, L_n$ includes at least one necessity. As we shall argue, no explanans can succeed in explaining all the contingent facts. We begin by assuming that $L_1, \ldots, L_n$ are *all* necessarily true. Later we consider the case in which they are not all necessarily true.[2]

Suppose, then, that $L_1, \ldots, L_n$ are all necessarily true. Given the fact that we cannot derive contingent truths from premises all of which are necessary, it follows that those "contingent" facts explained by $L_1, \ldots, L_n$ are not contingent at all. Instead these facts will be necessary consequences of necessarily true premises. The world will be Spinozistic, necessary through and through. So, if $L_1, \ldots, L_n$ are to explain all the *contingencies*, we cannot suppose them all to be necessarily true.

But if we regard one of them as contingently true—say, L_n—then we have a contingent fact as yet unexplained, namely L_n itself. Since we are seeking an explanation of *all* contingencies, the explanation has to include L_n itself. But L_n is a part of the *explanans*. Consequently a contingent L_n, in combination with the other L_i's, cannot be an explanation of the *totality* of contingent facts.

What happens if we concede L_n to be contingent and try to explain it in turn? We get a repetition of the same situation we have just seen and we are off to an infinite regress. That is, we will have to explain L_n by appeal to an explanans that contains either a further contingency or nothing but necessities. If we take the second alternative and appeal to nothing but necessities, it will follow (for the same reasons as before) that L_n is necessary and that everything derivable from it in conjunction with the other L_i's is necessary. The second option is out of the running, then, for reasons already familiar. So it will have to be the first alternative or nothing. But taking the first option starts an infinite regress of explanations of contingencies by contingencies. In this case, to be sure, necessities are allowed to appear in combination with contingencies in the explanantia at the various stages of the regress, but this hardly mitigates the fact that contingencies are being explained by appeal to other contingencies, without end. We will always have a contingency as yet unexplained and requiring an explanation.[3]

We would appear to have discovered that it is not possible to explain the whole universe of contingencies by appeal solely to necessities; for nothing besides the modal status of $L_1, \ldots, L_n$ has played any role in our reasoning. It is only further necessities that we can explain on the basis of necessities *alone*. Whenever we would explain a contingency, therefore, we cannot rely exclusively upon necessities in the explanans; we must rely upon contingencies, or a combination of necessities and contingencies. In either case, however, the result will never be an explanation of the universe of contingencies. It will be at best an explanation of the universe of contingencies *minus* at least one contingency, the one in the explanans. This contingency might yet be explainable; but to explain it in its turn, we would have to rely again upon a contingency in the explanans, and this latter contingency would also be explainable only on the basis of a further contingency, and so on. Thus, it would seem, we have discovered not only the impossibility of explaining the totality of contingent facts by appeal to necessities alone; we have discovered the impossibility of explaining the totality of contingencies *at all*.[4]

The conclusion that we cannot explain the totality of contingencies at all is a bit startling, so let us consider two objections one might raise. The first objection is that nothing has been said about the kind of necessity that is involved in cosmological arguments. The second is that we seem to have assumed that any explanation of the universe of contingencies would have to be a deductive argument.

As to the first objection, it doesn't matter to the argument what reasonable notion of necessity is presupposed, provided it has two properties: (i) that whatever is derivable from nothing but necessities is also necessary, and (ii) that all true propositions are either necessarily true or only contingently true. So long as these two properties are preserved, it does not matter how the notion of necessity is understood.

As to the second objection, we have implicitly presupposed not quite that an adequate explanation of the universe of contingencies would be a deduction, but that the explanans would necessitate the explanandum. This is a dispensable presupposition, however, which has served mainly to simplify the discussion to this point. To see this, suppose that the explanans need not necessitate the explanandum; suppose, that is, that it is possible for the explanans to be true and the explanandum to be false. Then it will be a contingent fact that the explanans explains the explanandum. This contingent fact will require an explanation like all other contingencies. It will not have been explained by the very explanation that relies upon it to explain other contingencies. The explanation that explains all other contingencies does not explain the contingent relation between *its* explanans and explanandum. Consequently we will still need an explanation for the contingent relation between the explanans and the explanandum, and thus begins, nearly enough, the same regress as before.

The assumption here is only that when some fact A explains some fact B, it is a fact of some kind that A explains B. For not just any fact explains any other, and there must be some differences (whether statable in an informative way or not) between the cases where some given fact explains another and where some fact doesn't explain some other. To say that the explanans A does not necessitate the explanandum B (in the sense relevant here) is to say that it is possible that A obtain and B not, even though A *in fact* explains B. If the connection between explanans and explanandum can be contingent in this way,[5] then it will be possible for a wholly necessary explanans to explain a contingent explanandum, because the explanatory connection between them might be contingent. Taking this possibility into account makes it more complicated to describe the regress of explanations of contingencies by contingencies, but it doesn't stop the regress. For, now, the regress will feature four options at each stage instead of two: one impossible, and the other three serving only to keep the regress going. Much as before, it will be unacceptable at any stage to have an explanans consisting wholly of necessities and related to the explanandum by a noncontingent explanatory connection. Hence the explanation at any

given stage must rely upon either (a) a wholly necessary explanans together with a contingent explanatory connection, or (b) a contingent explanans together with a noncontingent explanatory connection, or (c) a contingent explanans together with a contingent explanatory connection. In each case there will be an as yet unexplained contingent fact that is relied upon in the explanation, and the regress will continue. The only difference is that now we must recognize that the contingency relied upon in the explanation may sometimes not be, strictly, *part* of the explanans. Instead the contingency may lie in the *connection* between the explanans and the explanandum.[6]

II

Cosmological arguments in our sense invoke (or at least tacitly depend upon) some form of the Principle of Sufficient Reason.[7] They rely, in other words, upon a conception of the scope of explanation (to put it in more contemporary-sounding terms). Thus such arguments proceed by attempting to show that the totality of contingent facts falls within the bounds of the explicable—under the appropriate form of PSR—and then that it could be explained only by some sort of necessity.[8] Traditionally, the only necessity that it was thought would do is a deity whose existence is necessary and whose nature could not be other than it is, but our interest is more in the claim that only a necessity will do than in the particular necessity that was thought to be the relevant one. We have argued that no necessity could explain the whole of contingent reality and, indeed, that nothing at all can. It is an immediate corollary of this that no form of PSR which implies the whole universe of contingencies has an explanation can be true, and that no cosmological argument employing such a principle can be sound.[9] We shall now consider the impact of these points on cosmological arguments that argue from something less global than the whole of contingent reality.

Recent discussions of PSR and cosmological arguments (e.g., [12], [13], [14], [17]) have concentrated on what would be required to explain some subset of the totality of contingent facts—in particular, on the totality of contingent *beings*, contingently existing individual substances and contingently occurring events. (Instead of the totality of contingent facts, that is, recent discussions have concentrated on the set of what we might call contingent existential facts, the subset of contingent facts f such that for some contingently existing individual or contingently occurring event x, f = the fact that x exists or occurs.) It is allowed in these discussions, or most of them, that the totality of contingent beings might be infinite in number and so organized as to form a causally connected succession in which each contingent being's existence would be explainable by reference to (facts about) other contingent beings that have preceded it.[10] Thus it is conceded that each member of the totality may have an explanation without a necessity being needed to explain any, but it is then argued (as in [13]) that this would not

suffice to explain the existence of the *whole succession*. Only a necessity, it is argued, could do that.

The previous discussion allows us to see that if the explicability of each contingent being by reference to other contingent beings is not sufficient to explain the whole succession, neither can the whole contingent succession be accounted for by appeal solely to a necessity. The above discussion makes it clear that further contingent facts, or a combination of such facts with a necessity, have to be invoked to explain why the succession of contingent beings exists. So, whatever principle might be thought to imply that the whole succession, and not just its members, has an explanation, it can't be the strong form of PSR which implies at the least that every contingent fact has an explanation; it will have to be something less sweeping and less obvious. Furthermore, since there is no question of accounting for the succession on the basis of necessities alone—since some contingency has to be part of the explanation—it is at best difficult to see by what argument it could be established that the explanation could not get along with *just* contingencies in its explanans rather than with a mix that included at least one necessity. The arguments in the first section thus reveal that there are further, unnoticed, difficulties in cosmological arguments which seek to show the need to rely upon a necessity in explaining the infinite succession of contingent beings. These difficulties would remain *even if* we could state a plausible, less sweeping PSR which implies that the succession itself has an explanation.

Some philosophers underestimate the difficulty here, however. PSR, they think, can and should be modified as follows: it should require sufficient reasons for all contingencies except free choices, which simply do not have sufficient reasons since, being free, they are not necessitated or determined.[11] They are based upon reasons, to be sure; but these either do not cause or anyhow do not deterministically cause the choices they explain. They are not *sufficient* reasons in the sense relevant to PSR.

With such a modified PSR some philosophers think a plausible explanation of the totality of contingent existential facts may proceed as follows. God creates the universe by a "freely chosen" act of creation; this act, being freely chosen, is a contingent occurrence; so it can be invoked to explain the universe of contingent existential facts consistently with their contingency.

To this, of course, the objection may seem to apply that it is a *contingent* existential fact that God made the choice he did, and that this fact has not yet been explained. Therefore the totality of contingent existential facts has not been explained.

But there is a ready response to this objection. The response is to concede that God's choice still needs to be explained and then to argue that it can be explained by appeal to God's (noncontingent) reasons for making the choice. These reasons do not necessitate the choice they explain (either because reasons can explain a choice without causing it or perhaps because they can explain a choice without deterministically causing it), so that the choice

remains contingent, as does the consequent creation of the universe. But this presents none of the previously noted problems now; for PSR, as modified to accommodate "free" choices, does not require anything further in the way of explanation for God's free choice to create the universe. In particular it does not require that it have a *sufficient* reason.

Ingenious though it is, this response in the end fails. If it is contingent that God created this world for his reasons—if it is contingent, in other words, that God's reasons resulted in God's choice to create the universe—then it is possible for God, on the basis of those same reasons, to have created some other world or perhaps no world at all (this is so whether reasons are causes or not). It is a real possibility, that is, that some other choice, and hence some other act of creation and some other world, should have been the outcome of God's reasons. (Otherwise those reasons will have been *sufficient* and the choice will not have been contingent or "free" in the required way.) If, then, God's reasons are not sufficient, if they do not necessitate his choice, then God's reasons will not explain why he made the choice he actually did *rather than* some other that was a real possibility relative to his reasons for choice. The reasons will explain, in a way, why God chose as he did: they are reasons for making that choice, after all. But they are not reasons for making that choice alone—that choice rather than any of the other choices that God could have made on the basis of those reasons. The point is that no contrastive explanation of the choice or therefore of the created universe will be possible in this case. Why the actual universe of created contingent beings exists *rather than* some other, or perhaps none, receives no explanation.[12] This seems quite contrary to the spirit of the cosmological argument.

For consider what we have done. We have constricted PSR to accommodate "free" choices (supposing for the sake of argument that there are such), which cannot have "sufficient," that is, necessitating, reasons. Then we put such a free choice in the position of explanans for the totality of contingent facts other than "free" choices. Such an explanans neatly remains contingent even when it is itself explained in turn, since its explanatory tie to *its* explanans (God's reasons) is contingent. But now we have rendered unanswerable the contrastive sort of why-question we have been asking. Thereby we have also abandoned the project of the cosmological argument—which was to argue for a necessity as the answer required by our contrastive question about the universe of contingencies (or some subset thereof). If we are required to find an explanation only for some—rather than all—contingent facts, and if we are not required even to provide a contrastive explanation for those, then we can get along with nothing but contingencies in the explanans.

III

At this point we should begin to wonder whether it is even legitimate to ask *What is the explanation of the whole succession (as opposed to its several members)*? Hume did not think it legitimate. He says:

> the uniting of these parts [the contingent beings] into a whole, like the uniting of several distinct countries into one kingdom, or several distinct members into one body, is performed merely by an arbitrary act of mind, and has no influence on the nature of things. ([7], p. 56)

If this is all there is to the whole, then, Hume seems to be suggesting, there need not be any explanation of the whole beyond the explanations of its parts. If this is all there is to the whole, then as Hume says,

> Did I show you the particular causes of each individual in a collection of twenty particulars of matter, I should think it very unreasonable should you afterwards ask me what was the cause of the twenty. This is sufficiently explained in explaining the cause of the parts. (Ibid.)

Some wholes in fact do have explanations that don't just reduce to the several explanations of their parts. As Hume himself seems to recognize, it is not *always* unreasonable to ask for such a further explanation of a whole after one has been given an explanation of each of the parts. It would seem to depend upon whether the whole exhibits some "unity" which requires an explanation not provided by the explanation of the existence of the several parts. We interpret this to mean, minimally, that the existence of the whole should be a fact not logically implied by the existence of the several members or parts.

The relevant question, then, is whether the totality of contingent beings (individual substances and events) is the sort of whole the fact of whose existence is not logically implied by the existence of its several members, and whose existence therefore is not fully explained even if each of its parts is. What sort of "whole," then, is the totality of contingent beings?

Three suggestions have been made as to what sort of whole we might construe the universe of contingent beings to be in this connection: a set, a mereological sum, and an organic whole.[13]

William Rowe once proposed to regard the collection of contingent beings as a *set* and the question of its existence as a question about the existence of *the set* of contingent beings.[14] Letting 'A' denote the set of contingent beings, Rowe argues ([13], p. 145) that we can understand the question "Why does A exist?" either as

> a) Why does *A* exist?

or as

> b) Why does *A* have the members it has rather than not having any members?

and he argues further that we should understand the question as (b) rather than (a). For, as Rowe sees it, we are asking for a causal explanation of *A* and,

since sets are abstract entities and thus causally inert, the question must be understood to be about the members of *A*. Rowe's claim is then that when understood as (b) the question about the existence of the set of contingent beings makes perfectly good sense and is a legitimate question.

But it is hard to see that the question, as thus posed by Rowe, is any improvement at all on (a). Sets are uniquely determined by their members so that if *A* and *B* are sets that have the same members, then *A* and *B* are identical and conversely (see, e.g., [10], p. 34). Since sets are thus *determined* by their members, sets have their members essentially and no set *could* have other members than it has (see [16]). But then the question expressed by (b) is best understood as just "Why does *A* exist at all?" But that is question (a) again.

We could interpret (a) as

c) Why does *A* have the members it has rather than some other members?[15]

But, for the same reasons we thought (b) to be no improvement over (a), (c) turns out to be irrelevant; indeed, (c) makes about as much sense as "Why am I myself but not my brother?" For just as I cannot be anything but myself, *A* cannot be any other set than itself and therefore cannot have any other members than it has. So (c) really asks only "Why is *A* itself?" and that is not the relevant question here.

Thus Rowe has not improved on the question as posed by (a), which, in light of the essentiality to a set of its members, is just the question: Why do *A's* actual members exist? This means he has not found a way to pose the question so that we can see why the universe of contingent beings must *itself* have an explanation over and above the explanations of its members.[16]

Perhaps we can salvage Rowe's question if we avoid mentioning *sets*. There is something intuitively appealing about Rowe's question which calls for a reformulation and a reply that does not depend on a technicality, such as the nature of sets. Instead of talking about sets, as Rowe does, perhaps we should, as earlier suggested, talk about *mereological sums*. The notion of a mereological sum is not the same as the notion of a set; for the concept of membership in such a sum, unlike the concept of membership in a set, is transitive. (I.e., anything that is a member of a member of a given sum is *ipso facto* a member of that sum. This is not so for set membership. A member of a member of a given set is not *ipso facto* a member of that set and may not be a member of it at all.) But the notion of a sum is like the notion of a set inasmuch as the identity of a sum depends exhaustively upon the identity of its members: there is nothing more to the nature or identity of a sum than this. Therefore, the same objections that applied to questions (a)-(c) above would apply to the counterpart questions about the mereological sum of all the contingent beings; for there is nothing more to explain about the existence of a mereological sum than the existence of its members.

But, as noted, some wholes seem to have explanations that don't just reduce to the several explanations of their parts. As Hume himself would allow, it is not *always* unreasonable to ask for such a further explanation of a whole after one has been given explanations of each of the parts, but this is an empirical matter. For instance, suppose that one day five airplanes crash. We naturally want to find out why.[17] Suppose further that we find an explanation of each crash: one plane lost an engine, another ran out of fuel, a third went down because of pilot error, a fourth because of an air-traffic control erred, and the fifth because of a fire caused by a malfunctioning coffee pot. Would it be unreasonable to ask for a further explanation beyond these five individual explanations? Here it would seem unreasonable, for we would have no reason to think there is a connection between the crashes and so no reason to expect there to be a further explanation for the whole lot of them. There might be something further, of course, but the evidence does not warrant insisting there is an explanation of the whole lot. Furthermore, it would be contingent whether there is an explanation beyond the explanations of each individual crash, and further inquiry would depend on *a posteriori* evidence turned up when investigating the individual crashes.

Now suppose that the explanation of each of the crashes had been much the same: say, an explosion in the cargo area caused, in each case, by a similar device. Here we would have an empirical reason to expect a further explanation for the whole lot and it would clearly be reasonable to ask for a further explanation of the whole lot. The cause of the five accidents might be that a terrorist group had planted the explosives in each plane and had planned for all five crashes to occur on the same day. Thus it is not always unreasonable to *ask* for a further explanation of the five plane crashes; it is only unreasonable to *demand* (i.e., to insist that there must be) such an explanation of them; for there may simply be no further explanation, and it will be an empirical question whether to expect one.

Hence, if this is the kind of whole we are dealing with, one cannot argue, in the fashion of cosmological arguments, that there *must* be an explanation of the totality of contingent beings beyond the several explanations of the individual contingent beings, for there may be no further explanation. Whether we should think there is one is a contingent matter dependent on the outcome of empirical investigation. And that is enough to wreck the project of the cosmological argument insofar as it depends on the two assumptions mentioned at the beginning, since PSR, whatever its scope, must be necessary and *a priori*.

IV

Some other notion of a whole must be invoked here, and it is clear what it must be like. It must be the notion of a whole whose existence is not explained (or at least not exhaustively explained) by the explanation of its parts. Such wholes must at least be what Quentin Smith in [17] has called

organic wholes: organized, ordered, or structured collections of parts, whose existence *requires* the presence of a certain organization, order, or structure among the parts (where this is not implied by the existence of the parts), so that the explanation of the whole *requires* explanation of the further fact of organization, order, or structure.[18] Arguably the universe of contingent beings is an organic whole, consisting as it does of parts that interact according to laws of nature (and thus exhibit the requisite organization). And arguably this whole with its organization is not fully explained just by explaining their members or parts. At least that much may appear to be conceded in the usual statement of the issue, wherein the universe of contingent beings is stipulated to be a *causally connected* sequence of contingently existing individuals and contingently occurring events. This is a serious proposal.

Of course it might be objected to this proposal that the laws may be derivable from facts about the natures of the contingent beings themselves, and thus that an explanation of the parts is sufficient to explain the whole. It is a plausible suggestion that the fundamental laws of nature, whatever they are, are given or determined by the natures of the contingent beings governed by them—or, to put it differently, the natures of such contingent beings are specified (at least in part) by the fundamental laws. In that case the fundamental laws of nature will be implied by the existence of contingent beings having the relevant natures. Given the existence of the contingent beings with their natures, therefore, the fundamental laws of nature will be determined too, and the universe of contingent beings will not be an organic whole in the relevant sense, or at least cannot be claimed to be such on the basis of the fact that contingent beings interact according to the laws of nature.

Or, if the laws of nature are not given by the natures of the contingent beings governed by them then it might be objected that they cannot be completely explained for the same reasons we earlier saw that the totality of contingent facts cannot have an explanation. We will either generate an interminable regress of explanations or deny the contingency of the laws of nature if we try to explain them all.

But it can reasonably be replied to both objections that it is not the laws of nature for which explanation is sought. There are many nomologically possible worlds. There are many causal histories the universe of contingent beings could have instantiated that are compatible with the actual laws of nature, besides the history it actually instantiates. What is wanted is an explanation of why the universe of contingent beings instantiates the actual causal-historical structure rather than any of the other nomologically possible ones.

This, interestingly, might even involve the explanation of some *non*fundamental laws of nature. For some *non*fundamental laws of nature may not be derivable from the fundamental laws of nature alone or from the natures of the beings governed by the fundamental laws. The nonfundamental laws—typically the laws of the special sciences—hold only within given contingent boundary conditions that arise historically and are not implied by

the fundamental laws. Biological laws, for example, depend for their truth upon the existence of living things, and the existence of living things is not something that one could read off the fundamental laws of physics. For the emergence of life depended upon the historical realization of conditions propitious to such an emergence, and it is nomologically possible that those conditions not have been realized. Thus the explanation of the existence of organisms and therewith the truth of biological laws will involve an appeal not just to the fundamental laws of nature but to contingent historical conditions that are not predictable or derivable from those fundamental laws alone. If correct, this would mean that some laws depend upon, and are explained by, historical developments (and the fundamental laws)—a point that would add to the depth and interest of explaining the causal-historical structure of the universe of contingent beings by revealing it to be more than just a chronology of events.

Let's take stock of where we are. Some wholes, in particular organic wholes, are not adequately explained just by explaining their members or parts; some further facts essential to their existence are not thus explained and yet must be explained if we are to have an explanation of their existence. The universe (totality) of contingent beings is arguably such a whole; for arguably it is a causal-historical structure whose organization is not implied either by the existence of the contingent beings in it or by the fundamental laws of nature that govern it.

V

How, then, would we explain the universe of contingent beings, where that universe is construed as a causal-historical unity, a sequence of causally connected events, states, and things? Our first important claim about this is that we can't explain the universe of contingencies, thus construed, unless it has a beginning.[19]

To see this last claim, consider the fact that a temporally extended sequence of causally connected events and states can be explained only if two types of causes can be provided for it: triggering and structuring causes.[20] Structuring causes explain why a given course of events unfolds in the way that it does—why it eventuates in one outcome rather than another. In the simplest case the structuring cause of a causal sequence will just be a law of nature, but often it will be more. When, for instance, a dog has been conditioned to salivate at the sound of a bell, we explain its current salivation in response to such a sound by invoking its past conditioning, which is not a law of nature. It is because the dog has been appropriately conditioned that at the sound of the bell it salivates rather than barks or rolls over or does nothing at all. Past histories of individuals and systems thus sometimes function as structuring causes; they thus sometimes explain why a causal process eventuates in one outcome rather than another.

A triggering cause, as the name suggests, *triggers* or initiates a course of events. The triggering cause of the dog's current salivation is the sound of the bell (or, if you like, the dog's stimulation by the sound). If we want to know why the dog is salivating *now*, it is the triggering by the bell that explains; whereas, if we want to know why the dog is *salivating* now, it is the structuring cause, its previous conditioning, that explains. It should be evident that if the universe of contingent beings is a causally connected series with no beginning, there will be no trigger for it—nor need there be—though there will be triggers for each finite segment of it. Likewise there will be no structuring causes for (the history of) the whole series if there is more than one nomologically possible world compatible with the actual laws of nature; for, in that case, the laws cannot provide a structuring cause for the whole series, and the structuring causes of each finite segment will involve previous segments (as well as the laws of nature). There will be no explanation, in this case, for the whole universe of contingent beings construed as an organic whole constituted in part by its causal history. There doesn't seem to be room for such an explanation.

This is not the place to argue at length for the claim that the explanation of a causal process or history requires both triggering and structuring causes. But we note two things in defense. (1) It is our paradigm of explanation for events and processes that they have triggering as well as structuring causes.[21] No one supposes, e.g., that a structural flaw in a bridge, by itself, will explain why the bridge collapses. All agree there will have to be a trigger—such as, e.g., a heavy truck's driving onto the bridge. (2) That this is our paradigm of explanation for processes, events, and actions has been fully recognized even in the most resourceful, and plausible, recent effort to rehabilitate the notion of agency causation. In that effort an agent is held to be a type of structuring cause and it is explicitly recognized that the agent cannot function as cause in the absence of an event-trigger.[22] The explanatory role of the agent as cause is to explain why the agent responds in one way rather than another (within plausible limits) to antecedent and concurrent events and circumstances; it is not to provide the trigger of the agent's response. The events of the agent's own history are to play that role. The novelty, then, is only in supposing that the agent herself, rather than some fact about the agent, some trait of the agent's character or the like, can intelligibly play the role of structuring cause in the genesis of (free) action. So, even here, it is recognized that an action, including one allegedly explainable by appeal to agency, will have an event-trigger. If the whole universe of contingent beings has an explanation, therefore, it must have a beginning.[23]

We have now come to the key question to which all this has been leading: does not all this wreck PSR and the project of cosmological arguments insofar as they depend upon PSR? We shall argue that it does.

Surely it is an empirical and contingent matter whether the universe of contingent beings even had a beginning.[24] If it had a beginning, this is a

contingent fact about it. If it did not, that too is a contingent fact about it. And which of these is the fact of the matter is an empirical question not to be decided on the basis of some *a priori* and necessary principle such as PSR. If, as we have argued, the universe of contingent beings (assuming it to be an organic whole) can have an explanation only if it had a beginning, then it is contingent whether the whole of it (rather than just the existence of each contingent being or each finite segment of its overall history) has an explanation, or needs one. And there is something quite dubious about deciding the question of its beginning by invoking an *a priori* and necessary principle that implies that it must have an explanation (and therefore a beginning). This gets the matter backwards, in our view. It is contingent whether the totality of contingent beings had a beginning; hence it is contingent whether that totality has an explanation (over and above the several explanations of the existence of particular contingent beings and the finite segments of their overall history).

One therefore cannot argue, in the fashion of cosmological arguments, that there *must* be an explanation of the totality of contingent beings beyond the several explanations of the individual contingent beings or the finite segments of their overall history, for there may be no further explanation—the totality may not be the kind of "whole" that can be so explained. Whether there is an explanation—whether the universe is the right kind of whole—is a contingent matter to be decided somehow on the basis of the empirical evidence concerning, among other things, whether the universe of contingent beings had a beginning.[25] That is enough to wreck the project of the cosmological argument insofar as it depends on PSR, since PSR, whatever its scope, is a necessary and *a priori* principle.[26]

ENDNOTES

[1]It does not matter what precise formulation of PSR is invoked here; all that matters is whether it implies that every contingent fact has an explanation. So long as the formulation has that implication, our criticism applies to it.

[2]Rowe has discussed some of the alternatives we consider below in [14]. However, our discussion is broader in at least one important respect: it includes explanations in which the explanans does not entail the explanandum. Rowe explicitly assumes that the relationship is an entailment.

[3]Thanks go to Jack Davidson for making us aware that an earlier version of the argument to this point invited irrelevant objections and needed to be reworked.

[4]It may clarify what is meant here to put the point in terms of what A. N. Prior has called world-propositions. A proposition p is a world-proposition just in case it is possible both that p be true and that all truths be necessarily implied by it—in symbols: just in case $\Diamond(p \,\&\, (q)[q \rightarrow (p \rightarrow q)])$. Every world-proposition is a maximal contingency, an exhaustively comprehensive, total way things might have been: each world-proposition corresponds to a possible world in that each is true in exactly one possible world. (See, e.g., the postscript by

Kit Fine in [11], for further details). Translated into these terms, what is impossible is to explain why the (actually) true world-proposition is true. We could not explain why it is true by appeal to a wholly necessary explanans, for reasons we have already seen; but we cannot explain it by a contingent explanans either. For it would be circular to explain the truth of the true world-proposition by invoking a *contingent* fact. The explanation would be presupposing a contingent fact to explain why the whole lot of them (the true world proposition) had obtained. So not only is nothing an explanation of *all* the contingent facts, but some contingent fact (the most comprehensive one) has no explanation.

[5]What way is that again? To say, in the sense relevant here, that it can be contingent that A explains B is to say that the following two claims are consistent: A explains B and ◊ (A & -B). This pair of claims should not be confused with the surely false proposition that ◊ (A & -B & A explains B). See [15], Chapter 3, for an accessible discussion of the different kinds of relations, contingent and otherwise, between explanantia and explananda and for guidance to relevant literature on this in the philosophy of science.

[6]Since any kind of probabilistic reasoning will include a contingent connection between the explanans and the explanandum the same kind of reasoning will apply to objections that try to invoke some sort of probabilistic reasoning as providing the explanation in cosmological arguments.

According to William Rowe [14], once the needless complications are cleared away from James Ross' presentation in *Philosophical Theology*, Ross can be seen to have anticipated our point that A's explaining B must be a fact of some kind, either necessary or contingent, with deleterious consequences for the cosmological argument in either case.

[7]There are notable exceptions to this; for instance, the Islamic *kalam* cosmological argument. According to this argument, every being that begins has a cause for its beginning, and the world is a being that begins, so the world has a cause for its beginning. We say: *If* the world is a being that begins, then it has a cause, and a triggering cause at that. But it is a contingent matter whether the world does have a beginning, and therefore a contingent matter whether it has, or needs, a cause. See the discussion in note 24 below.

[8]Since cosmological arguments are out to show that the totality of contingent facts can be explained *only* by some sort of necessity, we are not concerned with attempts to show that a necessity, such as God, is *compatible* with or is a *possible cause* of some contingent facts. Here are two such strategies, both of which borrow from Swinburne's discussion of the argument from design.

The first attempt is to argue that God contingently chose to create the world and that, furthermore, God's actions are not necessitated but are rather free actions (explainable in terms of agency) that do not, and need not, have sufficient causes. The principle of sufficient reason would therefore not apply to God's actions. We discuss this option in more detail at the end of this section.

A second attempt would be to argue that some reason is needed to explain why the universe operates according to the laws of nature, and that a possible explanation would be that the universe is a creation of a rational free agent that necessarily exists, namely God.

Neither attempt shows that the totality of contingent facts can *only* be explained by some sort of necessity. Rather, both attempts are content with arguing that the existence of God is compatible with the totality of contingent facts.

[9]None of this is to say that a necessarily existing deity could not play some explanatory role in accounting for things, but it is to say that it can't be the universe, the totality, of contingencies that it explains, and further, that if facts solely about a deity are ever invoked to explain a contingency at all, they cannot all be necessary facts.

[10]Some say that no explanation can get by with just contingencies, since A does not explain B unless A necessitates B. But that, of course, does not get us a necessary being.

[11]See [19], pp. 44-47, for a great short discussion of weakened forms of PSR. Wainwright there mentions four versions of PSR. The first and fourth are refuted by our argument in section I. The second does not imply the needed consequence that the totality of contingent beings has a sufficient reason, unless you think that that totality, or something akin to it, is an entity (see the next section for an effort to find an appropriate "entity" to play the role of the totality of contingent beings). What we are currently entertaining is very close to the third version.

[12]The points made here about contrastive explanation in general and about contrastive explanation by reasons in particular are discussed at greater length in [9] and [6], respectively.

[13]See Quentin Smith, [17], whose discussion, in part, we follow here. Smith also suggests a fourth possibility: that the universe of contingent beings is an aggregate, where this is understood to be something distinct from the other three possibilities listed. We think this is not a distinct possibility, for reasons that can be more easily and clearly presented after we have considered the other three possibilities—set, mereological sum, and organic whole—mentioned in the text. For our reasons, see note 18.

[14]In fairness we should point out that Rowe no longer endorses this argument; see [14].

[15]Rowe suggests a similar interpretation in [12] p. 90.

[16]One way to try to unsnarl Rowe's question from our previous criticism is to reformulate it as follows:

> d) Why does the property of being a contingent thing have the extension it has rather than some other?

But this reformulation is not relevant in the present dialectical context. The present issue is whether the totality of contingent beings constitutes the sort of whole that can be sensibly required to have an explanation over and above each of its members having an explanation, and (d) does nothing to suggest that it does. Rowe's approach was relevant to us in the first place because it appeared to provide an *individual*—albeit an abstract one, a set—as the would-be explanandum. Presumably an individual would be more than—as Hume put it—"the uniting of . . . parts into a whole . . . by an arbitrary act of mind, [having] no influence on the nature of things," and would therefore be expected to require an explanation over and above the explanations of its parts. Since (d) effectively abandons the idea that a set can be used in this way, and offers no alternative suggestion as to why the totality of contingent beings should be the sort of "whole" that requires an explanation over and above the explanation of its parts, it is irrelevant here.

[17]This example is adapted from [18] pp. 10-11.

[18]There is, as we earlier mentioned in note 13, a fourth possibility entertained by Quentin Smith in [17]; namely, that the universe is an aggregate. In Smith's view an aggregate, unlike a mereological sum, does not contain all its members essentially, but its existence, like that of

a mereological sum, is sufficiently explained when the existence of each of its parts is. But what *is* an aggregate? Smith gives examples: human beings are each aggregates (of cells) and the Earth is an aggregate (of material parts). These, however, would seem to be examples of partite *individuals*. Nearly everyone therefore would agree with him that these can gain and lose parts, or members, without ceasing to be the things that they are, but we would certainly not agree with the other key claim Smith makes about aggregates, that the existence of an aggregate is sufficiently explained when the existence of each of its members has been explained. This is false, certainly, for his examples of aggregates, human beings and the Earth, and indeed for individuals generally. Smith's notion of an aggregate seems to sit confusedly between the notions of individual, mereological sum, and organic unity. We discuss the latter two cases in the text. And the totality of contingent beings seems to us not to be an individual.

[19]Smith (in [17], pp. 297-298) says that *if* the universe is a beginningless succession of causally connected states, then a causal act directed upon the universe is superfluous. With this we clearly agree, but we think more discussion of the point is needed than Smith gives it. We propose to provide it. In particular, we propose to address the broader question concerning what sort of explanation at all would be possible of a beginningless succession of causally connected states and beings. We shall argue that, by dint of having no beginning, such a succession would lack one of the components essential to the explanation of events and processes and thus would have no explanation. We also argue that it need not have one.

[20]We borrow this distinction between triggering and structuring causes, and the apt terminology, from Fred Dretske [5], Chapter 2, where the interested reader will find an extended discussion of these two types of causes.

[21]This, at least implicitly, has been recognized at least as long ago as Donald Davidson's "Action, Reasons, and Causes," *The Journal of Philosophy*, 60 (1963). Reprinted in Davidson [4], pp. 3-19; see especially p. 12 of this essay for the relevant point: "It is easy to reply that states, dispositions, and conditions are frequently named as the causes of events: the bridge collapsed because of a structural defect; the plane crashed on takeoff because the air temperature was abnormally high; the plate broke because it had a crack. This reply does not, however, meet a closely related point. Mention of a causal condition for an event gives a cause only on the assumption that there was also a preceding event." In our terms this is to say that among the causes of any event will be triggering as well as structuring causes and that the triggering causes will be events.

[22]See [1], especially p. 194, where Randolph Clarke states and addresses what he calls the "rational-explicability objection." He does not employ the terminology of structuring and triggering causes, but we think their use in the statement of his position does not distort his view in any way.

[23]Our discussion here has some relevance to the discussion of God's free will at the end of section II. There we talked about God acting on reasons and reasons, not being events, cannot be causes. But reasons can be structuring causes in the sense explained above, for they can help determine how a chain of events plays out. God's reasons can then be structuring causes. But structuring causes do not explain why something occurs when it does; for that we need a triggering cause. So in the absence of a triggering cause we don't have a causal explanation.

[24]For a dissenting view, see William Craig [2] or [3]. It is knowable *a priori*, he argues, that the universe must have a beginning, because no "actual" infinity, and hence no beginningless

series of events in time, is even possible in the "real" world as opposed to the mathematical world, which he says is a world of "thought only." (These are Craig's words, [3], pp. 188, 189.) His aim, he says, is not to "attempt to undermine the theoretical system bequeathed by Cantor to modern mathematics" but rather to argue only that there can be no infinite totalities in the "real"—presumably empirical—world. But his arguments, if they show anything, show that infinite totalities are not possible *at all*. And hence they challenge "the theoretical system bequeathed by Cantor to modern mathematics." A sample argument of his should suffice to characterize his approach and to show that it can't avoid challenging the modern mathematics of infinity. Suppose, says Craig, that we had a library of infinitely many books, all arranged somehow on shelves. And "suppose we could add to the library. Suppose I put a book on the shelf. According to the mathematicians, the number of books in the whole collection is the same as before. But how can this be? If I put the book on the shelf, there is one more book in the collection. If I take it off the shelf, there is one less book. I can see myself add and remove the book. Am I really to believe that when I add the book there are no more books in the collection and when I remove it there are no less books? . . . I find this hard to believe." ([3], p. 188.) Now if this shows that there cannot be any "actual infinities" in the "real" world, it equally shows that there cannot be any infinite sets in the "mathematical world." Here's why: if there are more books on the shelf after the addition of the further book, then there are more numbers in the set of all the natural numbers than in the set containing all the natural numbers except 0. For, there being infinitely many books on the shelf to start with, the books stand in a one-to-one correspondence with the set containing all the natural numbers except 0. Letting the additional book correspond to 0, then, the books on the shelf after the further book is put on it stand in a one-to-one correspondence to the set of all the natural numbers. If there are more books on the shelf after than before, there are more things in the set of all natural numbers than in the set containing all the natural numbers except 0. And according to "the mathematicians" there aren't more members in the first set than in the second.

A second point about Craig's argument is that it gains a spurious plausibility from what we suspect is an equivocation on "one more book" and "more books" and the like. Surely when he puts *another* book on the shelf, there is, in a sense, *one more book* on the shelf than before. That there is now another book on the shelf not there before is undoubtedly true. That the set of all natural numbers contains one more number—namely, 0—than is contained in the set of all the natural numbers exclusive of 0 is undoubtedly true too. And yet they are both infinite sets of the same cardinality. Thus it does not follow that the addition of another book to the already infinite set of books makes a larger number of books than before; this no more follows, anyway, than the corresponding claim about the sets of numbers. It is one of the strange consequences of the mathematics of infinity, as Craig is aware, that when you add one more thing to an already infinite set, you still have an infinite set of the same cardinality and hence a set that is no larger. So there is *also* a sense—the relevant one here—in which you do *not* have one *more* book in the set than before.

A third point is that it appears to be crucial for the success of his argument that theories about infinity cannot be translated from the mathematical world—an unreal world of thought, in Craig's view—into the real world. The argument therefore rests on the very controversial assumption that mathematical realism is false.

Craig's arguments are interesting and could be discussed further. But we think we have said enough here to indicate why we remain confident of our claim that it will be a contingent fact about the world whether it has a beginning or not.

It should be mentioned that Craig also produces a number of interesting *a posteriori*, "scientific" arguments in support of the view that the universe had a beginning. These arguments have no bearing on our present point, which is that it is contingent whether the universe has a beginning. Presumably, if this is a contingent matter, as we assert, then it not only might be true that the universe had a beginning but we might even have evidence that this is so.

[25]This is not to say that it is methodologically unsound to assume that the facts that fall within the domain of one's inquiries have explanations and indeed explanations of some particular kind. But one must be prepared to acknowledge that they may not have explanations of the sort one has envisaged or perhaps even at all. The fate of causal determinism in the face of the example of quantum mechanics is relevant here; for, as we understand the matter, it is a case in which certain sorts of facts have come to be acknowledged to be without explanation. The rise of Darwinian evolutionary biology, with its reliance on natural selection as opposed to any selection by teleological goal or end-state, may be another (on which see T. S. Kuhn's short remarks on the subject in [8], Chapter XIII, especially pp. 171-3).

[26]We thank Henry Newell, Charles T. Hughes, and an anonymous referee for the journal for helpful comments on earlier drafts of the paper.

REFERENCES

[1] Randolph Clarke, "Toward a Credible Agent-Causal Account of Free Will," *Noûs* 2 (June, 1993), pp. 191-203.

[2] William Lane Craig, *The Kalam Cosmological Argument* (London: The MacMillan Press Ltd., 1979).

[3] William Lane Craig, "Philosophical and Scientific Pointers to *Creatio ex Nihilo*," reprinted in Geivett and Sweetman (eds.), *Contemporary Perspectives on Religious Epistemology* (Oxford University Press, 1992), pp. 185-200.

[4] Donald Davidson, *Essays on Actions and Events* (Oxford University Press, 1980).

[5] Fred Dretske, *Explaining Behavior* (M.I.T. Press, 1988).

[6] Patrick Francken, "Incompatibilism, Nondeterministic Causation, and the Real Problem of Free Will," *Journal of Philosophical Research* 18 (1993), pp. 37-63.

[7] David Hume, *Dialogues Concerning Natural Religion*, edited by Richard H. Popkin (Indianapolis: Hackett Publishing Company, 1980).

[8] T. S. Kuhn, *The Structure of Scientific Revolutions*, second edition, enlarged (University of Chicago Press, 1970).

[9] David Lewis, "Causal Explanation," *Philosophical Papers*, Volume II (Oxford University Press, 1986), pp. 214-240.

[10] Benson Mates, *Elementary Logic* (Oxford University Press, 1972).

[11] A. N. Prior and Kit Fine, *Worlds, Times, and Selves* (London: Duckworth, 1977).

[12] William L. Rowe, *The Cosmological Argument* (Princeton University Press, 1975).

[13] William L. Rowe, "Two Criticisms of the Cosmological Argument," reprinted in Baruch A. Brody, ed., *Readings in the Philosophy of Religion*, 2nd ed. (Englewood Cliffs: Prentice-Hall, 1992), pp. 142-57.

[14] William L. Rowe, "Rationalistic Theology and Some Principles of Explanation," *Faith and Philosophy* 1 (1984), pp. 357-369.

[15] Wesley C. Salmon, *Four Decades of Scientific Explanation* (University of Minnesota Press, 1989).

[16] Richard Sharvy, "Why a Class Can't Change Its Members," *Nous* 2 (1968), pp. 303-14.

[17] Quentin Smith, "Internal and External Causal Explanations of the Universe," *Philosophical Studies* 79 (1995), pp. 283-310

[18] Richard Sorabji, *Necessity, Cause, and Blame: Perspectives on Aristotle's Theory* (Ithaca: Cornell University Press, 1980).

[19] William Wainwright, *Philosophy of Religion* (Wadsworth Publishing Company, 1988).