In Defense of the Kalam Cosmological Argument

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SUMMARY

Graham Oppy's attempt to show that the critiques of the *kalam* cosmological argument offered by Grünbaum, Davies, and Hawking are successful is predicated upon a misunderstanding of the nature of defeaters in rational belief. Neither Grünbaum nor Oppy succeeds in showing an incoherence in the Christian doctrine of creation. Oppy's attempt to rehabilitate Davies's critique founders on spurious counter-examples and unsubstantiated claims. Oppy's defense of Hawking's critique fails to allay suspicions about the reality of imaginary time and finally results in the denial of tense and temporal becoming.

IN DEFENSE OF THE KALAM COSMOLOGICAL ARGUMENT

Introduction

Graham Oppy maintains that, despite my replies, the critiques of the *kalam* cosmological argument offered by A. Grünbaum, P. Davies, and S. Hawking succeed in showing that *kalam* arguments are not "rationally compelling pieces of natural theology." [1] The phrase is reminiscent of Alvin Plantinga's disclaimer about the ontological argument. [2] Indeed, like Plantinga, Oppy differentiates between an argument's being a successful piece of natural theology and an argument's being sound or being rationally held to be sound. In order for the above-named critics to succeed in showing that *kalam* arguments are not rationally compelling pieces of natural theology, all they must do is show "that there is no good, non-question-begging reason for them to be persuaded that the arguments . . . are sound." [3]

These introductory comments by Oppy suggest that the issue before us concerns the role of defeaters of *prima facie* warranted beliefs. [4] The *kalam* cosmological argument is an exercise in positive apologetics aimed at proving that God exists. It may be formulated as follows:

1. Whatever begins to exist has a cause.

2. The universe began to exist.

3. Therefore, the universe has a cause.

Conceptual analysis of what it is to be cause of the universe will recover several of the principal attributes of God, so that the cause takes on the character of a personal Creator of the universe.

In order to remove the warrant provided by the argument for its conclusion, the argument's detractor must either expose a fallacy in its logical inference form or defeat at least one of its premises. Refutatory defeaters brought against the premises may be either *rebutting* defeaters which aim to show that the relevant premiss is false or *undercutting* defeaters which aim to show that the relevant premiss has not been proved to be true. Oppy's contention seems to be that the critics of the *kalam* cosmological argument have at least succeeded in providing undercutting defeaters of its premises and that therefore the argument, even if sound, is not successful in proving God's existence

If this is in fact the issue, then the question will be the comparative warrant enjoyed by the premises and their respective defeaters. If the premiss is more strongly warranted than its ostensible defeater, then any informed and rational person will, *ceteris paribus,* accept the soundness of the argument. The argument's defender will typically seek to decrease the defeater's warrant by defeating it, either rebutting or undercutting it, thereby increasing the relative warrant of the premiss under attack. The question at hand, then, will be whether the defeater-defeaters I offered in answer to the above-named critics succeed in refuting their proffered defeaters

This seems, as I say, to be the issue; but upon arriving at a postscript appended to Oppy's article, the reader discovers that for Oppy this is not at all the issue. Just as George Mavrodes criticized Plantinga for being overly stringent about what passes as a successful piece of natural theology, [5] so an anonymous referee complained that Oppy is demanding too much of the *kalam* argument if it must be such that no informed person who understands its premises and sees its logical validity will reject its conclusion. [6] In the face of this criticism, Oppy revises his claim: he now charges that the *kalam* argument is not "provisionally rationally compelling for its intended audience." [7] Oppy explains this notion as follows:

A. If an argument is logically compelling and proceeds from premises to which the intended audience is committed, it is provisionally rationally compelling for its intended audience.

An argument which meets this condition is deemed "a success," for it "forces one's opponent either to accept one's conclusion . . . or to revise other beliefs." [8] Oppy charges that the *kalam* argument is not even provisionally rationally compelling for its intended audience (namely, presumptively reasonable agnostics and atheists) because it relies on "physical and metaphysical theses which members of the target audience reject." [9]

Now at face value, Oppy's argument is invalid because (A) states only a sufficient, not a necessary, condition of an argument's being provisionally rationally compelling for its intended audience. A defender of the *kalam* argument might well maintain that his argument has this

character because it is logically compelling and proceeds from premises which its intended audience *ought* to accept (even if they do not) or from premises which are warranted for its intended audience (that is, are such that the audience will accept them if their cognitive faculties are functioning properly). Oppy probably intended (A) to be stated in terms of necessary and sufficient conditions:

A*. An argument is provisionally rationally compelling for its intended audience if and only if it is logically compelling and proceeds from premises to which the intended audience is committed.

But the *kalam* proponent might well reject (A*), as I have suggested. Perhaps a member of the audience, like some Soviet philosophers I heard at the World Congress on Philosophy in 1978, stubbornly rejects the premiss that *the universe began to exist* in defiance of and without any counter-explanation of the evidence simply out of a faith commitment to dialectical materialism. He has no adequately warranted defeater of the *kalam* proponent's evidence for the truth of that premiss; is the kalam argument not therefore rationally compelling with respect to him? Oppy thinks not; he says, "Once the conditions for debate--including the possession of respect for one's opponents--break down, questions about dialectical success or failure become nugatory." [10] Perhaps Oppy's point is that one's intended audience must be "presumptively reasonable," so that once that presumption fails, an argument cannot be provisionally rationally compelling for them. But clearly one may regard one's audience as generally reasonable, even if in the case of premises implying theism they believe irrationally. If they are generally reasonable people, but refuse to believe some of one's premises despite their want of a suitable defeater, then it seems to me that one can legitimately claim "dialectical success." Dialectical success cannot be equated with convincing one's opponent (or even forcing him to revise his beliefs); after all, many will simply refuse to be convinced. All sorts of psychological and spiritual factors come into play here for which a philosopher cannot be held responsible. Dialectical success in natural theology cannot, then, be measured merely in terms of success in convincing unbelievers. Christian apologist E. J. Carnell pointed out that one of the purposes of apologetics is to remove from the unbeliever any just excuse for his not repenting before God. [11] That objective is achieved so long as the unbeliever is presented sound theistic arguments with substantiated premises for which he has no adequately warranted defeater, even if he refuses to believe those premises

But suppose we accept (A*). Does the *kalam* argument fail to meet its conditions? This is far from obvious. Atheism does not imply the contradictory of either of the argument's premises taken separately. The unbeliever may simply have never realized the implication of the conjunction of these premises. Presented with the argument, he may be persuaded to become a theist. Or again, he may not accept one of the premises, but if the theist can furnish him an argument for that premiss based on propositions he accepts or if the theist can furnish a defeater for the defeater

which the unbeliever has brought against the premiss, then the non-theist may change his mind and come to accept the premiss. Is this mere speculation on my part? Not at all; I (and others) have seen atheists and agnostics change their minds when presented with the *kalam* cosmological argument and become theists. [12] Thus, hard empirical evidence refutes Oppy's claim that the *kalam* cosmological argument is a dialectical failure

But suppose Oppy were correct. Of what philosophical significance is his conclusion that the *kalam* argument is not provisionally rationally compelling for its intended audience? None at all, so far as I can see. The argument may still be sound and provide warrant for theistic belief. It would just not be very useful in evangelism. Perhaps Oppy's conclusion has the practical implication that the Church should not waste her time and resources holding training sessions on how to use the *kalam* cosmological argument to win souls. That would be an important lesson in stewardship and missions for which we might thank Oppy; but it is not a conclusion of interest to philosophers

What all this suggests is that the real issue raised by our trio of critics is the question as I originally framed it: whether their defeaters are successful against the *kalam* argument or whether these defeaters are not themselves refuted at a higher level by the defeater-defeaters I offered. In answering this question, we should do well to keep in mind the difference between undercutting defeaters and rebutting defeaters. Part of my complaint against these critics is that their proffered defeaters frequently do not so much as even take into account, much less refute, alternative positions compatible with theism, so that the theist can easily undercut these defeaters by merely mentioning such alternatives. Thus, Oppy errs when he advises, "one has two options: one can give up on the argument; or one can seek to construct arguments for the contentious premises." [13] The defender of the *kalam* argument need not come up with new arguments for a disputed premiss if he can simply undercut the defeater offered by the critic. In that case, it is now up to the critic to provide at a higher level a defeater of the defeater-defeater

A. Grünbaum's Critique

The above strategy will become clearer as we look at specific examples. Consider first Grünbaum's familiar argument that the universe cannot have a cause because a cause must precede its effect temporally, which is impossible if space-time began to exist. This defeater attempts to show that the conclusion of the *kalam* argument that *the universe has a cause* is incoherent; it is thus, *pace* Oppy, an attack on the soundness of the argument and, indeed, of Christian theism itself. Now in response to this defeater, I offered three different accounts of how

God could be causally related to the universe's origin, [14] including the hypothesis that cause and effect are in this case simultaneous. I observed that simultaneous causation is routinely discussed in analyses of causation and that it is intuitively applicable to the case of creation. All Grünbaum says about this alternative is the *single sentence:*: "I consider the notion of simultaneous causation, as applied to the purported *creation of time,* either unintelligible or, at best, incoherent." [15] But he gives no reason at all for this opinion, and, as I commented, until he does so, his remark is purely autobiographical and fails to refute my undercutting defeater. [16] It is not up to the theist to prove that simultaneous causation is intelligible and coherent; it is up to the critic to show that it is not. When the critic does come up with some reason, then the theist must undercut or rebut it, if he wants to retain rationally the proposed alternative. (In fact, I anticipated a possible objection to simultaneous causation which Grünbaum might raise and pre-emptively undercut it. [17]) But until the critic shows some incoherence in the proposed alternative, the Christian theist's claim that God caused the origin of the universe has not been shown to be incoherent and so remains undefeated, even if the critic does not accept the theist's proposed alternative. Thus, Oppy is wrong when he asserts that the *kalam* theorist needs to show to non-theists that "it is metaphysically possible that the universe was instantaneously created by a supernatural agent." [18] *Au contraire,* all the theist need do to defeat the proffered defeater is prove that this notion has not been proven to be impossible

Does Oppy, then, advance the debate by showing some incoherence in simultaneous creation? Not significantly; he just asserts that "it seems plausible to think that the creative actions of rational agents require lapses of time between the formation of appropriate intentions and the carrying out of those intentions." [19] Again, this single sentence does not constitute much of an argument. But to consider it at face value: notice that the objection says nothing against the notion of simultaneous causation, which posits no lapse between an exercise of causal power and the production of the effect. Oppy speaks rather of a lapse between the formation of an intention to cause and the exercise of causal power. The objection is that temporally prior to God's (simultaneously) causing the Big Bang, He would have to form an intention to do so, which is impossible. But Oppy's operative principle is doubly inapplicable to God. For an omniscient being like God, there can be no such lapse, since God does not need to make up His mind about what He is going to do. [20] And if God is timeless *sans* creation, then He has a timeless intention to create a temporal world, in which case there can be no lapse. [21] To carry his defeater, Oppy needs to show that the doctrines of divine omniscience and timelessness are incoherent. Until he provides such arguments, his defeater remains undercut

In sum, neither Grünbaum nor Oppy succeed in showing that the conclusion of the *kalam* cosmological argument is incoherent. I do not pretend that the doctrine of creation does not involve

many subtle and difficult questions; but precisely for that reason it cannot be defeated by easy one-liners such as Grünbaum and Oppy offer. [22]

P. Davies's Critique

Turn, then, to Oppy's defense of Davies's critique of the *kalam* cosmological argument. Taking his cue from Davies, Oppy attempts to refute the causal premiss that *whatever begins to exist has a cause* by appeal to the production of virtual particles in the quantum mechanical vacuum. [23] Wholly apart from the disputed question of whether virtual particles really exist at all, [24] the central point to be made here is that the quantum mechanical vacuum on which they depend for their existence is emphatically not nothing. The dynamical properties of vacuous space arise out of its interaction with matter and radiation fields, in the absence of which "this dynamism of empty space is but a formal abstraction lacking physical reality." [25] The quantum vacuum is a sea of fluctuating energy which gives rise to virtual particles. Thus, virtual particles can hardly be said to arise without a cause

Oppy apparently thinks that cosmological models in which the universe originates via a spontaneous fluctuation from the primordial vacuum are distinct from models in which the universe does not violate the mass-energy conservation law because the sum total of its positive and negative energy is zero. But this is just confused: these are the same models, all presupposing the existence of the quantum mechanical vacuum which spawns the universe. [26] Thus, these models do not subvert the causal premiss. Moreover, while these models merited scientific discussion when Davies wrote *God and the New Physics* back in the early 1980's, they are today widely rejected and no longer at the center of interest. [27]

Oppy is willing to engage in metaphysical speculations in order to defeat the *kalam* argument's second premiss that *the universe began to exist.* He suggests,

one might take the universe to be a distribution of properties across an at-least-four-dimensional manifold, and also hold that time is merely a local phenomenon--i.e. that none of the dimensions of the manifold is essentially temporal. Those parts of the manifold which are non-temporal might be able to provide an explanation of the origins of the temporal parts. [28]

It is difficult to know what to make of this extremely obscure suggestion; but the best sense I can make of it would be to take it as a description of the Hartle-Hawking model in which time is

imaginary prior to the Planck time and so indistinguishable from space. Since this model is more properly the province of our next critic rather than of Davies, I shall reserve comment until we consider Oppy's defense of Hawking's critique.

Finally, Oppy charges that my defeater-defeaters in defense of the second premiss often involve objection to critics' gratuitous reification or hypostatization of theoretical constructs but that it is not clear that one can get a suitably grounded commitment to the reality of the initial space-time singularity unless one also takes on the same ontological commitments. But since Oppy gives no examples or explanation of how this is the case, I must confess that I find the charge quite puzzling. The standard Friedman cosmology does not commit one to space-time substantivalism, four (or more) dimensionalism, the Many Worlds Interpretation of quantum physics, superspace, realism about sum-over-histories interpretation of quantum theory, and so on. The fact of the initial cosmological singularity is guaranteed by the General Theory of Relativity coupled with the Hawking-Penrose singularity theorems. No ontological commitments are required beyond the very general conditions laid down by that theory and those theorems. [29] So Oppy has to do much more than he has in order to carry his defeater that the standard Big Bang model makes the same ontological commitments as its exotic competitors.

Once again, then, we find that Oppy has failed to refute my defeaters of Davies's critique. He attempts to offer rebutting defeaters of the first premiss by supplying counter-examples, but these alleged counter-examples turn out upon examination to be spurious. With respect to the second premiss, he tries a *tu quoque* argument to undercut my charge of gratuitous hypostatization on the part of the argument's critics, but fails to substantiate his charge with specifics. Thus, my defeater-defeaters remain intact

S. Hawking's Critique

Finally, we come to Hawking's attempt to defeat the premiss that *the universe began to exist* by his quantum gravity cosmological model. Oppy has far too generous an assessment of the Hartle-Hawking model. [30] Far from being physically plausible, it does not seem to be even physically intelligible, relying as it does on imaginary time. And far from being consistent with the evidence, the model may not even be mathematically consistent and in fact fails in its attempt to predict a unique wave function of the universe. [31] For this reason the model has generated virtually no following among cosmologists despite its being trumpeted in the popular media

My principal complaint against Hawking's model was that it cannot be construed as a realistic description of the origin of the universe because of its dubious metaphysical presuppositions. I have no objection to treating Hawking's model instrumentally as a description of a universe with a beginning using the formalism of quantum mechanics, in which the beginning is suppressed. One might consider profitably the analogy of the use of imaginary numbers for the time coordinate in the metric of Minkowski space-time, a mathematical trick which suppresses the curvature in space-time and so allows one to treat a pseudo-Euclidean four-space as a Euclidean four-space. Space-time itself, as an (*ex hypothesi*) objectively existing reality, is not changed by this re-description. It is still a pseudo-Euclidean four-space, but we can treat it as if it were Euclidean by using imaginary numbers for the time coordinate. The only change that occurs is on paper. In a similar way, Hawking's use of imaginary numbers for the time variable allows one to redescribe a universe with an initial cosmological singularity in such a way that that point appears as a non-singular point on a curved hyper-surface. Such a re-description suppresses and literally spatializes time as well, which makes evident the purely instrumental character of the model. Such a model could be of great utility to science, but it would not, as Hawking boldly asserts, eliminate the need for a Creator

Oppy does not seek so much to defend a realist construal of Hawking's model as to claim that the model does not involve such realist commitments. Whether Hawking's claim to eliminate the need for a Creator implies a commitment to realism concerning superspace and sum-over-histories is, I think, a moot point; [32] but the realistic construal of imaginary time is essential to Hawking's claim. For it is this feature of the model that eliminates the initial singularity by spatializing time, so that space-time as we know it originates in a timelessly existing four-space. It is because time is imaginary that the points along that dimension prior to the Planck time are not related by the *earlier/later than* relations, so that the point which marks the beginning of the universe in real time is not prior to other points in imaginary time. Absent this feature of the model, the point which is the "South Pole" of the four-dimensional hemisphere prior to the Planck time would be the beginning of the universe, which Hawking wants to avoid. Thus, contrary to Oppy, the whole dispute hangs on a realistic interpretation of the geometry of space-time according to which time is an imaginary quantity prior to the Planck time

Oppy finds as absurd as I do Hawking's suggestion that real time is illusory and imaginary time is ontologically real; but he proposes to re-formulate Hawking's position to make it more palatable. Oppy advises,

What he ought to say is that what we call 'real time' is not a physically fundamental property of the universe; i.e. from the standpoint of basic physical description, what we call 'real time' has the same status as 'potable water' or 'visible light.' Of course, contra Hawking this is not to impugn the reality of real time--and [*sic*] nor is it to impugn the reality of the singularities in real time--though it

will, I think, require the insistence that real time is merely a local feature of the universe. Since, on this view, the singularities in real time are properly contained in the real universe, one can be a realist about them without giving up the idea that the universe has no boundaries. [33]

I take it that the scenario described here is the same as that adumbrated in the quotation in the previous section on Davies's critique. Unfortunately, what Oppy says here is most obscure. Hawking would agree with the first clause in the above quotation. Oppy's gloss on this seems to be that having assignable values restricted to the set of the real numbers is a contingent property of measurements of time or (from the earlier quotation) of that dimension which is time. Where he differs from Hawking is that he does not go so far as to deny that real numbers are associated with the correct measures of some intervals of time. But this show of reserve does nothing to meet the objections I lodged against imaginary time, namely, its physical unintelligibility and its metaphysical incoherence. These difficulties are so severe that my atheist collaborator Quentin Smith felt compelled to interpret Hawking's imaginary regime instrumentally and to maintain that classical space-time popped into being out of nothing at the Planck time! [34]

Oppy's claim that his interpretation does not impugn the reality of the singularities in real time is baffling, since imaginary time is invoked precisely to eliminate the cosmological singularities. If one is a realist about the singularities, then, *pace* Oppy, they do constitute boundaries to the universe--this is the case even for singularities formed in black holes during the real time regime. Oppy later interprets his envisioned scenario as "embedding the space which contains the singularity in a more extensive, appropriately contoured, manifold." [35] Since singularities are singular points in space-time, not space, what Oppy seems to envision is that our four-dimensional space-time is embedded in a sort of hyper-space-time. This metaphysical speculation is not analogous to physical theories which suggest that our space-time may involve additional (compacted) dimensions. Oppy's idea is that our space-time is four-dimensional, but that there exists a sort of hyper-time and hyper-space in which our space-time exists. How this idea connects with time's being only contingently real is unclear. My best guess is that Oppy conceives hyper-space-time to involve imaginary time, and our space-time with its real time and real singularities is embedded in it as in a static space. It is evident that this scenario bears no resemblance to Hawking's model universe. It is also evident that it does nothing to answer my objections to imaginary time, but only pushes the problem back a notch. Finally, the hypothesis succumbs to the same objection which I lodged against Brian Leftow's theory of the existence of temporal entities in eternity (which remarkably parallels Oppy's hypothesis as I have interpreted it), namely, it is impossible to preserve the reality of tense and temporal becoming once time is embedded in a timeless hyper-dimension. [36] I am far more confident of the reality of tense and temporal becoming than I am of the existence of Oppy's hyper-space-time. In fact, here again we see the incredible lengths to

which non-theists will go in order to avoid the existence of a Creator. Apart from an aversion to theism, there is absolutely no reason to adopt a hypothesis so speculative, so obscure, and so sterile as Oppy's

Concluding Remarks

Oppy's central failure in his critique of the *kalam* cosmological argument is his misunderstanding of the defeater-structure of rationality. He does not sufficiently appreciate that one may undercut purported defeaters by showing that the defeaters lack appropriate warrant. The ball is then in the critic's court; he is called upon to supply the warrant for his defeater. Oppy shirks this task, being content with the mere assertion that non-theists do not accept the theist's defeater-defeaters. Specifically, Grünbaum, Davies, and Hawking all make serious allegations against the premises and conclusion of the *kalam* cosmological argument without adequately supporting their defeaters in light of my defeater-defeaters, and Oppy fails to redress the situation. The *kalam* argument thus emerges from the fray unscathed

Footnotes

[1]

Graham Oppy, "Professor William Craig's Criticisms of Critiques of *Kalam* Cosmological Arguments by Paul Davies, Stephen Hawking, and Adolf Grünbaum," *Faith and Philosophy* 12 (1995): 237.

[2]

"It must be conceded," wrote Plantinga, that the ontological argument "is not a successful piece of natural theology" (Alvin Plantinga, *The Nature of Necessity*, Clarendon Library of Logic and Philosophy Oxford: Clarendon Press, 1974, p. 219). Interestingly, he contrasts the ontological argument with the cosmological argument with respect to the perspicacity of their key respective premises.

[3]

Oppy, "Craig's Criticisms," p. 237.

[4]

On the role of defeaters in the rationality of theistic beliefs, see Alvin Plantinga, “Reason and Belief in God,” in *Faith and Rationality*, ed. A. Plantinga and N. Wolterstorff (Notre Dame, Ind.: University of Notre dame Press, 1983), pp. 82-86; idem, “The Foundations of Theism: a Reply,” *Faith and Philosophy* 3 (1986): 306-312; idem, *Warrant: the Current Debate* (New York: Oxford University Press, 1993), pp. 217-219; idem, *Warrant and Proper Function* (New York: Oxford University Press, 1993), pp. 40-42.

[5]

George I. Mavrodes, “Jerusalem and Athens Revisited,” in *Faith and Rationality*, pp. 205-206. The passage from Plantinga cited by Mavrodes is inadvertently omitted from Plantinga’s essay in *Faith and Rationality*, but fortunately it appears almost verbatim in Alvin Plantinga, “Self-Profile,” in *Alvin Plantinga*, ed. James E. Tomberlin and Peter Van Inwagen, Profiles 5 (Dordrecht, Holland: D. Reidel, 1985), p. 71.

[6]

Oppy, “Craig’s Criticisms,” p. 245.

[7]

Ibid.

[8]

Ibid., p. 246.

[9]

Ibid.

[10]

Ibid.

[11]

Edward John Carnell, *An Introduction to Christian Apologetics,* 4th ed. (Grand Rapids: Wm. B. Eerdmans, 1948), p. 8.

[12]

For one such anecdote, see my *Reasonable Faith* (Wheaton, Ill.: Crossway Books, 1994), pp. 122-123.

[13]

Oppy, “Craig’s Criticisms,” p. 246.

[14]

W. L. Craig, “Prof. Grünbaum on Creation,” *Erkenntnis* 40 (1994): 327-331.

[15]

Grünbaum, “Creation as a Pseudo-Explanation in Current Physical Cosmology,” *Erkenntnis* 35 (1991): 244.

[16]

To his credit, Grünbaum elsewhere does respond properly to my defeater-defeater by trying to prove the incoherence of simultaneous causation in Adolf Grünbaum, “Some Comments on William Craig’s ‘Creation and Big Bang Cosmology’,” *Philosophia naturalis* 31 (1994): 231-235; but his arguments are unsuccessful, as I argue in “A Response to Grünbaum on Creation and Big Bang Cosmology,” *Philosophia naturalis* 31 (1994): 236-241.

[17]

Craig, “Prof. Grünbaum on Creation,” p. 338, n. 4.

[18]

Oppy, “Craig’s Criticisms,” p. 239.

[19]

Ibid., p. 239. Oppy also argues that there is no reason to think that genuinely simultaneous causation occurs. This is because causation is mediated by finite velocity signals. Two things may be said. First, simultaneity need not concern only instants, but non-degenerate intervals as well. For a cause and effect occurring during the same interval, it will be possible to divide the interval potentially *ad infinitum* and to find at every sub-interval intermediate causes and effects which are simultaneous at their respective levels. This process could even be held to terminate in an instant at which an impinging photon, say, actually is absorbed by a particle. Second, in EPR situations,

depending on one's definition of causality, there does occur instantaneous causation, for the measurement of a single photon brings about the collapse of the wave-function to a determinate value in the correlated photon (See the excellent discussion in Tim Maudlin, *Quantum Non-Locality and Relativity*, Aristotelian Society Series 13 Oxford: Blackwell, 1994, chap. 5.) That Oppy is prepared to embrace the fantastic and untenable hypothesis of backward causation to explain the violation of the Bell inequalities (see Maudlin, *Quantum Non-Locality*, pp. 197-201 for discussion) shows how desperate is his opposition to theism, for to reject simultaneous causation (in order to avoid theism) but to accept backward causation (in order to deny simultaneous causation) is to strain out the proverbial gnat and swallow a camel.

[20]

For discussion, see my chapter on divine deliberation in William Lane Craig, *Divine Foreknowledge and Human Freedom*, Studies in Intellectual History 19 (Leiden, The Netherlands: E. J. Brill, 1991), pp. 222-225.

[21]

For brief discussion and literature see William Lane Craig, *The Kalam Cosmological Argument*, Library of Philosophy and Religion (London: Macmillan, 1979), pp. 150-152.

[22]

Oppy also tries to redefend Grünbaum's assertion that the universe has *always* existed because the universe fails to meet the conditions I laid down for "*x* begins to exist," *viz*., *x* exists at *t* and there is no time immediately prior to *t* at which *x* exists. Oppy's claim fails for two reasons: (i) he gratuitously assumes that *t* refers only to instants, whereas it can refer to non-degenerate, temporal intervals, in which case the universe meets the conditions, and (ii) failure to begin to exist does not entail always existing in the relevant sense of being permanent (on which see now also Brian Leftow, *Time and Eternity*, Cornell Studies in the Philosophy of Religion Ithaca, N.Y.: Cornell University Press, 1991, pp. 131-133).

[23]

Oppy, "Craig's Criticisms," p. 241.

[24]

See Robert Weingard, "Do Virtual Particles Exist?' in *Proceedings of the Philosophy of Science Association,* 2 vols., ed. Peter Asquith and Thomas Nichols (East Lansing, Mich.: Philosophy of

Science association 1982), I: 235-242.

[25]

Alexander W. Stern, “Space, Field, and Ether in Contemporary Physics,” *Science* 116 (1952): 493. Stern is even willing to speak of the quantum vacuum as a sort of ether.

[26]

See discussion in William Lane Craig and Quentin Smith, *Theism, Atheism, and Big Bang Cosmology* (Oxford: Clarendon Press, 1993), pp. 125-129, 148-157.

[27]

See William Lane Craig, “The Caused Beginning of the Universe: a Response to Quentin Smith,” *British Journal for the Philosophy of Science* 44 (1993): 632-633, 635.

[28]

Oppy, “Craig’s Criticisms,” p. 242.

[29]

See the nice account in Craig and Smith, *Theism, Atheism, and Big Bang Cosmology*, pp. 109-115, 136-140.

[30]

Oppy, “Craig’s Criticism,” p. 243.

[31]

See C. J. Isham, “Creation of the Universe as a Quantum Process,” in *Physics, Philosophy, and Theology: A Common Quest for Understanding*, ed. R. J. Russell, W. R. Stoeger, and G. V. Coyne (Vatican City State: Vatican Observatory, 1988), p. 402; idem, “Space, Time, and Quantum Cosmology,” lecture presented at the Science and Religion Forum conference “God, Time, and the New Physics,” April 4-6, 1990, p. 29.

[32]

I followed Wheeler’s account of superspace in my original critique, according to which it is the fundamental reality. Oppy similarly thinks that “a realistic interpretation of Hawking’s model

requires some kind of commitment to the reality of the space over which the histories are summed" (Oppy, "Craig's Criticisms, p. 243). But then all three-geometries do subsist in a timeless superspace, and so the sum-over-histories method is not merely instrumental. In any case, Hawking's commitment to the Many Worlds Interpretation, despite his disclaimers, must be realist, not instrumental, as Isham emphasizes (Isham, "Space, Time, and Quantum Cosmology," pp. 30-31).

[33]

Oppy, "Craig's Criticisms," p. 244.

[34]

Craig and Smith, *Theism, Atheism, and Big Bang Cosmology* p. 321. Under the force of the critique by Robert Deltete, "Emerging from Imaginary Time," (preprint), Smith has now abandoned this interpretation.

[35]

Oppy, "Craig's Criticisms," p. 244.

[36]

See William Lane Craig, "The Special Theory of Relativity and Theories of Divine Eternity," *Faith and Philosophy* 11 (1994): 27-30. Oppy's view is, in effect, also a reiteration of Wheeler's realism with respect to superspace.