The Reason the Universe Exists is that it Caused Itself to Exist

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I

There are two familiar responses to the question, 'why does the universe exist?' One is that 'God created it' and the other is 'for no reason—its existence is a brute fact'. In this essay I propose to explore a third alternative, that the reason for the universe's existence lies within the universe itself.

I shall approach this question from a metaphysical perspective. In Robert Deltete's response to my article on 'Simplicity and Why the University Exists'[1], he makes a number of arguments that pertain to contemporary mathematical cosmology. These technical and mathematical arguments are interesting and need to be addressed, but I shall not address them here. Rather, I shall confine myself to some purely metaphysical points. In particular, I shall discuss a premise that Deltete shares with William Lane Craig, T. D Sullivan, William F. Vallicella[2] and others, namely, the premise that

> (1) the universe can begin to exist only if it is caused to begin to exist by a cause external to the universe (such a cause is usually identified, after further argumentation, with God).

Deltete, Craig, Sullivan and Vallicella (and most philosophers from the early Greeks to contemporaries) seem to think that this metaphysical principle follows from another metaphysical principle, viz.,

> (2) the universe cannot begin to exist uncaused.

[1] Robert Deltete, 'Simplicity and Why the Universe Exists: A Reply to Quentin Smith', *Philosophy* **73** (1998), 490–4. This is a response to Quentin Smith's 'Simplicity and Why the Universe Exists', *Philosophy* **72** (1997), 125–32.

[2] See T. D. Sullivan, 'On the Alleged Causeless Beginning of the Universe: A Reply to Quentin Smith', *Dialogue: Canadian Philosophical Review* **33** (1994), 325–35. This is a response to Quentin Smith's, 'Can Everything Come To Be Without A Cause?', *Dialogue: Canadian Philosophical Review* **33** (1994), 313–23. Also see William Lane Craig and Quentin Smith, *Theism, Atheism and Big Bang Cosmology* (Oxford: Clarendon Press, 1993), and William F. Vallicella, 'The Hume-Edwards Objection to the Cosmological Argument', *Journal of Philosophical Research* **22** (1997), 423–43.

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I shall show, however, that principle (1) does *not* follow from principle (2). William Craig writes about principle (2), 'probably no one in his right mind can really believe it to be false'[3]. If this is true, then most contemporary cosmologists (e.g., Stephen Hawking, James Hartle, Alexander Vilenkin, Alan Guth, Paul Steinhardt, etc.) are mentally off-centre and perhaps require haldol or some similar psychotropic medication to construct a sensible cosmological theory. But Craig's criterion of 'being in one's right mind' is too stringent, as the theist Phil Quinn points out[4]. None the less, let us grant for the sake of argument that (2) is true. I shall show there are three different ways in which (2) can be true and yet (1) false. That is, there are three ways in which the universe can be caused to begin to exist, and yet that it is not caused to begin to exist by God or any other external cause or causes.

II

Alain Aspect's confirmation[5] of Bell's theorem can plausibly be taken as confirming the existence of simultaneous or instantaneous causation across arbitrarily large spatial distances. For example, given the appropriate initial conditions, if a photon x is measured to be in a 'spin up' state, this simultaneously causes a spatially distant photon y to be in a 'spin down' state. The physical details need not detain us, since it suffices if such a scenario is even possible. (A good and very brief explanation of such 'EPR correlations' has been given by Michael Tooley[6].)

The history of science also gives us cases of *mutual*, simultaneous causation. Newton's theory provides an uncontroversial example. We can think of a possible world where an instantaneous or 'infinitely fast' gravitational force is the only factor that causally affects the motion of bodies. (For example, we can imagine smaller bodies, such as moons, orbiting larger bodies, such as planets.) There is an instantaneous gravitational attraction between two moving bodies at

[3] Craig and Smith, op. cit., p. 57.

[4] Philip Quinn, Review of William Lane Craig's and Quentin Smith's, *Theism, Atheism and Big Bang Cosmology, Philosophy and Phenomenological Research*, 56 (1996), 733–36.

[5] Alain Aspect and Phillipe Grangier, 'Experiments on Einstein-Podolsky-Rosen-type Correlations with Pairs of Visible Photons', *Quantum Concepts in Space and Time* (Oxford: Clarendon Press, 1986), 1–15.

[6] Michael Tooley, *Time, Tense and Causation* (Oxford: Clarendon Press, 1997), ch. 11.

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the instant t. Each body's infinitesimal state of motion at the instant t is an effect of an instantaneous gravitational force exerted by the other body at the instant t. In this case, the infinitesimal motion of the first body is an effect of an instantaneous gravitational force exerted by the second body, and the infinitesimal motion of the second body is an effect of an instantaneous gravitational force of the first body. This is a case of the existence of a state S1 being caused by another state S2, with the existence of S2 being simultaneously caused by S1.

If it is physically possible, actual or necessary that some *states* of bodies or particles are instantaneously caused to begin to exist by other such states, then this is both metaphysically possible and logically possible. Suppose we have a first state of the universe that consists of the initial temporal part (initial state) of three particulars (e.g., elementary particles). Let us call the three initial states or temporal parts of the three particles the states *a*, *b* and *c*. (For simplicity's sake, we shall adopt a 'geni-identical' theory of objects, namely, that objects are not enduring particulars but a succession of causally connected temporal parts (states, events).) The temporal part or state *a* of one of the particles instantaneously causes the state *b* to begin to exist, *b* instantaneously causes *c* to begin to exist, and *c* instantaneously causes *a* to begin to exist. This causal loop obtains at the first instant of time, t = 0.

In this case, the universe *begins* to exist, is *caused* to begin to exist, but *is not caused to begin to exist by God or any other cause*(*s*) *external to the universe*. Perhaps it is worth spelling this out in detail. The universe at t = 0 is nothing other than the particles' temporal parts *a* and *b* and *c*. Each of these time-slices of the particles is caused to begin to exist by something internal to the universe, namely, by one of the time-slices or states of one of the other three particles. If the universe at t = 0 is *a*, *b* and *c*, and *a*, *b* and *c* are each caused to begin to exist by something internal to the universe, it follows that the universe is caused to begin to exist, but not by anything external to the universe. The universe is self-caused in the sense that each part of the universe is caused to exist by some other part of the universe.

Thus, it is possible for an atheist to accept Deltete's principle that 'it is impossible for something to begin to exist uncaused' (1998, 493, n. 8) and still hold the universe begins to exist without the help of any external cause. And the atheist can hold that the universe comes to be and happily agree with Sullivan that 'we have good reason to believe that everything that comes to be, including the universe, is caused'. (Sullivan, 1994, 328). And finally, I can reassure Craig regarding his concern about my mental health: He writes: '…incredibly, Smith denies this causal principle. His final position

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in *Theism, Atheism and Big Bang Cosmology* is that the origin of the universe, including all matter and energy, and space and time themselves, is simply uncaused. … Now I confess that I am simply bewildered that Smith can affirm such a thing. I have wondered to myself on multiple occasions how he can really believe that the universe just popped into existence uncaused out of nothing.'[7] Let thy bewilderment cease: I can in good health believe that the universe's 'popping into existence' *was indeed caused*—but not by God.

III

There is a second way the universe can cause itself to begin to exist. Suppose the first hour of the universe's existence is half-open in the earlier direction. This means there is no instant corresponding to the number zero in the real line interval $0 > x \leq 1$. If time is continuous, then there is no first instant that immediately follows the hypothetical 'first instant' $t = 0$. This is because between any two instants, there are an infinite number of other instants. If we 'cut out' the instant that corresponds to 0 in the interval $0 \geq x \leq 1$, we will not find a certain instant that immediately comes after the 'cut out' instant $t = 0$. For example, the instant corresponding to the number 1/2 in the interval $0 > x \leq 1$ cannot be the first instant, since between the number 0 and the number 1/2 (= 2/4) there is the number 1/4. The same holds for any other number in the interval $0 > x \leq 1$.

This implies that every instantaneous state of the universe corresponding to a number in the interval $0 > x \leq 1$ is preceded and caused by other instantaneous states. There is no instantaneous state in this first half-open hour that lacks some earlier cause. Since the universe is nothing other than the succession of these instantaneous states, it follows that the universe begins to exist, but that its beginning to exist is internally caused. It is internally caused in the sense that each instantaneous part of the finitely old succession of parts is caused by earlier instantaneous parts of the succession.

Now some theists, like Craig and Swinburne, might ask: what causes *the whole interval*, specifically, the first half-open *hour*? Does this need an external cause, such as a divine cause?

The answer is negative, since the interval is nothing other than the set of the instantaneous states that make up the hour. The set or interval logically supervenes upon the members of the set. If Jack

[7] William Lane Craig, 'Theism and the Origin of the Universe', *Erkenntnis* **48** (1998), 47–57. See pages 50–51.

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and Jill are each caused to exist, then the set [Jack, Jill] does not need an extra cause of its existence. For the existence of Jack and Jill entail the existence of the set [Jack, Jill]. The set is not caused to exist, but is logically required by the concrete elements that are caused to exist.

Furthermore, the set is an abstract object, and abstract objects do not stand in causal relations. If the interval is conceived instead as a concrete mereological sum, then it still does not have a cause. If each part of a mereological sum is caused to exist by some earlier part(s), then the existence of the sum is logically guaranteed by this fact. There is no extra causal act directed upon the sum itself; indeed, an extra causal act is logically precluded. It is impossible to bring the sum (interval) into existence by an act of causation directed upon the sum if that sum logically supervenes upon other particulars (the instantaneous states that compose the sum) that have been brought into existence by distinct acts of causation. If the parts of the interval exist, that entails the interval exists, and consequently the causation of the parts is a logically sufficient condition of the existence of the interval.

I have not fallen into Vallicella's trap by adopting a Humean definition of causation. According to Hume, *c* causes *e* if and only if *c* and *e* are spatiotemporally contiguous, *c* occurs earlier than *e*, and *c* and *e* are subsumed under event-types C and E which are related by the generalization that all events of type C are followed by events of type E. Vallicella points out that 'there is no contradiction in maintaining that x causes y without in any way producing or bringing about y. For on an Humean analysis, there is nothing productive about causation, which is to say that on such an analysis causation is not causation-of-existence.' (Vallicella, 1997, 433). I reject Hume's definition of causation and am adopting what Vallicella calls 'the ordinary concept of cause. The latter is such that if x causes y, then x causes y to exist (occur).' (Vallicella, 1997, 436)

Thus, we have a second respect in which the atheist can accept a properly interpreted *kalam* cosmological argument, which reads (in one of its versions):

(3) If the universe begins to exist, the beginning of its existence is caused.
(4) The universe begins to exist.

Therefore,

(5) There is some cause(s) of the universe's beginning to exist.

We can characterize the universe as a continuum of successive,

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instantaneous states. This continuum of instantaneous states begins to exist in the sense that there is an earliest half-open interval of each length (a first hour, a first minute, a first second, etc.). The continuum's beginning to exist is caused in the sense that each instantaneous state that belongs to the continuum is caused by some earlier instantaneous states that also belong to the continuum.

Deltete writes in his reply to my 'Simplicity and Why the Universe Exists' about his sympathy for the causal principle that '"it is impossible for something to begin to exist uncaused", which Smith derides but which *he also never seriously addresses*.' (Deltete, 1998, 493, n. 8, my italics). First of all, I did seriously address it at length in [Craig and Smith, 1993, 178–191]. Second, I have now 'seriously addressed it' in a different sense by showing how the truth of this principle is consistent with an atheistic theory of a finitely old universe.

IV

There may be another way for the universe to cause itself to begin to exist, but this way will be found dubious by many since it involves backward causation. None the less, some cosmologists, such as John Wheeler, claimed that the big bang, the first state of the universe, is backwardly caused by cosmologists observing the big bang. Wheeler's theory makes little sense to me, unless we presuppose some sort of subjective idealism where past time and the universe itself is a creation of the human mind.

But we can have a universe that is backwardly caused to begin to exist on a theory of metaphysical realism. Some cosmologists, such as Alan Guth, have speculated that if we compress a certain amount of matter to the size of a proton, the result will be a 'big bang explosion' that creates another universe that detaches from our own like a small bubble detaching from a larger bubble. Now Kurt Gödel has shown that Einstein's General Theory of Relativity permits a universe in which time-travel into the past is possible. This universe contains a central cylinder around which the rest of the universe is rotating. If a rocket leaves the central cylinder at time t = 4, the rotation of the universe will 'tip the rocket's light cone' so that (from the point of view of the central cylinder) the rocket's 'future half of the cone' is actually pointed in the direction of the central cylinder's past.[8] The person in the

[8] For a diagram of this scenario, see L. Nathan Oaklander and Quentin Smith, *Time, Change and Freedom* (London: Routledge, 1995), p. 204.

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rocket counts her time as t´ = 5, t´ = 6, but the people in the central cylinder see these 'rocket times' as actually corresponding to earlier and earlier central-cylinder times, so that the rocket's t´ =5 corresponds to the cylinder's t = 3, the rocket's t´ = 6 corresponds to the cylinder's t = 2, and so on. Now suppose the rotating part of the universe narrows to the boundaries of the cylinder at the part of the cylinder that corresponds to the earliest cylinder time t = 0. Let us suppose this earliest cylinder time contains a big bang explosion. The rocket approaches the cylinder's t = 0 state and just before the rocket reaches this state of the cylinder, a person in the rocket compresses a chunk of matter down to the size of a proton. This proton explodes out of the rocket and its explosion (heading in the future direction, according to the rocket's time) comprises the initial big bang state t = 0 of the central cylinder. In this way, the initial cylinder state t = 0 is caused to exist by something that exists later than t = 0 (according to the cylinder time), namely, the compression of the proton on the rocket.

This represents a third way in which the universe can cause itself to exist. Admittedly, the possibility of this third way is more dubious or controversial than the first two ways. The atheist need not repose too much weight on the assumption that backward causation is really possible, since she can always deny its possibility and say the universe caused itself to begin to exist in the first way (via a simultaneous causal loop) or in the second way (via a half-open interval of instantaneous and causally connected states of the universe).

V

The theist cannot at this point insist that any cause of the universe's beginning to exist must exist earlier than the universe, for the theist typically holds that God's act of causing the universe to begin to exist did not occur earlier than the universe's first state. The theist typically says that God timelessly causes the universe to begin to exist or simultaneously causes the universe to begin to exist. Some theists, like Swinburne, hold that God exists in a metrically amorphous time that exists earlier than the first state of the universe, but this is not the usual theist position. Traditionally, the theists are much more sympathetic than atheists to the theory that causes need not exist earlier than their effects.

I think this addresses the fundamental metaphysical reason why Deltete, Craig, Sullivan, Vallicella and other theists object to my thesis that the universe began to exist without being caused to do so.

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Their objection is that an uncaused beginning is impossible[9]. I have now nullified that objection by explaining three ways in which the universe can cause itself to begin to exist. Deltete, Craig, Sullivan and Vallicella are now deprived of the main weapon in their arsenal of arguments against the atheistic theory of a finitely old universe. They can no longer say the atheistic theory can be rejected out of hand since it violates the 'self-evident' or 'plausible' principle that uncaused beginnings are impossible. Given this, 'the cosmological argument for God's existence' is invalid for universes that begin to exist. More precisely, the *kalam* cosmological argument for God's existence is invalid, since its premises are consistent with the conclusion that the universe caused itself to begin to exist. The *kalam* cosmological argument in one of its theistic versions is that: if the universe begins to exist, it has a cause; the universe begins to exist; therefore the universe has an external cause such as God. The invalidity is the inference of 'an external cause' from 'a cause'.

Thus, the atheist is not the one who needs to fear the principle that *if the universe begins to exist, it has a cause*. Indeed, it is this very principle that endangers theism.[10]

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[9] The modality in question is metaphysical possibility. For an explanation of the difference between metaphysical possibility and logical possibility, see Quentin Smith, 'A More Comprehensive History of the New Theory of Reference', in P. W. Humphreys and J. H. Fetzer (eds) *The New Theory of Reference: Kripke, Marcus and its Origins* (Kluwer Academic Publishers, 1998), pp. 235–83.

[10] Also see Quentin Smith, 'Causation and the Logical Impossibility of a Divine Cause', *Philosophical Topics* **24** (1996), 169–91; 'Why Stephen Hawking's Cosmology Precludes a Creator', *Philo: The Journal of the Society of Humanist Philosophers* **1** 75–94; and 'A Natural Explanation of the Existence and Laws of our Universe', *Australasian Journal of Philosophy* **68** (1990), 22–43. The physicist Lee Smolin apparently independently re-discovered the original theory presented in 'A Natural Explanation of the Existence and Laws of our Universe' and re-presented a popularized or layperson's version of it in his *The Life of the Cosmos* (Oxford University Press, 1997). For another discussion of how the causal principle undermines theism, see Adolf Grünbaum's excellent article, 'Theological Misinterpretations of Current Physical Cosmology', *Philo: The Journal of the Society of Humanist Philosophers* **1** (1998), 15–34.

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