

Faith and Philosophy: Journal of the Society of Christian Philosophers

Volume 18 | Issue 2

Article 3

4-1-2001

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Recommended Citation

Koons, Robert C. (2001) "Defeasible Reasoning, Special Pleading and the Cosmological Argument: A Reply to Oppy," *Faith and Philosophy: Journal of the Society of Christian Philosophers*: Vol. 18 : Iss. 2 , Article 3.

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DEFEASIBLE REASONING, SPECIAL PLEADING AND THE COSMOLOGICAL ARGUMENT: A REPLY TO OPPI

Robert C. Koons

This is a reply to a paper by Graham Oppy in the July, 1999 issue of this journal, "Koons' Cosmological Argument." Recent work in defeasible or nonmonotonic logic means that the cosmological argument can be cast in such a way that it does not presuppose that every contingent situation, without exception, has a cause. Instead, the burden of proof is shifted to the skeptic, who must produce positive reasons for thinking that the cosmos is an exception to the defeasible law of causality. I show how Oppy's critique can be turned into a plausible rebuttal of my argument. However, this rebuttal can be set aside when the original argument is supplemented by a plausible account of the nature of causal priority. Several independent lines of argument in support of this account are outlined.

Introduction

In "Koons' Cosmological Argument,"¹ Graham Oppy offered a single criticism to the main argument of my 1997 paper, "A New Look at the Cosmological Argument."² In this main argument, I sought to demonstrate the existence of a necessary situation which is the uncaused cause of all wholly contingent situations. In addition, Oppy posed a number of objections to what I called "plausible corollaries" to my principal theorem, including the existence of a necessary being all of whose attributes are immeasurably great. Finally, Oppy suggested that the usual Humean objections to the design argument still stand, despite my argument that the design argument is greatly strengthened by the prior success of the cosmological argument.

In this paper, I will focus almost all of my attention on Oppy's simple objection to my main argument. I will clear up a few misunderstandings which account, I think, for Oppy's failing to see the force of several of my arguments for my corollaries. One should bear in mind, however, that my claims concerning these arguments in the 1997 paper were quite modest: I called the arguments "plausible inferences", by which I meant that they provided *prima facie* but defeasible reasons for adopting the corollaries as our best available conjectures about the nature of the First Cause. I did not intend for them to be taken as apodeictic (deductively valid) in character, much less as involving principles that are necessary, *a priori* and exceptionless, as Oppy seems to have interpreted them.³



In addition, I will have little to say here about the design argument or the many-worlds hypothesis. My original paper was concerned with the cosmological argument: there was scope neither in that paper nor in this one for an all-out defense of the design argument. My point in the 1997 paper was simply to argue that the conclusion of the cosmological argument enables the theist to turn aside two standard objections to the design argument, namely, the threat of an infinite regress of designers, and the weakness of an argument from analogy to human artifacts. Oppy does not dispute either of these points, choosing instead to reiterate a long list of standard objections, almost all deriving from *Hume's Dialogues Concerning Natural Religion*. Needless to say, I find none of these objections persuasive, but this particular debate must be taken up at some later date.

A Brief Sketch of my Cosmological Argument

The formal framework I employed in "A New Look at the Cosmological Argument" was a modal logic supplemented by the Lesniewski-Goodman-Leonard calculus of individuals ("mereology").⁴ By way of modal logic, I needed only the axioms and rules of *T*. I used the two usual predicate symbols of mereology, \sqsubseteq and \circ , representing part-of and overlap, respectively. I needed three mereological axioms:

Axiom 1 $x \sqsubseteq y \leftrightarrow \forall z (z \circ x \rightarrow z \circ y)$

Axiom 2 $\exists x \phi(x) \rightarrow \exists y \forall z (z \circ y \leftrightarrow \exists u (\phi(u) \& u \circ z))$

Axiom 3 $x = y \leftrightarrow (x \sqsubseteq y \& y \sqsubseteq x)$

Axiom 1 defines the part-of relation in terms of overlap, and Axiom 2 is an aggregation or fusion principle: if there are any situations of type ϕ , then there is an aggregate or sum of all the ϕ situations. Axiom 3 guarantees that the part-of relation is reflexive and anti-symmetric.

There were two principles linking the modal and mereological languages. Here I needed to introduce a new predicate, *A*. Where *b* is a possible situation, *Ab* can be used to state that *b* actually obtains.

Axiom 4 $x \sqsubseteq y \rightarrow \Box (Ay \rightarrow Ax)$

Axiom 5 $\Box (\forall y \in F Ay \rightarrow A \hat{x}F)$

Axiom 4 ensures that aggregation of situations is a form of conjunction: a whole necessitates all of its parts. Conversely, 5 implies that the existence of all the members of a sum necessitates the existence of the sum itself. (In "A New Look," I inadvertently omitted Axiom 5, which is needed in proving Lemma 2[3, p. 198] but which clearly fits the intended interpretation of aggregation.)

There is one special notion that had to be defined: that of being “wholly contingent”, represented by ‘ ∇ ’.

Definition $\nabla x \leftrightarrow (Ax \ \& \ \forall y (y \sqsubseteq x \rightarrow \neg \Box Ay))$

A wholly contingent situation is an actual situation none of whose parts are necessary.

Finally, I needed only three facts about causation:

Axiom 6 (Veridicality) $(x > y) \rightarrow (Ax \ \& \ Ay)$

Axiom 7 (Separate Existence) $(x > y) \rightarrow \neg(x \circ y)$

Axiom 8 (Universality) $\forall x (\nabla x \rightarrow \exists y (y > x))$

Axiom 6 stipulates that only actual situations can serve as causes or effects. Axiom 7 is intended to capture Hume’s insight that a cause and its effect must be “separate existences”. The language of mereology, when applied to situations, enables us to state Hume’s principle precisely: a cause must not overlap its effect. It is very important to bear in mind that Axiom 6 does not require that a cause must not overlap its effect in space or time: it is only *mereological* overlap (the having of a common part) that is ruled out. Axiom 8 expresses the universality of the causal relation: every wholly contingent situation has a cause. Axiom 8 does not entail determinism, in any of its usual senses, since I have not stated that causes are sufficient conditions for their effects. I do not assume that every event is necessitated by its causes; in fact, I believe that this is not typically the case. For this reason, this account of causation is compatible with indeterministic theories of human freedom and indeterministic interpretations of quantum mechanics.

In “A New Look at the Cosmological Argument”, I used these axioms to prove the following theorem:

Theorem 1

If there are any contingent situations, then the cosmos (the sum of all wholly contingent situations) has a cause that is a necessary situation.

Since we know that there is at least one contingent situation, we can use Theorem 1 to conclude that the cosmos has a cause that is a necessary situation, a First Cause. It is legitimate to call this cause a “first cause” if we assume (as seems plausible) that all effects are contingent.

The Role of Defeasible Reasoning

Even though we have excellent empirical evidence for the generalization that wholly contingent situations have causes, it is hard to see how any amount of data could settle conclusively the question of whether or not this generalization (Axiom 8) admits of exceptions. The skeptic can always find a logically consistent position by simply restricting the scope of axiom

8 in such a way as to exclude its application to the cosmos as a whole.

The most effective response, dialectically speaking, is to insist that, at the very least, our experience warrants adopting the causal principle as a *default* or *defeasible* rule. This means that, in the absence of evidence to the contrary, we may infer, about any particular wholly contingent situation, that it has a cause.

This is, however, all that is needed for the cosmological argument to be rationally compelling. In place of a deductively valid, *apodeictic* proof of the existence of a first cause, the defender of the cosmological argument can offer instead a defeasible argument (an argument correct by the standards of nonmonotonic reasoning). The burden is then shifted to the agnostic, who must garner evidence of a positive sort for the proposition that the cosmos really is an exception to the rule. Merely pointing out the defeasible nature of the inference (i.e., the bare possibility of the cosmos's being an exception) does not constitute a cogent rebuttal.

Considerable progress has been made in recent year in developing formal systems of defeasible or nonmonotonic reasoning that satisfy certain plausible meta-logical constraints. For example, in the Commonsense Entailment system of Asher and Morreau,⁶ a defeasible version of Axiom 8 could be expressed by using a default conditional connective, >:

Axiom 8* $\forall x(\forall x > \exists y (y > x))$

This version of Axiom 8 can be read as: *normally*, a wholly contingent situation has a cause. This defeasible Axiom 8* will allow us to infer that any given wholly contingent situation has a cause unless some positive reason can be given for thinking that the situation in question is an exception to the rule, for example, by showing that the situation belongs to a category of things that typically does *not* have a cause.

The skeptic could refuse to accept even the defeasible generalization 8*. Like Kant or Russell, he might insist that the universality of causation be seen as a canon or prescriptive rule for reason, and not as a descriptive generalization (even a defeasible one) of mind-independent reality.

However, to give up even the defeasible version of Axiom 8 as a descriptive generalization about reality is to embrace a radical form of skepticism. All of our knowledge about the past, in history, law and natural science, depends on our inferring causes of present situations (traces, memories, records). Without the conviction that all (or nearly all) of these have causes, all of our reconstructions of the past (and therefore, nearly all of our knowledge of the present) would be groundless. Moreover, our knowledge of the future and of the probable consequences of our actions depends on the assumption that the relevant future states will not occur uncaused. The price of denying this axiom is very steep: embracing a comprehensive Pyrrhonian skepticism.

From Oppy's Critique to the Best Rebuttal to the Argument

In his response to my argument, Oppy seems confused about the nature of defeasible argumentation. To rebut a defeasible argument, it is not sufficient

merely to point out that one or more of the principles involved admit of exceptions. This is merely a truism that holds of all defeasible arguments. To think that this truism constitutes a rebuttal is to be guilty of what is classically known as the "fallacy of Accident". For example, if I know that smokers generally develop health problems, and that Smith is a smoker, it is reasonable for me to conclude that Smith will develop health problems. Merely pointing out that some smokers live long without developing such problems ("My uncle Joe smoked like a chimney and lived to be 95") is entirely irrelevant to the rational cogency of the original argument. Similarly, merely to point out, as Oppy does, that the Cosmos *might be*, for all we know, an exception to Axiom 8 is, as a rebuttal, a non-starter. We need some special reason for thinking that the Cosmos in particular is exceptional in this respect. The burden of proof is squarely on Oppy's shoulders, and merely complaining about my supposed "question-begging" and "foot-stomping" improprieties⁷ does nothing to discharge this responsibility.

Oppy defines a *first event* as a situation to which nothing is temporally prior. Oppy argues that we could replace Axiom 8* with the principle that every *non-first event* has a cause (call this Axiom 8NF). Oppy contends that all the evidence that can be adduced in support of Axiom 8* can also be adduced in support of 8NF, so there is no compelling reason for the skeptic to prefer the first to the second.⁸

Oppy admits that his principle might seem to be "slightly less natural" than Axiom 8*.⁹ I would argue that Oppy's principle is in fact "slightly less natural" than 8* in exactly the same way that *all emeralds are grue* is "slightly less natural" than *all emeralds are green*. When drawing inductive generalizations, any loss of naturalness, no matter how "slight", can be critical. In fact, Oppy's restriction of the universality of causation to non-first events is a classic case of special pleading, until and unless he can provide some principled ground for thinking that the absence of temporally prior situations is relevant to the presence or absence of a cause.

Oppy is confusing defeasible or nonmonotonic reasoning with deductive reasoning. It is certainly *logically consistent* to maintain the universality of causation with the exception of first events, but Oppy has not shown that it is *reasonable* to maintain such an exception. If Oppy's only reason for excepting first events from the scope of Axiom 8 is his distaste of the conclusion which would otherwise be drawn (*viz.*, the existence of a necessary first cause), then his position is consistent but unreasonable, just as it would be unreasonable for me to except the events that occur after January 1, 2002. It would be *consistent* for me to maintain that all events except those occurring after January 1, 2002 have causes, and my version of Axiom 8, which we might call Axiom 8Y2K is supported by exactly the same body of evidence supporting Axiom 8*, but clearly it would be unreasonable to except those events without providing some positive reason to think that the temporal location of an event relative to the turn of the millennium is relevant to its being caused or uncaused. Similarly, Oppy's restriction is unreasonable, in the absence of any reason to think that an event's relative temporal location is relevant to its having or lacking a cause.

Can Oppy's objection be redeemed? I think it is possible to find a reasonable rebuttal of my argument that lies somewhere in the neighborhood

of Oppy's suggestion. I will do my best to develop the most promising rebuttal to the defeasible version of the cosmological argument, in the hopes that by doing so, I will contribute to a greater understanding of the structure of a dialectic involving defeasible reasoning.

A cogent rebuttal can be based on making the simple question, Don't contingent situations typically have *contingent* causes? This rebuttal is an instance of a wider strategy: focus on some unique feature of the First Cause and point out that the cause of the world's having that feature is an exception to some well-established generalization. Indeed, for the most part, contingent situations do have contingent causes. They also have causes with finite attributes and causes that can be located in space and time, features which, in each case, the hypothesized First Cause would lack.

Once we have established that the the cause of the cosmos would be relevantly unusual, we seem to be faced with two equally unattractive options: supposing that the cosmos has only a very unusual kind of cause, or supposing that it has no cause at all. Thus, we seem to end in a stalemate.

We can reconstruct Oppy's objection along these lines. Although Oppy offers no defense for his restriction of the scope of Axiom 8*, there are several defenses that could be mounted. A defender of Oppy's principle could perhaps appeal to Hume's account of the nature of causal priority. If the causal priority of an event to one of its effects simply consists in its temporal priority to that effect, then we would have very good reason for supposing that first events have no causes, since nothing could be causally prior to them. However, there are good reasons to resist Hume's account of the nature of causal priority. First, it excludes the possibility of temporally backwards causation, which seems to be metaphysically possible and has actually figured in scientific explanations and interpretations of quantum mechanics. Second, the nature of temporal priority is even more obscure than that of causal priority, and the best accounts of temporal priority seem to be those that presuppose the ontologically prior existence of causal priority (as I argue in Chapter 4 of *Realism Regained*).¹⁰

A second line of defense of Oppy's principle would be to point out that all of the causes with which we are familiar are temporally prior to their effects. In *Realism Regained*,¹¹ I provide a number of arguments for thinking that this is mistaken: that we do, in fact, have experience of the causal efficacy of atemporal situations (such as the situations that support the holding of certain natural laws). Moreover, even if this claim were correct about our experience, it would fail to support Oppy's principle, since what we need is a positive reason for thinking that situations that are not temporally related to an event cannot cause it. Merely observing that all of the causes we are familiar with in experience are temporally prior to their effects does not support Oppy's principle if our experience is in fact limited to temporally located situations. We can only observe that situations do have temporal causes; we cannot observe that they *do not have* atemporal causes, but it is the latter observation that would be needed to justify Oppy's restriction of Axiom 8*. Consider the following analogy: all the causes we have so far observed occurred before January 1, 2002, but this gives us no reason to think that all causes without exception will occur before this date.

However, there is a third, more successful line of defense for Oppy's principle. All of the situations we have observed have had causes which were *at least in part* located in time at a moment earlier than the effect. Oppy's first events are clearly unusual in this respect: if they have any causes, these causes cannot be located even in part at a time prior to the first event.

This third version of a defense of Oppy's principle can be subsumed under the original objection I mentioned: namely, that all observed cases of causation are cases in which the cause was *contingent*. In my 1997 paper, I argued that necessary (non-contingent) situations cannot be located in space or time.¹² If I can explain why we must conclude, this fact notwithstanding, that the cosmos has a necessary cause, then I will have also explained why we must conclude that first events have non-temporal causes, since necessary causes are ipso facto atemporal ones.

My Response to this Rebuttal

In other words, the defender of the cosmological argument must respond to this sort of rebuttal with substantial reasons for thinking that, although the First Cause is unique in a number of respects, each of these unique features can be adequately explained by extrapolating from tendencies already observable in ordinary cases of causation. My own defense of the argument is based on the following thesis: that, in some precise sense, a cause is always *more nearly necessary* (or, equivalently, *less profoundly contingent*) than its effect.

Relative necessity can be defined by the following:

Definition

a is more nearly necessary than $b \leftrightarrow_{\#} \forall x \sqsubseteq b [\Box(Ax \rightarrow Aa) \ \& \ \Diamond(Aa \ \& \ \neg Ax)]$

In other words, a situation a is more necessary than situation b just in case a is actual in every world in which any part of b is actual, but a could itself be actual in the absence of the actuality of any part of b . This follows from the *identity conditions* of situations. The causes of a situation are essential to its identity: had the very same truth been verified by a situation caused in a different way, we would not have had the same situation as verifier. The corresponding thesis involving effects is not plausible: a situation's identity does not include the eventuality of all its effects.

This assumption is a generalization of the Kripkean intuition that the origin of a thing is always essential to it. It is true that in natural language we sometimes treat event-tokens with slightly different parts and antecedents as identical. For example, we might say that the death of Caesar would have been less painful had Brutus not participated. However, such looseness in natural language should not be taken as settling the metaphysical issue.

This principle (an effect necessitates the existence of its causes) does not imply that the *content* or *intrinsic type* of an effect necessitates the *content* or *type* of its causes. For example, the token situation of Caesar's death could

not have existed had not all of its causes, including Brutus's knife-thrust, existed. This of course does not mean that Caesar wouldn't have died unless Brutus and the other senators had killed him. The truth 'Caesar died' would have been verified by a different situation in all of those worlds in which Brutus does not help in inflicting the fatal set of wounds. The situation that actually verifies the truth 'Caesar died' would not have existed had any of its causes failed to exist.

There are several additional reasons for thinking that causes are more nearly necessary than their effects. First, it is clear that we need some account of causal priority that explains the transitivity and asymmetry of this relation. An account of causal priority in terms of relative necessity nicely satisfies this desideratum.

Second, this account enables us to specify exhaustively the *potential causes* of a given situation: *a* is a potential cause of *b* if and only if *a* is more nearly necessary than *b*. Such a specification is necessary if we are to account for the statistical properties of causal connections, the so-called "Markovian principles" developed by Salmon¹³ and Suppes¹⁴ and studied recently by Pearl and Verma and Spirtes, Glymour and Scheines.¹⁵ I use these Markovian principles in developing a causal calculus in Appendix B of *Realism Regained*. Markov locality entails that the causal antecedents of an event "screen off" the probability of that event from the probability of any non-consequent event-token. If we assume that the probability of every actual event-token is screened off in this way by its *actual* causes, then we are implicitly assuming that the causal antecedents of any actual token are necessary to its identity, that there are no non-actual or counterfactual causes of actual tokens.

Finally, this principle seems to be implicit in our conviction that the past is *fixed* and the future is *open*. The relative necessity of causally antecedent tokens gives us an explanation of the asymmetry of past and future. The fixity of the past can best be understood as the relative necessity of past event-tokens, given the token event corresponding to the present. This thesis is implicit in all "branching-future" models of temporal logic.

The cosmos (as I have defined it) is a situation of absolutely minimal contingency. If situation *a* contains situation *b* as a part, then *b* is no less profoundly contingent (no more nearly necessary) than *a*, since (by Axiom 4) *a* could not be actual if *b* were not actual. Since the cosmos contains every wholly contingent situation as a part, no wholly contingent situation can be less profoundly contingent than the cosmos.

Since the cosmos is a situation of minimal contingency, it is not surprising that it should have no contingent cause, but it would still be very surprising if it had no cause at all. By extrapolating from our common experience with causation, we conclude that a situation of minimal contingency (such as the cosmos) has a non-contingent (necessary) cause. At the same time, the principle of causal priority as asymmetric necessitation gives us good reason for concluding that the necessary cause of the cosmos is itself uncaused, since nothing can be strictly more necessary than an absolutely necessary situation.

These considerations lead to a new version of the critical Axiom 8:

Axiom 8** $\forall x(\forall y > \exists y(y \text{ is more nearly necessary than } x \ \& \ y > x))$

On the basis of induction, we can confirm that, at every degree of necessity (short of absolute necessity), every token is caused by some token more necessary than it. As we successfully build scientific models that stretch across astronomical and geological time, we confirm that situation-tokens across a wide swath of degrees of necessity have causes that are strictly more necessary than themselves. Axiom 8** is the generalization of this pattern (in the form of a defeasible rule). Axiom 8** states that we may reasonably infer, about any token at any degree of contingency (short of absolute necessity), that it has a causal antecedent which is more necessary than it.

We can now give an adequate justification for the restriction of causality to wholly contingent situations. If we substitute any situation that is not wholly contingent (that contains at least one necessary part) for x in the consequent of Axiom 8**, the result is necessarily false, since there is no situation more necessary than an absolutely necessary situation. Consequently, the generalized defeasible axiom couldn't be true without the restriction in the antecedent to wholly contingent situations. Any further restriction, along the lines advocated by Oppy, would have to be justified on other grounds.

When we apply Axiom 8** to the Cosmos, or to any other minimally contingent situation, we succeed in drawing the defeasible conclusion that it has a cause, and in addition, we have an explanation as to why the cause of the Cosmos is necessary.

Oppy's Critique of My Corollaries

In section 7 of "A New Look," I argued for six corollaries of my principal theorem. Oppy objects to the first five of these, primarily on the grounds that they do not follow deductively from a priori premises. Again, Oppy misinterprets my intent. I claim that there are defeasible arguments for each of the corollaries, providing *prima facie* cases for some tentative conjectures about the first cause. I never claimed that the arguments are a priori: in many cases, they rely upon inductive generalizations from scientific experience. A cogent rebuttal of these arguments would require introducing some kind of contrary evidence or counter-argument.

I am confident that the inferences sketched in this section represent a natural and proper tendency of the human mind. The Rubicon is crossed when one accepts the existence of a necessary first cause. I know of no one, living or dead, who accepted the argument for a first cause who did not go on to embrace the existence of an infinite and immaterial being. Oppy is no exception.

Our experience supports the supposition that each situation involves one or more particular individuals instantiating one or more properties or relations. Situations are themselves concrete particulars. If a situation s realizes the situation-type of *there existing some F*, then there is some particular individual a of such a kind that s realizes the situation-type of *a's being F*. Barwise and Perry referred to this feature of situations as their *referential transparency*. (For more details, see Chapters 2 and 3 and Appendix A of *Realism Regained*.)

If a situation is necessary, then the particular individual or individuals involved in the situation have the property of existing necessarily, as I con-

clude in Corollary 1.

In Corollary 2, I argue that a collection of necessary beings constitutes something other than a mere aggregation. Oppy offers sets and numbers as exceptions. However, such mathematical objects form a tightly coherent system, and so seem to support my conclusion rather than Oppy's. In any case, Oppy hasn't demonstrated that such abstract objects exist with absolute necessity. In Chapter 15 of *Realism Regained*, I take seriously the possibility that there are asymmetrical necessitation relations among the numbers, with larger numbers necessitating their predecessors, but not vice versa.

Corollary 3 concerns God's *attributes*. Oppy finds my somewhat compressed definition of *attribute* mysterious, so I will try to clarify my meaning. An object has a variety of properties. In some cases, the thing's having one property, say *F*, is causally responsible for it's having another property, *G*. For example, a sample of salt has the property of being soluble because of certain physical and chemical properties of its molecules. Thus, its property of consisting of such molecules is causally responsible for its property of solubility.

A property *F* of *x* is an *attribute* of *x* just in case it is a property of *x* and there is no property *G* of *x* such that *x*'s having *G* is causally responsible (even in part) for *x*'s having *F*. In other words, as I defined the term in 1997, attributes are the causally fundamental properties of a thing.

Let *s* be the situation that is the first cause, and let *God* be the mereological sum of all individuals *x* such that, for some property *F*, *x*'s being *F* is included in *s*. Each of the properties of any such *x* corresponds to a property of God, not (as Oppy supposes that I assume) because every property of the part is a property of the whole, but because in such cases God always has the property of *having a part with property F*.

Suppose for contradiction that one of God's attributes, say *D*, is a contingent property of God. This would mean that God's being *D* is caused by the first cause, *s*. This would mean that some other property *E* of God's (such that God's having *E* is included in *s*) is causally responsible for God's having *D*, contrary to our assumption that *D* was an attribute of God's. Hence, God has all of its attributes of necessity.

I assume that the attribute of any part corresponds to an attribute of the whole. I don't mean (as Oppy supposes) that the whole has the very same property, but that the whole's having a part with its attribute is itself an attribute of the whole. For example, the causally fundamental properties of each molecule of a sample of salt correspond to causally fundamental properties of the whole sample, namely, the attribute of being composed of molecules with those physico-chemical attributes. This quite plausible principle, in combination with Corollary 3, immediately gives me Corollary 4, that all of God's parts have their attributes of necessity.

Finally, I argued that all of God's attributes are immeasurable (Corollary 5). Our experience with the physical world supports the generalization that measurable properties are continuous, and that finite, non-zero intensities of continuous properties are contingent. There appear to be exceptions to these generalizations, as in quantum mechanics. However, acceptance of the hypothesis of quantization in physics required considerable

positive evidence to overcome the strong rational presumption in favor of the possibility of small increases and decreases.

Once again, Oppy insists on reading my argument as a deductive syllogism, assuming that *all* measurable properties are continuous, and that *all* continuous properties are contingent. In fact, I claimed only that there is a strong presumption in favor of contingency in such cases, and Oppy has offered no reason to override that presumption in the case at hand.

I may have been insufficiently clear about the status of the quantity *zero*. I did not intend to include the *zero* value of an attribute as *measurable*. In fact, *infinity* and *zero* are mutually convertible: infinite knowledge corresponds to zero ignorance, and zero knowledge to infinite ignorance. A necessary situation could well include both zero and infinite values (as values of the attributes of things), since both of these values are *metrically isolated*. It is only values that are not metrically isolated, values that have qualitatively similar alternatives arbitrarily close in degree, that are presumably contingent. Consequently, it is easy for me to admit that God might measure *zero* on such scales as ugliness, evil or ignorance.

Oppy argues on page 383 that Corollary 5 leads to the conclusion that God does not have such attributes as intelligence or power, since these are measurable. However, an infinite degree of intelligence (like the complete absence of intelligence) is metrically isolated, in the relevant sense. Any decrease in intelligence from the infinite to the finite involves a qualitative change, not an arbitrarily small variation. It is, however, only the latter that creates the presumption of contingency.

I am not claiming that the cosmological argument by itself provides grounds for attributing intelligence to God, but only that it provides grounds for expecting that if God has any positive intelligence at all, it is infinite in degree. In the absence of any contrary consideration, this is the most reasonable conjecture for us to form.

Skyhooks and Cranes

The cosmological argument is of critical importance to the scientific development of metaphysics. In *Darwin's Dangerous Idea*,¹⁶ Daniel Dennett refers to a colloquialism of contemporary engineering, the *skyhook*, defined by the OED as:

skyhook orig. Aeronaut. An imaginary contrivance for attachment to the sky; an imaginary means of suspension in the sky.

To these *deus ex machina* devices of pseudo-explanation, Dennett contrasts the real and useful crane, solidly anchored in the reality of material bodies and their motions. Only materialistic explanations, Dennett claims, can be genuine explanations, whether we are discussing natural science or metaphysics.

If the cosmological argument is successful, then the playing field between materialistic and theistic explanations can be levelled. Theistic explanations are crane-like after all, beginning, as any serious metaphysical explanations must do, with the causally fundamental first cause.

This re-orientation of metaphysics has profound implications for such projects as accounting for the nature of logical and mathematical truths, natural necessity and natural laws, the Big Bang and the anthropic coincidences, the origin of life and of biological information in general, the objectivity of value, and the possibility of human knowledge. In each case, the success of the cosmological argument enhances significantly the explanatory virtues of theistic hypotheses.

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NOTES

1. Graham Oppy, "Koons' Cosmological Argument," *Faith and Philosophy* 16(1999): 378-389.
2. Robert C. Koons, "A New Look at the Cosmological Argument," *American Philosophical Quarterly* 34(1997): 193-212.
3. Oppy, *ibid.*, pp. 383-4.
4. Henry S. Leonard and Nelson Goodman, "The Calculus of Individuals and Its Uses," *Journal of Symbolic Logic* 5(1940): 45-55.
5. Koons, *ibid.*, p. 198.
6. Nicholas Asher and Michael Morreau, "Commonsense entailment: a modal theory of nonmonotonic reasoning," *Proceedings of IJCAI-91: Twelfth International Joint Conference on Artificial Intelligence*, Los Altos, Calif., Morgan Kaufmann, 1991.
7. Oppy, *ibid.*, p. 381.
8. *Ibid.*
9. *Ibid.*, p. 388 n. 5.
10. Robert C. Koons, *Realism Regained: An Exact Theory of Causation, Teleology and the Mind*, New York, Oxford University Press, 2000.
11. *Ibid.*, pp. 316-319.
12. Koons (1997), pp. 199-200.
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