

The Origin and Creation of the Universe: A Reply to Adolf Grünbaum

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I INTRODUCTION

When a man who is arguably the greatest living philosopher of space and time asserts that the question of creation in physical cosmology is a 'pseudo-problem' (Grünbaum [1990]), then the natural theologian and philosopher of religion had better sit up and take notice. According to Grünbaum, the question of the *origin* of the universe is, indeed, a genuine problem which is addressed by physical cosmology; but he differentiates this from the pseudo-problem of the universe's *creation*. Whereas the former problem concerns whether the universe is temporally finite in the past, the latter seeks an 'external cause' of the beginning of the universe, particularly a divine cause, or God. Grünbaum argues that this latter question is not merely pseudo-science, but a pseudo-problem altogether.

Now the natural theologian may certainly agree that the *origin* of the universe and the *creation* of the universe are conceptually distinct in that the latter alone has reference to a cause. He will no doubt also agree that terms like 'creation', 'annihilation', 'nothing', and so forth, are used by physicists in philosophically misleading ways. He may even agree that the problem of creation is not properly a part of physical cosmology, but is a *meta*-physical problem. But if he stands in the tradition of the *kalām* cosmological argument, it will be his contention that the origin of the universe *implies* the creation of the universe, since it is metaphysically impossible that the universe came into being spontaneously out of nothing.

2 THE TRADITIONAL COSMOLOGICAL ARGUMENT

Grünbaum, however, disagrees sharply with the traditional *kalām* cosmological argument for a temporally first cause of the universe. He argues that the traditional argument is philosophically imperforate and that attempts to plug the holes by appeal to the findings of modern cosmology are doomed to failure.

Unfortunately, the dutifully attentive natural theologian will no doubt be disappointed (and somewhat amazed) at the superficiality of Grünbaum's critique. Not only does Grünbaum's article appear to be little more than a warmed-over version of a previous critique published over 35 years ago (Grünbaum [1954]; cf. *idem* [1952]), but he seems to have neither understood the traditional argument nor to have offered any penetrating analysis of it.

According to Grünbaum, the argument is based on the premiss that 'Everything has a cause', and it proceeds to inquire as to the cause of the universe, assuming tacitly that the physical universe had a temporal beginning. It concludes that the universe as a whole had a beginning in the finite past as the result of an act of creation out of nothing by a single, conscious, external cause, or agent, who is then claimed to be God.

Now this is a gross caricature of the traditional argument, as Grünbaum ought to know from the references he cites (Craig [1979]). The causal premiss operative in the argument is not that everything has a cause, but that 'Whatever begins to exist has a cause'. I can think of no prominent philosopher or natural theologian who held that everything has a cause, except for some Enlightenment rationalists who by 'cause' meant something more like 'explanation' or 'reason'. This fact has been repeatedly pointed out by theists, but stereotypes seem to die hard. Furthermore, proponents of this argument did not simply assume that the universe began to exist, but presented elaborate philosophical defenses of this premiss, employing arguments against infinite temporal regression such as came to be embodied in the thesis of Kant's first antinomy concerning time. Finally, the identification of the external cause of the universe's inception was not gratuitously assumed to be a personal Creator; rather the proof's proponents argued for this conclusion on the basis of the fact that a temporal effect could not arise from an eternal cause unless that cause were a personal agent.

Grünbaum goes on to present three groups of objections against his misconstruction of the cosmological argument. Group I seems to draw into doubt the concept of 'cause' in the argument: (i) The concept is used equivocally, since in the premiss it refers to causes which transform previously existing materials from one state to another, whereas in the conclusion it refers to a cause which creates *ex nihilo*. (ii) It does not follow from the causal premiss that the first cause is a conscious agent. (iii) It is logically fallacious to infer that there is a *single* conscious agent responsible for the first state of the total physical universe.

To which it may be answered: (i) The univocal concept of 'cause' employed in premiss and conclusion alike is the concept of efficient causality, that is to say, something which produces or brings into being its effects. Whether

such production involves transformation of previously existing materials or creation *ex nihilo* is completely incidental. That this is so is evident from the fact that the proponent of the argument must confront and deal with the objection that the first cause may not have created *ex nihilo*, but instead transformed an eternal, quiescent universe into a universe in change (Craig [1979], pp. 99–102; Goetz [1989]; Craig [1991]). So the argument is clearly not equivocal.¹ (ii) Of course, not all efficient causes are personal; but apart from agent causation it is extremely difficult to explain how a temporal universe could have arisen from a state of changeless eternity (Craig [1979], pp. 149–53, *idem*. [1991]). (iii) The inference to a single external cause, while not following strictly from the argument proper, seems justified in light of the principle that one should not multiply causes beyond necessity. For his part, Grünbaum cannot seem to decide whether the argument commits the fallacy of composition or involves a quantifier shift. But it seems obvious that the argument runs neither ‘Everything in the universe has a cause; therefore, the whole universe has a cause’ nor ‘Every thing has a cause; therefore, there is one cause of every thing’. Rather the argument is a logically impeccable example of universal instantiation: ‘Whatever begins to exist has a cause; the universe began to exist; therefore, the universe has a cause.’ That the universe is a thing which began to exist becomes all the more obvious in light of modern cosmology, since in the very earliest stages of the universe individual things did not exist within it.

Group II objections seem to focus on the claim that the temporal regress of events must be finite and terminate in an uncaused first cause: (i) Causality is logically compatible with physical causal chains which extend infinitely into the past. (ii) If everything has a cause of its existence, then we must ask for the cause of God’s existence.

Again, the natural theologian will reply: (i) It is not the concept of causality as such which is incompatible with infinite temporal regression. Rather the incompatibility is between the concept of actual infinity and a temporal

¹ The deeper issue here, not discussed by Grünbaum, is whether all efficient causes must be merely transformative. In his earlier piece, he asserted that in daily life and science things are always made from previously existing materials rather than nothing (Grünbaum [1954], p. 15). This may be so (depending on how we regard mental entities and miracle claims); but even if that is the case, we are not thereby forced to posit a material cause for the universe, if, on the basis of philosophical argument and scientific cosmology, we come to conclude that it began to exist. But what is necessary, on the pain of absurdity, is that it shall have had at least an efficient cause. That conclusion is not based merely upon the experiences of daily life and science. While we may come to believe that whatever begins to exist has an efficient cause because of our experience with transformative causes, not only is that no proof that all efficient causes are or must be transformative, but deeper reflection also reveals that the first premiss of the *kalām* cosmological argument, while confirmed by inductive experience, is based primarily in the metaphysical insight that something cannot arise spontaneously from nothing, so that a beginning-to-be *ex nihilo* would have to have a creative cause. The issue, then, is whether the universe had an absolute beginning.

regress of events. Grünbaum's attempts to write off the belief in the impossibility of an infinite past as due to 'thought fatigue' or a quantifier shift ('Every thing does not exist at some time; therefore, there is a single time at which everything does not exist') merely exposes his unfamiliarity with the arguments involved.² (ii) No version of the cosmological argument has ever contended that everything has a cause. According to the *kalām* version everything that begins to exist has a cause. Since God is eternal, He requires no cause, whereas the universe, which began to exist, does.

The objections of Group III are directed at assertions that divine *creatio ex nihilo* surpasses all understanding: (i) If *creatio ex nihilo* is incomprehensible, then belief in such a doctrine is irrational. (ii) An incomprehensible doctrine cannot serve as an explanation for anything.

But the natural theologian has a ready response: (i) *Creatio ex nihilo* is not incomprehensible in Grünbaum's sense. The doctrine may be mysterious in that we do not know *how* God brought the universe into being, but the doctrine that He did so makes a clear and well-understood assertion, as is evident from the fact that we are debating it. Whether one accepts the doctrine on the basis of philosophical argument, scientific evidence, or revelation, the statement that a finite time ago God brought the universe into being out of nothing is not meaningless jibberish, but expresses a proposition with intelligible content. (ii) Therefore, the doctrine most certainly does constitute a purported explanation of the origin of the world. The natural theologian could quite cheerfully concede that it is not a *scientific* explanation; but it is an explanation nonetheless, a philosophical or metaphysical explanation.

These objections are so flimsy that one cannot help but wonder who it is that they are meant to refute. Who are these unnamed theists whose contentions Grünbaum attacks? What philosopher of religion or natural theologian in the history of thought is supposed to be susceptible to these objections? One suspects that Grünbaum is really attacking popular misconceptions of the cosmological argument; but then what justification is there for attacking such straw men in a scholarly publication?

² In his earlier article, we find an additional objection: if it said that an infinite past time could not have elapsed and therefore the universe could not have existed forever, then one may retort that the Deity must also have been created at some time, since it, too, could not have existed forever (Grünbaum [1954], p. 15). But the proponents of the *kalām* argument maintained that God is timeless *sans* the world, so that the objection finds no foothold (Craig [1980]). In the same place Grünbaum also argues that there is no more difficulty in an infinite past than in an infinite future. But that is the case only if one adopts his B-theoretic view of time; on an A-theory no future exists.

In this earlier piece (which is, incidentally, a much more careful critique than the recent re-write), Grünbaum also asserts that modern mathematics gives infinity a positive mathematical and physical meaning. But what he does not demonstrate is that the logical consistency of Cantorian infinite set theory and transfinite arithmetic (given their axioms and conventions) implies that an actual infinite is ontologically possible.

3 THE SCIENTIFIC COSMOLOGICAL ARGUMENT

The natural theologian's disappointment and surprise with regard to Grünbaum's critique will not be allayed by his discussion of the 'New Creation Argument', for little advance is made over Grünbaum's 1952 and 1954 discussions of the then viable steady state model and the Big Bang model. The only new wrinkle, quantum cosmology, Grünbaum seems to know only from a secondary source (Weisskopf [1989]).

I shall ignore his remarks on matter 'creation' in the steady state theory (though this should not be construed as tacit agreement with his assertions) and turn instead directly to his *Auseinandersetzung* with Big Bang models of 'creation'. Grünbaum first considers classical Big Bang models of two sorts: case (i) features a time interval which is closed at the Big Bang instant $t = 0$ such that $t = 0$ was a singular, temporally first event of physical space-time, whereas case (ii) features a time interval which is finite but open in the past and excludes the mathematical singularity at $t = 0$ from being a point of space-time.

Let us consider case (i) first. According to this model, instants of time simply do not exist prior to $t = 0$. Thus, it is potentially misleading, opines Grünbaum, to say that 'time began' at $t = 0$:

This description makes it sound as if time began in the same sense in which, say, a musical concert began. And that is misleading, precisely because the concert was actually preceded by actual instants of time, when it had *not yet* begun. But, in the Big Bang model under consideration, there were no such earlier instants before $t = 0$ and hence no instants when the Big Bang had not yet occurred (Grünbaum [1989], p. 389).

This is a curious argument, in which Grünbaum appears to assert that it belongs analytically to the concept of some entity x 's beginning to exist that there were instants of time prior to x 's beginning at which x did not exist. Perhaps we can express this by stating

'x begins to exist' =_{def} 'x exists at time t and there are times immediately prior to t at which x does not exist.'

But it seems very strange that x 's beginning to exist at t entails the existence of temporal instants prior to t . Imagine that the temporal instants prior to a performance of Beethoven's Fifth Symphony were non-existent. Should we say that the symphony concert then fails to have a beginning, even though it is precisely the same concert as that which is contingently preceded by temporal moments? Grünbaum gives no argument for this claim. The fact that x begins to exist ought to leave the question of existents prior to x

altogether open; that is,

‘*x* begins to exist’ =_{def} ‘*x* exists at *t* and there is
no time immediately prior to *t* at
which *x* exists.’

So understood, any thing existing at the first moment of time begins to exist as surely as a temporally embedded concert begins to exist.³ The ineptness of Grünbaum’s definition is evident in that it entails that a beginning of time itself is analytically impossible, which is surely wrong. To say that time began to exist is not to assert the self-contradiction that prior to $t = 0$ there were times at which time did not exist, but to claim, as Quentin Smith points out, that (i) there is a finite interval of time such that every other interval of the same length is later than that interval and (ii) prior to any interval of a given finite length there is at most a finite number of intervals of the same length (Smith [1985], p. 579).

Grünbaum trades on certain infelicities of expression, for example, the question as to what happened *before* the Big Bang, in order to object to seeking a cause of that event. But such expressions may be regarded as a *façon de parler*; it is philosophically unobjectionable to conceive of God as causally, if not temporally, prior to the Big Bang. God’s act of creation may be regarded as simultaneous with the origin of the universe. Nor do I see any reason for Grünbaum’s objection to our saying that the universe came *into* being or that its origin was ‘sudden’. A physical thing comes into being if it exists at *t* and there are no moments immediately prior to *t* at which it exists; an event is sudden if it happens without antecedent warning. Both these expressions seem entirely appropriate with regard to the universe’s origin.

Oddly enough, Grünbaum concedes that the question, ‘What caused the Big Bang?’ may well be appropriate if there were instants of time prior to $t = 0$. Very well; suppose 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

³ In order to accommodate within a theistic context the possibility of an eternal God’s entering time at the moment of creation, we should refine the definition such that

‘*x* begins to exist’ =_{def} ‘*x* exists at *t*; there is no
time immediately prior to *t* at
which *x* exists; and the actual
world contains no state of
affairs involving *x*’s timeless
existence.’

I am indebted to Stephen Talmadge for earlier discussions of this issue.

time. Thus, it is meaningful to speak both of the cause of the Big Bang and of the beginning of the universe. But are we to think that these notions become meaningless due simply to the contingent fact that God may not have been thinking discursively in the state of affairs in which He exists alone without the universe?

In short, I see no reason why in case (i) we may not speak intelligibly of a beginning of the universe at $t = 0$ and inquire concerning the cause of this event.

What about case (ii), according to which the singularity exists on the boundary of space-time, rather than as an event in space-time? According to this model, there is no first instant of time even though one may designate a first interval of time of arbitrary finite duration, just as there is no smallest fraction in the finite interval between 0 and 1. Grünbaum's salient point here is that once again there are no temporal instants prior to the singularity, so that questions concerning the beginning and creation of the universe are illegitimate. Obviously, however, Grünbaum's argument concerning case (ii) makes no advance over his unsound objections to case (i). His conclusion that matter has *always* existed, though the age of the universe is finite, is mere word play—the key concept here is *permanence*, and that is a much more subtle issue than Grünbaum allows (see Smith [1989]). The universe has 'always' existed in the sense that there is no past moment of physical time at which it did not exist; but it has not 'always' existed in the strong sense of being permanent, since it had a beginning of its existence, and therefore it is sensible to ask for its cause.

Turning then from classical to quantum cosmology, Grünbaum maintains that such models provide no warrant for invoking an external cause for the quantum mechanical vacuum from which the observable universe is supposed to have emerged. Grünbaum's handling of these models is, as I said, based upon a single secondary source, and he conflates two distinct types of quantum cosmological models, namely, vacuum fluctuation models associated with Tryon, Brout, Englert *et al.*, and the wave functional model of the universe espoused by Hartle and Hawking. I have elsewhere argued that neither of these approaches provides an empirically plausible alternative to the hypothesis of creation and that they are no less metaphysical than theism (Craig [1990]; *idem* [forthcoming]). Rather than repeat those arguments here, let me say only that vacuum fluctuation models face, among other difficulties, the severe problem of explaining the existence of our relatively young cosmos if the quantum mechanical background space is supposed to have existed from eternity (Barrow and Tipler [1986], pp. 605–6), and the Hartle–Hawking model is predicated upon a physically unintelligible and metaphysically misguided substitution of imaginary time for ontological time. It seems to me, therefore, that Grünbaum has not succeeded in showing that it is misleading or inappropriate to talk about the beginning of the universe

in the context of current scientific cosmology nor that it is philosophically unintelligible to ask for a cause of that beginning.

4 CONCLUSION

In summary, while a distinction between the origin and creation of the universe can (and should) be made, Grünbaum's refusal to regard the latter as anything more than a pseudo-problem is very poorly founded. His objections to the traditional *kalām* cosmological argument were largely aimed at straw men or else misconceived, while his reservations about the beginning of the universe in current cosmology were based on idiosyncratic definitions. The question of the creation of the universe is a genuine philosophical problem that deserves discussion.

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REFERENCES

- BARROW, J. and TIPLER, F. [1986]: *The Anthropic Cosmological Principle*. Oxford: Clarendon Press.
- CRAIG, WM. L. [1979]: *The Kalām Cosmological Argument*. Library of Philosophy and Religion. London: Macmillan.
- CRAIG, WM. L. [1980]: 'Julian Wolfe and Infinite Time', *International Journal for Philosophy of Religion*, 11, pp. 133–5.
- CRAIG, WM. L. [1990]: 'What Place, then, for a Creator?': Hawking on God and Creation', *British Journal for the Philosophy of Science*, 41, pp. 471–91.
- CRAIG, WM. L. [1991]: 'The *Kalām* Cosmological Argument and the Hypothesis of an Eternal, Quiescent Universe', *Faith and Philosophy*, 8, pp. 104–08.
- CRAIG, WM. L. [forthcoming]: 'The Caused Beginning of the Universe: A Reply to Quentin Smith', *British Journal for the Philosophy of Science*.
- GOETZ, STEWART C. [1989]: 'Craig's *Kalām* Cosmological Argument', *Faith and Philosophy*, 6, 99–102.
- GRÜNBAUM, ADOLF [1952]: 'Some Highlights of Modern Cosmology and Cosmogony', *Review of Metaphysics*, 5, pp. 481–98.
- GRÜNBAUM, ADOLF [1954]: 'Science and Ideology', *Scientific Monthly*, 79 (July), pp. 13–19.
- GRÜNBAUM, ADOLF [1990]: 'The Pseudo-Problem of Creation in Physical Cosmology', in John Leslie (ed.) *Physical Cosmology and Philosophy*, pp. 92–112, *Philosophical Topics*. New York: Macmillan Co.
- SMITH, QUENTIN [1985]: 'On the beginning of Time', *Noûs*, 19, pp. 579–84.
- SMITH, QUENTIN [1989]: 'A New Typology of Temporal and Atemporal Permanence', *Noûs*, 23, pp. 307–30.
- WEISSKOPF, VICTOR [1989]: 'The Origin of the Universe' *New York Review of Books*, 36 (2), pp. 10–14.