

Creation *EX NIHILO* and the Big Bang

Wes Morriston

Abstract: William Lane Craig claims that the doctrine of creation *ex nihilo* is strongly supported by the Big Bang theory of the origin of the universe. In the present paper, I critically examine Craig's arguments for this claim. I conclude that they are unsuccessful, and that the Big Bang theory provides no support for the doctrine of creation *ex nihilo*. Even if it is granted that the universe had a "first cause," there is no reason to think that this cause created the universe out of nothing. As far as the Big Bang theory is concerned, the cause of the universe might have been what Adolf Grünbaum has called a "transformative cause"—a cause that shaped something that was "already there."

When God began to create the heavens and the earth, the earth was a formless void and darkness covered the face of the deep, while a mighty wind swept over the face of the waters.

Genesis 1:1-2

We are got into fairy land, long ere we have reached the last steps of our theory; and there we have no reason to trust our common methods of argument, or to think that our usual analogies and probabilities have any authority. Our line is too short to fathom such immense abysses.

David Hume

As Adolf Grünbaum has pointed out, many familiar causes are "transformative" in character. When a person makes something, he makes it *out of* something.¹ He transforms a pre-existent material into something else (the effect). The carpenter cuts the wood and fits it together so as to make a house, the potter shapes and bakes his clay so as to make a pot, and so on.

Genesis 1 can be read as saying that God did something of this sort with the "formless void"—shaping it in a step-by-step process that led to sky and

earth and sea. But according to the traditional Christian interpretation, this is not the whole story. If there was a First Stuff (a “formless void,” perhaps) out of which God made the universe, then he must have made *that* too. And inasmuch as it is the *First* Stuff, he did not make it out of any other stuff. He created it *ex nihilo*.

The traditional Christian doctrine of creation has often been stated in Aristotelian terms: God is the *efficient* cause of the universe. No doubt God had something definite in mind when he created (*the formal* cause), and no doubt he had his reasons for creating (the *final* cause)—but there was no *material* cause—no “stuff” that God worked with in the very first act of creation.

But we don’t need Aristotle’s Four Causes to explain what is meant by creation *ex nihilo*. For present purposes I shall adopt the following definition:

x is created *ex nihilo* by y if and only if i) y causes x to exist, and ii) y does not cause x to exist by transforming some other material stuff.²

For convenience and stylistic variation, I shall continue to use the Aristotelian expression, “material cause,” to refer to whatever underlying material stuff is altered by a “transformative cause.”

Now suppose, for the sake of argument, that the universe was caused to exist by a very powerful person. Why isn’t this person a “transformative cause?” Why not suppose that there is a material cause? Why do Christians insist that God must have created the universe *ex nihilo*?

Although there is little scriptural support for this traditional doctrine,³ there are obvious theological motives. Philosophically minded Christians have long held God to be, not just the greatest being who happens to exist, but the Greatest Conceivable Being. A God who could not create without shaping a pre-existent material stuff would be *limited* by the nature of that stuff—he could create only what his stock of materials permits. Such a God would not be the Greatest Conceivable Being since one can consistently conceive of a God whose power is not limited in this way.

In recent years, however, some Christian philosophers have suggested that purely scientific and philosophical considerations show that the universe was not made *out of* anything. William Lane Craig, in particular, has argued that creation *ex nihilo* is strongly supported by the Big Bang theory of the origin of the universe. Craig gives at least two different arguments for this conclusion. The first depends on the supposed “infinite density” of the initial singularity, the second on the claim that there was no *time* prior to the initial singularity.

Griinbaum, on the other hand, has forcefully argued that creation *ex nihilo* does not follow from any reasonable interpretation of the claim that the universe has a cause. Causes of the sort that are acknowledged in everyday experience and in scientific explanations either do not involve conscious agency, or, if they do, they also involve the *transformation* of some pre-existing *material*. In neither case do we have the sort of cause envisaged by classical theism. So even if one were to grant the premise that everything (including the beginning of the universe) has a cause, it would not follow that the universe was created *ex nihilo*.⁴

In the present paper, I shall show that neither of Craig's "Big Bang" arguments is successful in refuting Grunbaum's contention, or in establishing a link between the Big Bang theory and creation *ex nihilo*. Even if it is granted that the universe was created by a very powerful person, the Big Bang theory provides no support for the further claim that this person created the universe *out of nothing*. As far as the Big Bang theory is concerned, the creation of the universe might have consisted in the *transformation* of something else. And even if God is the cause of the Big Bang, his first creative act might have consisted in the shaping of something that he did not create.

THE FIRST ARGUMENT

In an article with the title, "Philosophical and Scientific Pointers to Creation *ex Nihilo*," Craig argues that the Big Bang theory entails creation *ex nihilo*. The "staggering implication" of what is known about the expansion of the universe, he says, is that "at some point in the past, *the entire known universe was contracted down to a single point. . .*"⁵ As we go back in time, we reach "a point at which . . . the universe was 'shrunk down to nothing at all.'" And this, Craig insists, shows that the universe was created out of nothing.

This event that marked the beginning of the universe becomes all the more amazing when one reflects on the fact that a state of "infinite density" is synonymous with "nothing." There can be no object that possesses infinite density, for if it had any size at all, it would not be *infinitely* dense. . . . Thus, what the Big Bang model requires is that the universe had a beginning and was created out of nothing.⁶

The argument can be conveniently outlined as follows:

1. According to the Big Bang theory, the universe "began with a great explosion from a state of infinite density."⁷
2. "There can be no object" having "infinite density."
3. So, "'infinite density' is synonymous with 'nothing.'"
4. Therefore, the Big Bang theory "requires" that "the universe had a beginning and was created out of nothing."

This argument of Craig's need not detain us for long. There are at least three quite obvious—and decisive—objections to it.

(i) In the first place, "infinite density" is *not* synonymous with "nothing," and the "initial singularity" that figures in Craig's statement of the Big Bang theory" is not simply nothing at all. A mere *nothing* could not begin expanding, as the infinitely dense "point universe"⁹ is supposed to have done. And even if it lacks spatial and temporal spread, the initial singularity would have other properties—for example, that of "being a point." It would therefore be a quite remarkable *something*, and not a mere nothing. So, step 3 is obviously false.

(ii) In the second place, (3) does not follow from (2). No one would suppose that it follows from the fact that there can be no round squares, that

“round square” is synonymous with “nothing.” But neither should anyone suppose it follows from the fact (assuming it is a fact) that there can be no infinitely dense objects, that “infinite density” is synonymous with “nothing.”

(iii) Something interesting does follow from (2), however. If no object can have infinite density, then the universe was never in a state of infinite density, and the interpretation of the Big Bang that figures in step 1 of the argument is false. It seems, then, that Craig must either scrap this way of describing what the Big Bang theory says, or else relax his strictures against infinite density. Either way, this particular argument for creation *ex nihilo* is unsound.

Nowadays, few Big Bang theorists would say that there ever was a “point universe” or a “state of infinite density.”¹⁰ It is true that on the standard Big Bang model, the “geometry” of the continuing expansion is such that, as we trace its history backwards in time, the diameter of the universe continually decreases—gradually approaching a limit of zero. But *having a diameter of zero* can be thought of as an ideal limit, rather than as the state of anything that once actually existed.

As we approach this limit, however, we have no theory that enables us to draw reliable inferences about the behavior of the universe. It is well known that general relativity breaks down prior to 10⁻⁴⁵ seconds (or “Planck time,” as it is called), and that quantum effects then become significant. What is needed is a theory that somehow “incorporates the principles of both general relativity and quantum theory.”¹¹ Until such a theory emerges, all claims about the earliest stage in the history of the universe remain in the category of sheer speculation.¹²

THE SECOND ARGUMENT

In “The Ultimate Question of Origins: God and the Beginning of the Universe,” Craig explains the relation between creation *ex nihilo* and the Big Bang theory in a rather different way.

The standard Big Bang model... describes a universe which is not eternal in the past, but which came into being a finite time ago. Moreover—and this deserves underscoring—the origin it posits is an absolute origin *ex nihilo*. For not only all matter and energy, but space and time themselves come into being at the initial cosmic singularity.... On such a model the universe originates *ex nihilo* in the sense that at the initial singularity it is true that *There is no earlier space-time point* or it is false that *Something existed prior to the singularity*.¹⁵

In this passage, Craig does not equate the “initial cosmic singularity” with “nothing.” What he says instead is that nothing preceded the initial singularity *in time*, and this is supposed to show that it came into existence *ex nihilo*. If it was created—and Craig, of course, believes he can show that it was created by a timeless person—then it must have been created out of nothing. In that case, it has an *efficient*, but not a material, cause. The Creator did not make the initial singularity by transforming a pre-existent material stuff. He couldn’t have, since there was no time prior to creation.

This argument can be conveniently summarized as follows:

5. The initial singularity exists at the earliest point of space-time.
6. There is no time prior to the earliest point in space-time.
7. Therefore, there was nothing temporally prior to the initial singularity.
8. So, the initial singularity must have come into existence out of nothing.
9. If, therefore, the initial singularity was created, it must have been created out of nothing.

There are at least two problems with this argument. The first is that the Big Bang theory does not entail the truth of premise 6. Even if it is granted that the space-time of our universe begins at (or shortly “after”) the initial singularity, it does not follow that *time* begins then.

To see this, suppose that God created the initial singularity, but that he did a lot of other things first. Maybe he created other universes (with their own “space-times”)—or perhaps he just thought things over for a while prior to creating the universe. As Craig himself has suggested in one of his responses to Grünbaum, God might have “counted up” to creation.

... [S]uppose that God led up to creation by counting, “1, 2, 3, . . . , fiat lux!” In that case the series of mental events alone is sufficient to establish a temporal succession prior to the commencement of physical time at $t = 0$. There would be a sort of metaphysical time based on the succession of contents of consciousness in God’s mind prior to the inception of physical time. Thus, it is meaningful to speak both of the cause of the Big Bang and of the beginning of the universe.¹⁴

In view of the way Craig characterizes the Big Bang theory, perhaps the “count” in his thought experiment should go like this: “1, 2, 3, . . . , Let there be an infinitely dense particle!”¹⁵ Space-time begins when (or shortly after) God says, “Let there be an infinitely dense particle!” In this imaginary scenario, the creation of space-time takes place within a more fundamental kind of time—a kind of time that is perfectly conceivable independently of the existence of our universe. Craig refers to it as “metaphysical time.”

What is the nature of metaphysical time? According to Craig, it is tensed, dynamic, and non-relative. There is an ever-changing fact of the matter about which events are future, which present, and which past. Future events become present, present events become past, and past events sink further and further into the past.

We have just seen that a temporal series of purely mental events, coming into existence and passing away in metaphysical time prior to the beginning of the universe, is possible. But there also does not seem to be any a priori bar to the possibility of a temporal series of *non*-mental events occurring prior to the beginning of our space-time. If he had wished to do so, God could have created a whole series of universes, each with its own history and its own special laws, prior to creating ours.

Craig, of course, thinks that any such temporal series must have a

beginning. He offers a pair of well-known (and controversial) a priori arguments against the possibility of a beginningless series of events, and he also argues that the ultimate cause of the very first event in metaphysical time must be a timeless person. I will not reproduce or challenge any of these arguments here.¹⁶¹ I shall assume, for the sake of argument, that metaphysical time has a beginning. What is important in the context of this paper is that such a beginning need not coincide with the beginning of space-time.

If, as Craig explicitly acknowledges, God *could have created* metaphysical time long before creating the space-time of our universe, it follows that there could have been something temporally prior to the earliest point in space-time ($t = 0$), and premise 6 of Craig's argument for creation *ex nihilo* would then be false. Premise 6 *may* be true anyway—metaphysical time and space-time *could have* begun together. But since the Big Bang theory says nothing about *metaphysical* time, Craig cannot consistently appeal to that theory to show that this is so.

If this were the only thing wrong with Craig's argument, it might seem easy enough for him to produce an argument for the same conclusion without relying on the disputed premise 6. If, as Craig holds, metaphysical time must have a beginning, then *whenever* that beginning occurs—whether before or at $t=0$ —there is no time prior to it. And in either case, I believe Craig would say that *something* comes into existence *out of nothing*.

It is only fair to point out, however, that *the Big Bang theory* would contribute nothing to such an argument. More importantly, perhaps, the revised argument would not establish that *the universe* (or any part thereof) was created *ex nihilo*, but only that *something or other* was. Even if Craig's a priori arguments against the possibility of an infinite past were successful, they would not enable him to show that the heavens and the earth were created out of nothing.

Leaving this point aside, let us ask how Craig's argument fares if it is assumed that the first moment of metaphysical time coincides with $t=0$ in space-time. It seems to me that this still doesn't give us "origination *ex nihilo*." What follows from step 7 of the argument is only that the universe didn't emerge from something *that existed at a time earlier than $t=0$* —not that it wasn't made out of anything at all. To get from (7) to (8), we need an additional premise:

7 *1/2*. If there was nothing temporally prior to the initial singularity, then it must have come into existence out of nothing.

Unfortunately, it is not at all clear that (7 *1/2*) is true. Even if we accept Craig's contention that the universe was caused by a timeless and personal God, why should we join him in supposing that God is the *only* being who exists outside time? Why could there not also have been a timeless "stuff" out of which God "formed" the universe? If God had created the singularity out of something timeless, then it would not have come out of nothing even though there was nothing *temporally* prior to it, and (7 *1/2*) would be false. It seems, then, that the beginning of the universe could have had a material

cause even if there is no time prior to the beginning of the universe.

I believe the reason Craig doesn't take this possibility into account is that he equates the possibility of a material cause of the universe with the possibility that matter/energy plays a certain role in creation. Assuming that matter/energy is itself created, it can hardly be among the causes of creation. And since matter/energy has temporal duration, it also follows that the material cause (if any) of the universe cannot be timeless.

That this is how Craig thinks about the possibility of a material cause of the universe can be seen in his recent discussion of "vacuum fluctuation" models of the origin of the universe.

Still, insofar as vacuum fluctuation models render it plausible that the universe lacks a material cause, they are of service to theism.... There is no reason that the theist could not explain *creation ex nihilo* by saying that the sum total of the matter/energy in the universe is zero and thus God in creating the universe required no material substratum.¹⁷

Craig here assumes that matter/energy is the only possible "material substratum" for creation. If, prior to the Big Bang, the sum total of matter/energy were zero (as Craig apparently believes is postulated by a vacuum fluctuation model of creation¹⁸), Craig thinks this would support his claim that the universe was created out of nothing. And since, as he has also argued, matter/energy is never "quiescent,"¹⁹ it also follows that there could not be a *timeless* material cause.

But why suppose that matter/energy is the only possible "stuff" out of which God might have made the universe? It's true that we don't seem to be acquainted with any timeless "stuffs" that could have played this role. But we don't encounter any timeless persons either, and Craig has no trouble with that idea. Indeed, he thinks that the need for an *efficient* cause of the beginning of the whole temporal order forces him to postulate one. So why should there not also have been a timeless material "stuff" for God to work with?

Craig has claimed that it is obvious—so obvious that no honest and rational person could fail to agree—that *nothing can begin to exist without a cause*.²⁰ But as far as I can see, the need for a *material* cause is exactly on a par with the need for an *efficient* cause. To see this, consider the following "stories" that might be offered to explain the coming into existence of a house.

Story 1. There was no lumber, no nails, no bricks, no mortar, no building materials of any kind. But there was a builder. One day, the builder said, "Five, four, three, two, one, Let there be a house!" And there was a house.

Story 2. There was no builder, but there were lumber, nails, bricks, mortar, and other necessary building materials. One day, these materials spontaneously organized themselves into the shape of a house.

I do not see that Story 1 is in any way superior to Story 2. Both stories are incompatible with our experience of the way the world works. Both are deeply counter-intuitive. The fact is that a house needs both an *efficient* and a *material* cause.

Admittedly, the universe is not a house. But as far as I can see, the universe is at least as much (or as little) in need of a *material* as of an *efficient* cause. Let us suppose, then, that Craig is right in thinking that the causes (if any) of the universe would have to be timeless. And let us suppose further that he is right in thinking that—although we have never encountered a timeless person—we must postulate one as the *efficient* cause of the universe. Why, then, would it not be equally appropriate to postulate a timeless *material* cause?

I do not have a candidate for the timeless material cause of the universe. The only “stuffs” with which we are familiar are this-worldly materials, all of which exist in time. But it is equally true that the only persons with which we are familiar are this-worldly persons, and all of them exist in time. My question, then, seems perfectly reasonable. If we follow Craig in postulating a timeless person as the efficient cause of the whole natural order, why should we not also postulate a timeless “stuff” as the material cause of the universe?

It might occur to someone to object that the material cause of the universe couldn't be timeless because it is a part or an aspect of the universe, and because every such part or aspect is temporal. The material cause of the universe (if there were one) wouldn't just disappear after creation. It would remain within the physical universe—as the stuff of which it continues to be “made.” If there were a material cause of the universe, it would necessarily have temporal duration.

Perhaps. But even if this is so, it is not an adequate defense of *Craig's* position. For it fails to demonstrate a clear *difference* with respect to temporality between a timeless efficient cause and a timeless material cause. Craig, it will be recalled, holds that the *efficient* cause of the universe is timeless only *sans* the universe. When God created the universe, Craig thinks that he also placed himself within time. Assuming that this makes sense, we may ask why God could not also have placed a timeless material cause within time (and the universe). The “stuff” of which the universe is made would then be timeless *sans* the universe. But when he created a universe with a beginning in time, we may suppose that God put this same “stuff” into time. At the point of creation, so to speak, both the material and the efficient cause of the universe enter time.

I hasten to assure the reader that my purpose here is not to recommend such a doctrine of creation. I claim only that, given what is known about the Big Bang, creation *out of* an unknown timeless stuff is not *less* likely than creation *by* an equally unknown timeless person.

When I say that creation out of some timeless stuff is not less likely than creation *ex nihilo*, I do not mean to suggest that either possibility is especially likely. My own humble and admittedly non-expert view is that since almost everything connected with the Big Bang theory is highly speculative, it would be a grave mistake to draw from it any firm conclusions about the cause(s) of the Big Bang. Deriving any conclusion from the Big Bang theory about the truth or falsity of classical theism is premature at best.

But this is not all. Those who support Craig's argument believe that the

universe requires an *efficient* cause, but that it is not, and does not need to be, made *out of* anything. I believe my argument shows that this position is not sustainable. Either our commonsense intuitions about ordinary intramundane cases of causation can reasonably be applied to the beginning of the universe, or they cannot be. If they can be, then creation *out of* some uncreated “stuff” may actually be quite a lot more likely than creation *ex nihilo*! In our experience of the world, after all, the making of enduring things always involves the transformation of some pre-existent material.²¹ So, if commonsense intuitions are to be relied upon here, creation *ex nihilo* is out. If, on the other hand, our commonsense intuitions about causation cannot reasonably be applied to the beginning of the universe,²² then our epistemic situation does not allow us to draw any conclusion whatever about the existence or nature of a first cause. Either way, Craig’s Big Bang argument for creation *ex nihilo* lacks cogency.

A wise philosopher once said,

Though the chain of arguments ... were ever so logical, there must arise a strong suspicion, if not an absolute assurance, that it has carried us quite beyond the reach of our faculties, when it leads to conclusions so extraordinary, and so remote from common life and experience. We are got into fairy land, long ere we have reached the last steps of our theory; and there we have no reason to trust our common methods of argument, or to think that our usual analogies and probabilities have any authority. Our line is too short to fathom such immense abysses.²³

Hume’s target in this remarkable passage was Malebranche’s claim that God is “the sole and immediate cause of every event which appears in nature.” But I think these eloquent words are well adapted to the present context as well. They provide a quite accurate description our epistemic situation with respect to creation *ex nihilo* and the Big Bang theory. Here too, I think some philosophers have gotten themselves pretty far into “fairy land.” Here too, “our common methods of argument” fail to settle all the hard questions we are capable of asking.

In the last analysis, we simply do not have enough to go on to say what the causes (efficient or material) of the beginning of the universe are likely to be. Certainly, the Big Bang theory does not settle the issue in favor of creation *ex nihilo*. Even if time and the universe began together, they may, for all we can tell, have been created *by* an unknown efficient cause *out of* an equally unknown material “stuff.” The best course may well be to suspend judgment about all of these bizarre possibilities.²⁴

University of Colorado, Boulder

NOTES

1. Adolf Grünbaum, “The Pseudo-Problem of Creation in Physical Cosmology,” *Philosophy of Science* vol. 56, no. 3 (1989): 373-394. See also Grünbaum, “Creation as a Pseudo-Explanation in Current Physical Cosmology,” *Erkenntnis* 35: 233-254.

2. When I use the expression “material cause” below, I am referring to an underlying “stuff” that is affected by a “transformative cause” in Grünbaum’s sense

of that expression.

3. The claim that God created *out of nothing* is not well supported by Genesis 1. Readings of verse 1 range from “In the beginning God created the heavens and the earth . . . t o “When God began to create the heavens and the earth . . . Neither reading entails creation *ex nihilo*. Both are consistent with the view that God made the heavens and the earth out of *something* that was already there when God “began to create,” and the second reading is at least consistent with the view that the “form-less void” was the stuff out of which God made the earth. The only unambiguous biblical assertion that God created out of nothing occurs in 2 Maccabees 7:18. (Maccabees is accepted as scripture by Roman Catholics, but not by Protestants.)

4. In “The Pseudo-Problem of Creation in Physical Cosmology.”

5. William Lane Craig, “Philosophical and Scientific Pointers to Creation *ex Nihilo*,” in *Contemporary Perspectives on Religions Epistemology*, ed. R. Douglas Geivett and Brendan Sweetman (New York: Oxford University Press, 1992), 191.

6. “Philosophical and Scientific Pointers,” 192. Craig repeats this argument almost verbatim in *Theism, Atheism, and Big Bang Cosmology* (New York: Oxford University Press, 1993), 43-44.

7. “Philosophical and Scientific Pointers,” 192.

8. Craig refers to it as the “Standard Big Bang Model.” See “The Ultimate Question of Origins: God and the Beginning of the Universe,” *Astrophysics and Space Science* 269-270 (1999): 723-740.

9. This phrase is used by “four prominent astronomers” whom Craig approvingly quotes in “Philosophical and Scientific Pointers” and in *Theism, Atheism, and Big Bang Cosmology* (43). Writing in *Scientific American* (March 1976), J. Richard Gott III, James E. Gunn, David N. Schramm, and Beatrice M. Tinsley say this: “The universe began from a state of infinite density about one Hubble time ago.... The *point universe* was not an object isolated in space; it was the entire universe . . . (6 5 , my italics).

10. Even those who believe there was an initial singularity do not hold that it possessed infinite density. They suppose instead that the singularity had *no* density, since it had zero volume. For a helpful explanation, see Milton K. Munitz, *Cosmic Understanding* (Princeton University Press: Princeton, NJ, 1990), 111.

11. R. M. Wald, *Space, Time, and Gravity: The Theory of the Big Bang and Black Holes* (Chicago: University of Chicago Press, 1977), 53.

12. Ohio State astronomer Barbara Ryden puts the the point quite bluntly: “Frankly, we are clueless about how matter behaves at higher temperatures and densities. Our experience is all with densities which are much lower by comparison. A naive extrapolation tells us that when the universe was 0 seconds old, it had infinite density and temperature, but again, our knowledge of what happens in the extremely early universe is pure speculation.” See: http://www-astronomy.mps.ohio-state.edu/~ryden/astl62_9/notes37.html.

13. Craig, “The Ultimate Question of Origins.”

14. William Lane Craig, “The Origin and Creation of the Universe: A Response to Adolf Grünbaum,” *British Journal for the Philosophy of Science* 43 (1992): 233-240.

15. Craig sees this as a “knockdown argument” for the conclusion that “time as it plays a role in physics is at best a measure of time rather than constitutive or definitive of time.” See William Lane Craig, “Design and the Cosmological Argument,” in *Mere Creation: Science, Faith and Intelligent Design*, ed. William A. Dembski (Downers Grove, Ill.: InterVarsity Press, 1998), 350-1.

16. Though I have done so elsewhere. See “Must the Past Have a Beginning?” *Philo* vol. 2, no. 1(1999): 5-19. See also “Craig on the Actual Infinite,” *Religious Studies* (forthcoming).

17. William Lane Craig, “Design and the Cosmological Argument,” in Dembski, *Mere Creation*, 345-6.

18. I cannot vouch for the accuracy of Craig’s understanding of the vacuum fluctuation model.

19. William Lane Craig, "The *Kalam* Cosmological Argument and the Hypothesis of a Quiescent Universe," *Faith and Philosophy* 8, no. 1 (1991): 104-108.

20. I have argued elsewhere that, when applied to a "beginning" prior to which there is no time, this principle is not obviously true. See "Must the Beginning of the Universe Have a Personal Cause? A Critical Examination of the *Kalam* Cosmological Argument," *Faith and Philosophy* 17, no. 2 (2000): 149-169.

21. Any exception to this rule would surely be regarded as a miracle. If there were strong empirical evidence of miracles of this sort, that would boost the prior probability of creation *ex nihilo*. But even if they were well evidenced, the standard Christian miracles are *not* of this sort. Jesus turns *water* to wine. He makes *the sea* "be still." He raises *Lazarus* from the dead. And so on.

22. This is my own position, which I have developed in "Must the Beginning of the Universe Have a Personal Cause?" Craig's reply to this paper, "Must The Beginning Of The Universe Have A Personal Cause?: A Rejoinder," as well as my response to Craig, "Causes and Beginnings in the *Kalam* Argument: Reply to Craig," are also forthcoming in *Faith and Philosophy*.

23. David Hume, *Enquiry Concerning the Human Understanding*, section vii, part i.

24. I would like to thank the editor of *Philo* for his insightful comments and judicious advice. I would also like to thank Eric Vogelstein for straightening me out on several things.