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KALAM: A SWIFT ARGUMENT FROM ORIGINS TO FIRST CAUSE?

1. INTRODUCTION

William Lane Craig has given an extended defence of the following version of the Cosmological Argument for the existence of God:

> Since everything that begins to exist has a cause of its existence, and since the universe began to exist, we conclude, therefore, that the universe has a cause of its existence. We ought to ponder long and hard over this truly remarkable conclusion, for it means that transcending the entire universe there exists a cause which brought the universe into being ex nihilo … we may plausibly argue that the cause of the universe is a personal being.[1]

This 'Kalam' version of the Cosmological Argument may be laid out formally as follows:

(i) The universe began to exist.
(ii) Everything which begins to exist has a cause. (The Causal Principle.)
(iii) Therefore the universe had a cause.

The attractive swiftness of a three-line argument from origins to a first cause is undeniable. A second source of Kalam's attractiveness to those in pursuit of a natural theological proof of God's existence is that it appears to provide an answer to Hume's central objection to cosmological arguments, namely that the possibility that the first cause itself is physical cannot be ruled out.[2] Since, in this case, the cause in question is the cause which generates the entire physical universe, it would appear that it could not itself be physical, on pain of admitting the absurdity that something was caused by a part of itself.

The Kalam argument can only be refuted by denying a premise which seems to be well confirmed by the development of Big Bang Cosmology, namely that the universe came into being ex nihilo a finite time in the past, or by denying a principle which seems securely grounded by the successful practice of science, namely that every beginning is caused. It apparently offers, in a single syllogism, an argument which implies the existence of a

[1] W. Lane Craig, in Q. Smith and W. Lane Craig, *Theism, Atheism and Big Bang Cosmology* (Oxford: OUP, 1993), pp. 63–64. Earlier versions of Lane Craig's arguments may be found in Lane Craig, *The Kalam Cosmological Argument* (London: Macmillan, 1979).

[2] D. Hume (1990) *Dialogues on Natural Religion* (London: Penguin, 1990), p. 100.

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supernatural cause of the universe as a whole; a simple, swift and solid basis for a natural theology. The moral of this paper is that the attractions are, alas, illusory.

II. DID THE UNIVERSE BEGIN TO EXIST?

The beginning of the universe has traditionally been understood to be an absolute beginning ex nihilo, i.e. that, prior to the beginning of the universe, nothing physical existed.[3] How could we establish that there was an absolute beginning to our universe? Various arguments recently advanced suggest that this can be derived a priori.[4] These arguments aim to show that nothing is actually infinite; the only real infinities are potential, i.e. things which are capable of infinite growth or division. The set of past events, if infinite, would be an actual infinite, not merely a potential infinite (in the way that the future is). Since there cannot be an actual infinite, the universe must have had a beginning. This conclusion–which, if correct, would show that generations of cosmologists who thought that the question about origins was an empirical one were mistaken–is justified by arguments claiming to show that the proposition that something could be actually infinite implies a contradiction.

The paradoxes draw on the distinction between the potential and actual infinite. A set of things is potentially infinite if it can be extended without limit by addition or division. The set of tickings of an eternal clock which began ticking yesterday is, for example, potentially infinite. At any given time, the set is finite, but it can grow without limit over time. It was Cantor who introduced a second form of infinite: the actual infinite.[5] An actually infinite set is not simply one which is growing over time; it actually contains, at a given time, an infinite number of members. What this means can be understood as follows. Two sets have the same size if their members can be set in 1–1 correspondence. For example, if we can pair each member of a set of rocks with each member of a set of dogs, the set of rocks and dogs have the same number of members. Cantor's ingenious suggestion was that this correlation criterion for size could be extended to include sets such as the set of all natural numbers. This set contains an actually infinite number of numbers, and Cantor assigned the cardinal numbers alepho (ao) to represent this size of set.

[3] Kant defines a beginning as an existence preceded by a time in which the thing was not (Kant, *Critique of Pure Reason*, A427/B455). Such a definition implies that there was time prior to the universe's beginning. An alternative view (held by Augustine) is to see time beginning with the beginning of the universe.

[4] See arguments by Lane Craig, in Smith and Lane Craig, 1993. See also G. Whitrow 'On the impossibility of an Infinite Past', *British Journal for the Philosophy of Science* **29** (1978), pp. 39–4 and P. Huby, 'Kant or Cantor? That the Universe, if Real, Must be Finite in both Space and Time', *Philosophy* **46** (1971), pp. 121–132.

[5] See G. Cantor, *Contributions to the Founding of the Theory of Transfinite Numbers*. Translated by P. Jourdain (Chicago: Open Court, 1915).

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The theory of the actual infinite yields paradoxical results. We can, for example, pair off the set of even numbers with the set of natural numbers, thus:

1	2	3	4	5	6 …
|	|	|	|	|	|
2	4	6	8	10	12 …

It follows that there are as many natural numbers, as there as even numbers, i.e. a_0! For actually infinite sets, the part is equal to the whole.

Lane Craig considers that, applied to physical things, such paradoxes imply the impossibility that any set of physical things could be actually infinite. If an actual infinite could exist in reality, for example, we could have a library containing an actually infinite number of books. If indexed, every possible natural number would be written onto some book. If we now seek to add a new book to the library, we face a problem: there is no number with which to index it, for every possible number is written on some book. This, Lane Craig thinks, is absurd, since discrete things which exist in reality can always be numbered. This absurdity is considered to show that an actually infinite set of physical things cannot exist.[6]

A number of objections may be raised to this intriguing argument. We may ask at the outset whether Lane Craig has demonstrated that the paradox is an instance of a genuine contradiction. Lane Craig's problem is with finding numbers for new books in the library. But in the actually infinite library we can always find numbers for new books. For the series of natural numbers starting with 10,11,12 … is isomorphic to the series 1,2,3 … . By the correlation criterion for set size , they contain the same number of members. So any set of books numbered by the series 1,2,3 … can be renumbered 10,11,12 … , leaving numbers free for additions to the library.[7]

If we reject the actual infinite, what are we to make of mathematics? Paradoxes of the same form as the library paradox may be constructed for the series of natural numbers (as the above example illustrates). Now Cantor's set theory marked a great advance in mathematics, and it is far from clear that this branch of mathematics can survive without an actual infinite. Mathematicians have seen fit, for the most part, to accept that the infinite has some apparently bizarre features but to deny that this amounts to showing the inconsistency of transfinite mathematics.[8] It would seem that the same attitude is appropriate to consideration of physical actual infinites.

[6] Lane Craig, in Smith and Lane Craig, pp. 12–13.

[7] See Smith, *ibid.* p. 84, for this objection.

[8] The mathematician Hilbert proposed the 'finitist' programme of re-constructing mathematics without allowing that a_0 refers to anything in mathematical or physical reality. The difficulties which Gödel's work creates for the finitist programme are discussed by Adrian Moore. See A. Moore, *The Infinite* (London: Routledge, 1990), pp. 178–179.

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Lane Craig suggests that a notion of the actual infinite is admissible in mathematics, but not admissible when applied to sets of concrete entities such as books.[9] It is difficult to see that this distinction between mathematical and physical reality can bear the weight required of it. To admit that the concept has application in mathematics is to admit that there is no contradiction in the *concept* of a set of infinite size. Lane Craig's point is that, when we suppose that any set of concrete things falls under this concept, a contradiction is generated. But if there is no contradiction in the notion of a set of infinite size, why is it deemed problematic to suppose that there may be an occupied set of infinite size? It is unclear what distinguishes physical things from numbers, such that the paradoxes of the actual infinite are deemed evidence of absurdity in the former but not the latter case.

We may also question the strength of the analogy between a library and the set of events comprising the universe's history. Events are not like books, nor is the series of past events like a set of books in a library. In particular, whilst there is a clear sense in which the books in a library exist all at once, such that, if the library is of infinite size, the infinity in question must be the actual infinite, there would seem to be no clear sense in which the series of past events may be said to exist *all at once*. There is something bizarre about supposing that a past event has reality now; events are happenings, and to think that an event may still exist even while it is not happening is most odd.[10]

In a further attempt to demonstrate the incoherence of an infinite sequence of events, Lane Craig considers a variant on Russell's *Tristram Shandy Paradox*.[11] Tristram Shandy writes his autobiography, such that it takes a year to write about one day of his life. If the number of days in his life was actually infinite, then the time would arrive when all the days of his life had been written about, since an actually infinite lifetime contains as many days as it does years. But it is clearly impossible that, if he began today, Tristram Shandy would ever have written about every day of his life, since, as time does by, he would lapse further and further behind. Hence, an actually infinite future sequence is impossible.

As this stands, it tells us only that no series of events beginning *today* will ever be actually infinite; the future, if infinite, is potentially infinite. If the paradox is to tell us anything about the past, then it needs to be 'turned around'. Lane Craig attempts to turn the paradox around as follows. If Tristram Shandy had been writing throughout an infinite past, then there

[9] Lane Craig, in Smith and Lane Craig, p. 16.

[10] This is a point developed by Arthur Prior. See A. Prior, *Papers on Time and Tense*. (Oxford: Clarendon Press, 1968), chapter 1.

[11] Lane Craig, in Smith and Lane Craig, pp. 33–34. See also S. Cowan, 'A Reductio Ad Absurdum of Divine Temporality', *Religious Studies* **32** (1996), pp. 371–378. Cowan's critique of divine temporality draws on Lane Craig's reasoning about the Tristram Shandy Paradox.

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would have been a year for every day in the past , so that, by the present day, he would have been able to finish his autobiography. The argument then, is:

(i) The task cannot be finished. For the recording of yesterday's events cannot begin before yesterday, and cannot (ex hypothesi) be completed by today.
(ii) If an actually infinite past is possible, then past days are in 1–1 correspondence with past years.
(iii) If past days are in 1–1 correspondence with past years, the task could be completed by today.
(iv) If an actually infinite past is possible, then the task could be completed by today. (From (ii) and (iii).)
(v) If an actually infinite past is possible, then the task could be both completed and not completed. (From (i) and (iv).)
(vi) Hence, by Reductio Ad Absurdum, an actually infinite past is not possible.

The flaw in this argument lies in the ambiguity of the phrase '1–1 correspondence'. By definition, if the past is actually infinite, a 1–1 correspondence between past days and past years can be established (yesterday corresponds to the last year, two days ago corresponds to the last but one year, and so on). In this sense of 1–1 correspondence, premise (ii) is correct. But equally, if this sense of 1–1 correspondence is employed, premise (iii) is false. The existence of a correspondence of this sort does not imply that the task could be completed. Tristram Shandy (we suppose) cannot write about a day until that day has occurred. In order to show that the task could be completed it is thus necessary to establish a 1–1 correspondence between past days and past years beginning subsequently to those days. Using *this* sense of correspondence, premise (iii) would be correct. But the defender of the actual infinite is not committed to there being such a correspondence. It is impossible, for reasons that have nothing to do with the actual infinite, that such a correspondence be established. Suppose Tristram Shandy to be writing today. Then yesterday, and, indeed, any day in the past year, cannot be set in correspondence with a past year beginning subsequently to that day. If we read '1–1 correspondence' in this way, premise (iii) is correct, but (ii) is false.

The appearance of a valid argument is generated by failing to note that premises (ii) and (iii) depend on different senses of '1–1 correspondence'. As Small points out in his incisive analysis, when applied to the past, the Tristram Shandy story gives us only one half of a paradox.[12] We can readily see that Tristram Shandy cannot have finished his task (premise (i)), but we cannot demonstrate the other half of the paradox, namely that writing

[12] R. Small, 'Tristram Shandy's Last Page', *British Journal for the Philosophy of Science* **37** (1986), pp. 213–216.

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throughout an actually infinite past implies that he would have finished, since the required correspondence between past days and past years subsequent to those days cannot be established (unlike in Russell's original story, in which the first day of the future corresponds to the first year of future writing, and so on). To respond, as Lane Craig does,[13] by arguing that our inability to locate the past days which correspond to past years is like our inability to locate all the beetles that have ever crawled over the face of the earth, misses the point. The correspondence between past days and past years subsequent to those days is ruled out as a matter of logic, unlike Lane Craig's merely contingent failure to establish the cardinality of the set of beetles.

It may well appear to many that the debate about the necessary finitude of the past is redundant. For do we not have, in the recently developed and widely adhered to 'Big Bang Cosmological Theory', the basis for a sound empirical argument for the beginning of the universe? For empirical reasons, many would nowadays be willing to grant the first premise of the Kalam Argument.[14]

Any argument which, like the Kalam cosmological argument, attempts to derive substantial metaphysical conclusions from current scientific theories, will be vulnerable to an immediate challenge. Can we reasonably believe that the theory correctly represents the structure of our universe? In the terminology of contemporary philosophy of science, this translates into the question as to whether or not we can justify a *realist* attitude towards Big Bang Cosmology.

Realism about a scientific theory involves the doctrine that the success of the theory gives good grounds for believing it to be correct, at least in its central claims. The heart of the case against realism lies in the possibility of underdetermination of theories by the data, that is, the possibility that, alongside a successful theory, there may be another, incompatible theory, which equally well accounts for the available data.[15] Should this sceptical scenario be countenanced, it would appear that realists go beyond their epistemic rights in inferring from a theory's success, to its probable truth or verisimilitude.

The debate about scientific realism is hugely controversial. But it is relevant here to point out that, even for one not inclined towards anti-realism in general, there are grounds for caution with respect to such a tentative scientific pursuit as modern cosmology. It is not at all implausible to suppose that there *could* be a rival, incompatible theory, with the same power in

[13] Lane Craig, in Smith and Lane Craig, p. 102.

[14] See Smith and Lane Craig, especially chapters 1 and 4. See also J. Gott, E. Gunn, D. Schramm and B. Tinsley, 'Will the Universe Expand Forever?', *Scientific American*, (March 1976), p. 65; and S. Hawking, 'The Edge of Spacetime', in P. Davies (ed.) *The NewPhysics* (Cambridge: CUP, 1989) for arguments from Big Bang Cosmology to an absolute beginning.

[15] David Papineau's Introduction to the recently published set of readings in the Philosophy of Science brings the questions of realism and underdetermination to the fore. See D. Papineau (ed.), *The Philosophy of Science* (Oxford: OUP, 1996).

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accounting for observation as Big Bang Cosmology. To make inductive inferences to the distant past is to create the logical space for equally empirically adequate rival theories, and hence to enter a domain in which the problem of underdetermination is most pressing. In this regard, it is not insignificant to note that Big Bang Cosmology has a short history, and that there are serious questions about its empirical credentials.[16]

Even if these qualms about realism in cosmology are laid aside, there is a second problem with the inference from the Big Bang to an absolute beginning. The epistemic difficulty with substantiating the claim that the universe began ex nihilo arises because it involves a negative existence claim. To say that the universe began ex nihilo is to say that there was nothing (physical) at all, prior to something. But what can be evidence that there was nothing at all? How is it known that there was nothing prior to the Bang? Theoreticians have not found it hard to construct theories according to which, for example, what we call the universe is simply the latest in a series of oscillating cycles,[17] or in which it is treated as an inflated quantum fluctuation from a background vacuum space-time.[18]

Given the failure of a priori arguments for an absolute beginning, the response of the defender of Kalam has to be that the theory itself precludes this possibility.This can be motivated as follows. The Big Bang theory posits a point at which all the matter of the universe is compressed, a point called 'the singularity'. Hawking's early work concerned the nature of such singularities, and he considered that they would be points at which the laws of physics break down.[19] But if this is so, then it is hard to see how the Big Bang could be connected to earlier physical events. Even if causal connections could be made, the existence of earlier cycles would have no observable consequences, and such cycles could be 'razored out' of the theory, by application of Occam's principle that we ought not to multiply entities when explaining. The singularity provides, then, a way of setting a boundary to the physical universe. If real, it would appear to be a point which could not

[16] See G. Rhook and M. Zangari, 'Should we believe the Big Bang?: A Critique of the Integrity of Modern Cosmology', *Philosophy of Science Association* 1 (1994) pp. 228–237. Rhook and Zangari express doubt as to whether the Big Bang theory's empirical success merits the dominance it enjoys in current cosmology. In particular, they highlight anomalies concerning the theory's treatment of cosmic red shifts, and argue that the theory relies crucially on the Inflationary hypothesis, which is itself in poor shape empirically.

[17] The physicist John Wheeler suggested an oscillating universe model in which the universe undergoes a Big Squeeze at the end of each cycle, so that it 'forgets' the properties of previous cycles. The possibility of indeterminism arises because, at the end of each cycle, the scale of the universe falls below the Planck length, at which quantum effects become significant. By this means, the theory evades the objection made to earlier oscillating universe theories, namely that the build-up of entropy in successive cycles implies that our universe could only have been preceded by a finite number of cycles. See C. Misner, K. Thorne and J. Wheeler, *Gravitation* (San Francisco: W. H. Freeman, 1973), p. 1214.

[18] See, for example, E. Tryon, 'Is the Universe a Vacuum Fluctuation?', *Nature* **246**, no. 5433 (1973), pp. 396–397.

[19] For non-technical discussion, see Hawking, 'The Edge of Spacetime', in P. Davies (ed.), *The New Physics* (Cambridge : CUP, 1989).

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be the effect of prior cosmological activity, or at least, a point such that there could never be any evidence for such activity.[20]

But this sort of attempted proof of an absolute beginning runs into the following problem. The prediction, by a theory, of a singularity, is standardly taken as evidence that the theory has broken down. In the cosmological case, it indicates that there is an era in the universe's history about which we cannot rely on the Big Bang's predictions. The Big Bang theory is not telling us that the universe had an absolute beginning. The correct conclusion to be drawn from the singularity is that the theory *does not tell us* what happened in the earliest phase of the universe. A consistent picture of the earliest phase of the universe must wait until we are in possession of a satisfactory theory of quantum gravity.[21] The difficulty raised here is a severe one: the empirical argument for an absolute beginning appealed to the singularity to conclusively rule out the possibility of prior, physical goings on from which the Big Bang emerged. But it is the presence of the singularity itself which shows that we cannot rely on the Big Bang theory to tell us what was going on around about the time that the universe supposedly began. The empirical argument for an absolute beginning of the universe is impaled on the horns of this dilemma.

When Newton postulated divine intervention to correct planetary orbits so as to maintain the equilibrium of the Solar System, Leibniz famously charged that he was making God an inefficient watchmaker.[22] Bringing in God when physics fails has been dubbed the 'God of the Gaps' approach. It is often pointed out that such postulations are vulnerable to advances in science being then taken to show that God is unecessary. It is hard to avoid the suspicion that bringing in God as the cause of the Big Bang is 'God of the gaps'ish.

It may not always be mistaken to search for God in the gaps. For not all gaps are the same shape, and, to extend the metaphor, some may be peculiarly God-shaped. If, for example, we had shown satisfactorily that the universe began ex nihilo, from no prior cosmological goings-on, then the only available causes would be supernatural. It is not, contrary to the dogmatic assertions of some physicalists, a necessary presupposition of scientific method that every physical event has a physical cause, and it is exactly when origins are considered that making such an assertion may well be to beg the question.

[20] It is in such terms that Quentin Smith argues from the Big Bang theory to an absolute beginning of the universe. See Q. Smith, 'The Uncaused Beginning of the Universe', *Philosophy of Science* **55** (1988), pp. 39–57. Reprinted in extended form in Smith and Lane Craig, chapter 4.

[21] Hawking draws an analogy between the Big Bang singularity and the prediction, by classical electromagnetic theory, of an infinite probability of finding an electron at the atomic nucleus. This physically absurd prediction is removed by giving a quantum mechanical treatment of the atomic system. Hawking's hope is that the quantization of gravity will similarly remove the Big Bang singularity. See Hawking, in P. Davies (ed.) *The New Physics* (Cambridge: CUP, 1989), pp. 61–69.

[22] See G. Leibniz and S. Clarke, *The Clarke/Leibniz Correspondence* (Manchester : Manchester University Press, 1956), p. 11.

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But apparent gaps may merely reveal our ignorance of the true physical causes. Given the widespread success of the method of searching for physical causes for physical events, and given the subsequent removal of God from gaps in physics which were due merely to ignorance, we must give reasons why the Big Bang probably was not the effect of a physical cause, before we can claim that its occurrence is evidence for a supernatural cause. In view of the failure of the a priori and empirical arguments for an absolute beginning, I conclude that we are not currently in possession of such reasons.

III. THE ATHEISTIC RESPONSES

A number of atheists have responded to the Kalam Argument in rather stronger terms, offering arguments designed to show that we can, or indeed must, make an inference from cosmology to the non-existence of a first cause. If we have thus far found the Kalam argument less than wholly satisfactory, we may still consider that the argument from origins to no-creator is also uncompelling.

One argument which I will not consider at great length is that given by Quentin Smith.[23] Smith believes that the universe did begin from absolutely nothing at all, with no natural or super-natural cause. Some would wish to dismiss this on a a priori grounds as incorrect. I am not in possession of any a priori proof that uncaused beginnings of existence are impossible, but Smith's attitude, as its stands, is still in violation of the methodological principle that we should search for causes. According to this methodological variant on the causal principle, uncaused beginnings ought only to be postulated if all possible causal accounts are found to fail. We would be deeply unimpressed by the student who, three weeks into her research on the causes of a new disease, having failed to find a cause for the disease, concluded that it occurred uncaused. If our universe did not have a physical cause (as it could not have if its beginning was an absolute beginning from no prior physical goings on), then, in lieu of a proof that there can only be physical causes, the reasonable option is to suppose a non-physical, super-natural cause.

One reason for ruling out a cause of the universe as a whole concerns the problem of time. Suppose that we make the Augustinian assumption that if the universe began, time began with it. Combined with the assumption of causal temporal priority (that causes must always precede their effects in time), it follows that there could not be a cause of the first state of the This is an argument advanced by Grunbaum:

> The physical correctness of [the Big Bang] model is also implicitly denied by anyone who asks any of the following questions: 'What happened *before* t = 0?', 'what *prior*

[23] In Smith and Lane Craig, chapter 4 and also in Smith, 'The Uncaused Beginning of the Universe', *Philosophy of Science* **55** (1988), pp. 39–57.

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events CAUSED matter to come *into* existence at t = 0?', or 'what *caused* the big bang to occur at t = 0?' ... each of these questions presupposes that t = 0 was preceded by other existing moments of time. Yet just this assumption is denied by the very model to which these questions are being addressed!'[24]

This has only a veneer of plausibility. Theists divide over the question of God's eternity, but it is clear that, whether we take eternity to be a period of infinite time, or take God's eternity to be a matter of timelessness, the resources are available for a response to Grunbaum. Taking the first of these options, it is simply false to say that time began with the universe. Nothing about the Big Bang theory rules out the possibility of a period of 'empty time' (time in which nothing changed) prior to the Big Bang, or even a period of time in which the changes going on were mental events in the mind of God. Those who prefer to view eternity as timelessness, seeing God's activity in creation as not forming part of the series of temporal events, will reach such a position simply by denying that it is any part of the concept of cause that causes must precede their effects in time, thus denying the second premise in Grunbaum's argument. God is the first cause in some atemporal sense; he is first, not in time, but in the order of explanation.

One atheistic response to Kalam which is deserving of consideration, if only because of the attention it has received, is the 'no-creator' argument offered by Professor Stephen Hawking. Hawking makes the suggestion that the finite/infinite past debate assumes a false dichotomy:

> In the classical theory of gravity, which is based on real space-time, there are only two possible ways the universe can behave: either it has existed for an infinite time, or else it had a beginning at a singularity at some finite time in the past. In the quantum theory of gravity, on the other hand, a third possibility arises ... it is possible for space-time to be finite in extent and yet to have no singularities that formed a boundary or edge.[25]

This is an ingenious suggestion. The assumption that either the universe began, or it has existed for an infinite amount of time, had been held almost unquestioningly, prior to Hawking's proposal. Hawking is offering a third way, alongside the beginning and the finite past. On the basis of his proposal, he engages in some bold speculation:

> The idea that space and time may form a closed surface without boundary also has profound implications for the role of God in the affairs of the universe ... So long as the universe had a beginning, we could suppose it had a creator. But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end: it would simply be. What place, then, for a creator?'[26]

Hawking's argument for his No Boundaries Theory may be set out as follows:

[24] Grunbaum, A. (1989) 'The Pseudo-Problem of Creation in Physical Cosmology', *Philosophy of Science*, 56, p. 389. Reprinted in J. Leslie (ed.) *Physical Cosmology and Philosophy* (New York : Macmillan, 1990). [25] S. Hawking (1988) *A Brief History of Time* (London: Bantam Press), pp. 135–136.
[26] Hawking, *ibid.* pp. 140–141.

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(i) Time can be space-like.
(ii) If time can be space-like, then time, like space, can be finite but unbounded.
(iii) If time were finite but unbounded, there would be no first instant.
(iv) Hence, the universe would have no beginning.
(v) Hence, there cannot be initial conditions or a place for God.[27]

Now a straightforwards attack on this argument would be to argue that Hawking's inference from (iv) to (v) is invalid. The only God who would lose his place in the Hawking universe would be a deist God who acts only at the beginning. Thus, for example, Polkinghorne answers Hawking by saying that God (creator and sustainer) is to be found everywhere, and as such does not lose his place, even if Hawking's speculations are correct.[28] To give this answer to Hawking is effectively to concede that he has produced an adequate rebuttal of the Kalam argument, and to fall back to a 'sufficient reason' style argument, which sees God as the ground of being, and, as such, the reason for the universe's existence rather than its temporal cause. But we may wonder whether, on closer analysis, Hawking's theory really does undermine the adequacy of the Kalam first cause argument. The discussion of the relevance of the Big Bang theory to the Kalam argument highlighted that the attempt to draw metaphysical or theological conclusions from the theory presupposes the correctness of a realist interpretation of the theory. The question of realism may be raised again in the context of Hawking's theory.

To adopt a realist reading of the Hawking theory would be to suppose that the theory is designed to tell us how the universe really was. But to view the theory in this manner, as aimed towards truth, invites the question as to whether or not we should believe that it succeeds in accurately describing the early universe. It is hard to answer this question positively. Insofar as Hawking's theory implies the spatialization of time, it is open to a range of metaphysical objections from those philosophers who have argued for the distinctness of time and space.[29] But even without consideration of metaphysical issues, we may ask whether or not the theory has achieved anything like the degree of empirical success which would warrant belief in it. Hawking himself (at least in one of his technical papers), far from claiming empirical adequacy for his theory, notes that the wave-function of the universe which

[27] See Hawking, *ibid*. p. 140 for this argument.
[28] J. Polkinghorne, *Reason and Reality* (London: SPCK, 1991), p. 81.
[29] One of the central current controversies in the philosophy of time concerns whether or not, in McTaggart's terms, an intrinsic description of time must employ the A-predicates 'past', 'present' and 'future', as well as the B-relations 'earlier than', 'simultaneous with' and 'later than'. To believe (as defenders of the A theory do), that it is correct to describe events as, successively, future, present and then past is to accept a view of time's passage which clearly demarcates time from space. But even opponents of the A theory seek ways to capture the intuitive sense of time's distinctness from space, namely in terms of causal relations. One leading B-theorist (Professor David Mellor), takes pains to express his rejection of spatialized time, a view he regards as foolish. See Mellor, *Real Time* (Cambridge: CUP, 1981).

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it describes 'does not correspond to the quantum state of the Universe that we live in'.[30]

An alternative (and more promising) approach is to adopt an anti-realist view of the Hawking theory. To interpret the theory along anti-realist lines is to view it as a mathematical tool, useful for calculation, but without ontological import. It is common practice, in science, to transform variables into other forms which make mathematical puzzles more tractable, and it is in this way that the anti-realist will advocate viewing Hawking's 'space-like imaginary time' proposal.

Anti-realism about the Hawking theory looks plausible, but, if adopted, neutralizes its power to say anything about the origins of the universe. According to the anti-realist interpretation, Hawking has not given grounds to deny God his place as a first cause, for the success of the theory is of instrumental significance only. The postulation of space-like time may, or may not, prove to be of value as a mathematical tool, but to adopt an anti-realist interpretation of the theory is precisely to deny that the theory's success should be viewed as evidence that it correctly describes real cosmological history, and hence to deny that, in any sense, the theory precludes the possibility of a super-natural first cause.

It is not insignificant that those who work their way through his most confusing book, find Hawking equivocating between realist and anti-realist interpretations of his theory. In places, he makes statements which amount to a commitment to scientific realism, as, for example, when he states that science aims at the provision of a theory which describes the entire universe,[31] and that we may reasonably suppose that science is progressing towards a description of the laws that govern our universe.[32] Yet in other places, he informs us that science aims no higher than at the construction of theories to describe observations, and even expresses doubts about the meaningfulness of supposing that theoretical terms refer to real entities. At this point, the philosopher of science may justly suspect an incipient positivism in Hawking's thought.[33]

Anyone who wishes to take seriously Hawking's quip about his theory removing the place for God must face the issues raised by the debate over scientific realism. In the same manner that Big Bang Cosmology cannot establish an absolute beginning to the universe unless a realist interpretation of the theory can be justified, Hawking's theory only has substantial metaphysical implications if it can be given a realist interpretation. But since

[30] S. Hawking and J. Hartle (1983) 'Wave function of the Universe', *Physical Review D* **28** p. 2975.
[31] Hawking, *A Brief History of Time* (London: Bantam Press, 1988), p. 10.
[32] Hawking, *ibid.* p. 12.
[33] See Hawking, *ibid.* p. 139. The suspicion of a lurking positivism is confirmed by comments Hawking makes elsewhere. When giving his account of 'My Position', he is brusquely dismissive of the notion of theory-independent reality, which, he admits, may make him a positivist. Positivism, Hawking implies, is a view which others have rejected on the basis of intellectual fashion alone! See Hawking 'My Position' in his *Black Holes and Baby Universes and Other Essays* (London: Bantam Press, 1993).

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metaphysical and scientific considerations make an anti-realist reading much more tenable, I conclude that Hawking's theory offers no support for an argument from origins to no-creator.

IV. CONCLUSIONS

The atheistic responses to the Kalam argument are inadequate for the reasons given, but significant problems remain for those who consider that, on a priori or empirical grounds, we have evidence for the absolute beginning of the physical universe from no prior physical things, and until such difficulties are satisfied, Kalam cannot be endorsed. What is striking about the argument is its closeness to a scientific theory–it is a piece of reasoning about the causes of physical events, after all. Other arguments–Swinburne's attempt to turn the so-called 'fine tuning' of the laws and initial conditions of the universe comes to mind–are similar in this regard.[34] What is required, if such arguments are to succeed, is a careful regard for the nature of scientific explanation. Suppose, for example, as both Kalam and Swinburne's design argument do, that we posit a non-physical cause of some physical state. Such postulations will not be convincing unless we are in possession of good evidence that there were such states. Minimally, then, such arguments presuppose that the theory positing such states may be read in a realist manner, and the course of the argument has shown that, when dealing with cosmology, establishing realism is not a trivial affair. But furthermore, if the natural theologian is to exonerate himself from the charge of positing a 'God of the gaps', some reasons must be adduced why positing a super-natural cause is more reasonable than positing a natural cause for the physical state in question. This is the point at which most care is needed. For what are the criteria by which we should determine when it is more reasonable to posit a super-natural rather than natural cause? An answer to this question will lead into the thorny issues of the logic of explanation and the epistemic virtues. It seems, then, that if the natural theologian is to advance down this line, it will be by offering a very broad, well developed case, in which the treatment of science is handled carefully within the framework of more general views about explanation.The argument from creation to creator is nothing like as swift or simple as a single syllogism.[35]

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[34] See Swinburne, R. 'Argument from the Fine-Tuning of the Universe', in Leslie, J., *Physical Cosmology and Philosophy* (New York: Macmillan, 1990), pp. 154–173.

[35] Earlier versions of this paper have been read at the Tyndale Conference for the Philosophy of Religion, and to the Philosophy of Religion Seminar at King's College, London. I am grateful to participants for their comments and criticisms. Grateful thanks are also due to Dr W. H. Newton-Smith for his patient supervision of the thesis from which these arguments derive, and to Professor Swinburne and Dr Lockwood for comments.

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