Simplicity and Why the Universe Exists

QUENTIN SMITH

I

If big bang cosmology is true, then the universe began to exist about 15 billion years ago with a 'big bang', an explosion of matter, energy and space from a singular point. This singularity is spatially and temporally pointlike; that is, it has zero spatial dimensions and exists for an instant (at t=0) before exploding with a 'big bang'. The big bang singularity is also lawless; Stephen Hawking writes:

> A singularity is a place where the classical concepts of space and time break down as do all the known laws of physics because they are all formulated on a classical space-time background. ...[T]his breakdown is not merely a result of our ignorance of the correct theory but represents a fundamental limitation to our ability to predict the future [of the singularity], a limitation that is analogous but additional to the limitation imposed by the normal quantum-mechanical uncertainty principle.[1]

The lawlessness of the singularity entails that it 'would thus emit all [possible] configurations of particles with equal probability'[2]. Paul Davies describes this vividly: 'Anything can come out of a naked singularity—in the case of the big bang the universe came out.'[3].

If the universe began to exist with a lawless singularity, then there is no reason to suppose that the universe will, or probably will, evolve in a manner that leads to the existence of intelligent organisms. The singularity does not deterministically cause a sub-

[1] Stephen Hawking, 'Breakdown of Predictability in Gravitational Collapse' *Physical Review* D 14 (1976): 2460. Since 1982, Hawking has rejected big bang cosmology and its initial singularity and has adopted a quantum cosmology. Cf. Quentin Smith, 'Stephen Hawking's Cosmology and Theism', *Analysis* **54** (1994): 236–43; Quentin Smith, 'The Ontological Interpretation of the Wave Function of the Universe', *The Monist*, forthcoming in 1997.

[2] Hawking, ibid, p. 2460.

[3] Paul Davies, *The Edge of Infinity* (New York: Simon and Schuster, 1981), pp. 161.

sequent state of the universe that leads to intelligent life. Further, there is not a high objective chance or propensity for the big bang singularity to explode as a life-conducive universe rather than as a life-hostile universe. Indeed, the singularity and the symmetry-breaking stages occurring shortly after the big bang, where the particles and forces acquired their specific masses and strengths, had an extremely low probability of occurring in a way that leads to an animate universe.

However, if God caused the universe to begin to exist with the intention that the universe contains intelligent life, he would have created an initial state that certainly or probably evolves in a law-like manner that is conducive to the existence of intelligent organisms.[4] Since big bang cosmology implies that the initial state is instead a lawless singularity, big bang cosmology disconfirms the theistic hypothesis.

It has been countered that God could intervene in his creation at the big bang singularity and ensure that it explodes in a big bang that has the laws and physical conditions that lead to the evolution of intelligent life. But this response is implausible, since this would be an irrational way to create a universe with intelligent beings; there is no reason to create a singularity that requires immediate corrective intervention to ensure the desired result.

The theist may respond, as do William Craig, John Leslie and Richard Swinburne[5], that the creation of a big bang singularity, with subsequent divine interventions, can have a reason. God could intervene for an aesthetic reason, that he enjoys directly

[4] Swinburne is mistaken when he ascribes to me the view that a divine creation requires deterministic life-producing laws. Cf. Richard Swinburne, 'Review of William Craig's and Quentin Smith's Theism, Atheism and Big Bang Cosmology', *The Philosophical Review* **104** (1995): 337–339. My argument is that a divine creation requires that laws determine *or make it probable* that intelligent beings evolve. Cf. William Craig and Quentin Smith, *Theism, Atheism and Big Bang Cosmology* (Oxford: Clarendon Press, 1993), p. 242 and other pages. In his review, Swinburne also misrepresents my argument about Hawking's cosmology presented in the last chapter of *Theism, Atheism and Big Bang Cosmology*.

[5] William Craig and Quentin Smith, *Theism, Atheism and Big Bang Cosmology*, pp. 266–267; Swinburne, ibid.; John Leslie, 'Review of William Craig's and Quentin Smith's *Theism, Atheism and Big Bang Cosmology*', *Zygon* **31** (1996): 345–349. John Leslie says a reason for divine intervention may be that it was *necessary*; it was an intervention that 'God could not have avoided making' if he wanted intelligent organisms to exist. But the 'necessity' here is relative to possible universes that obey our actual laws of nature. My point is that it is logically possible that there be other laws of nature (and initial conditions).

fashioning the universe. The analogy Craig and Swinburne draw is between God's intervention and artists, chefs and boys building model airplanes who delight in making something.[6] But their analogy' fails, since the artists, chefs and model-builders do not first fashion a state whose probabilistic tendency is for the opposite of their desired end; rather, they fashion an initial state whose tendency is for the desired end and they fashion further states whose tendency is also for the desired end. Aesthetic delight in creation essentially involves fashioning states whose tendency is towards one's desired end. Thus, the theist cannot plausibly introduce 'aesthetic delight in creation' as a reason for God to create a singularity which does not have a tendency explode in the manner that God desires.

A defender of theism may respond that we (with our finite intellects) are not in a position to know if the creation of a singularity is a rational or irrational way to create an animate universe. Although a sceptical position such as this threatens any claim to knowledge in the philosophy of religion, it has been advanced by Daniel Lorca in a recent article in this journal. Lorca's position is that the atheist and theist positions are evidentially indeterminate; specifically, the 'Big Bang Cosmological evidence is such that either position is equally probable since we just do not have enough information to show which position is stronger.'[7]

One might respond to Lorca's argument in several ways, but the most interesting way to respond involves giving a new twist to the debate. I will take Lorca's conclusion as the starting point of an atheistic argument I shall develop in this paper. I shall assume that the debate between theistic and atheistic accounts of the big bang singularity are currently at an impasse, so that the *extant* atheistic and theistic interpretations of big bang cosmology are equally probable. Further, I shall introduce a restriction that guarantees novelty, namely, that only new hypotheses are allowed to be introduced, hypotheses (or, more generally, statements, arguments or theories) that are *not* implied by the hypotheses that have already been advanced in the cosmological debate between atheists and theists.

Given these conditions, I shall introduce an atheistic hypothesis that arguably shows the atheistic interpretation of big bang cosmology is more probable than the theist interpretation. The new hypothesis is a proposed law of nature that explains why the big bang singularity exists.

[6] Craig and Smith, p. 267. Swinburne, p. 338.

[7] Daniel Lorca, 'A Critique of Quentin Smith's Atheistic Argument from Big Bang Cosmology', *Philosophy* **70** (1995): 48.

On the face of it, a hypothesis of this sort may seem preposterous. What natural law could conceivably explain why the big bang singularity exists? Indeed, how could any law conceivably explain why any initial state of any (possible) universe exists? Do not laws (by definition) connect one state to another state, and thus explain the existence of one state in terms of the existence of an earlier state?

It seems that laws presuppose that a universe exists, and cannot explain why a universe begins to exist. But this traditional assumption can be challenged.

II

The atheist can reasonably hypothesize that it is a law of nature that *the simplest possible thing comes into existence in the simplest possible way*. This hypothesis may be called 'the Law of the Simplest Beginning'. This law mentions a particular thing and makes an existence claim, but some other laws do so as well. One example is Galileo's law that *on the earth, all free-falling bodies accelerate at a rate of 9.81 meters per second squared*. If 'the earth' is a definite description and if Russell is right that definite descriptions imply that the described item exists, then Galileo's law both mentions a particular thing and implies that it exists.

What is the simplest possible thing? If something lasts for a briefer period of time than another thing, it is simpler in this respect. It follows that the simplest thing, temporally speaking, is something that has zero duration. Something temporal that has zero duration is instantaneous. The big bang singularity, as we have seen, is instantaneous.

Something is simpler than something else, in terms of spatial size, if it is smaller. The spatially smallest possible thing is something with zero spatial dimensions, a point. The big bang singularity is a point.

Something is simpler than something else, in terms of its material constitution, if (all else being equal) it contains less matter. The big bang singularity is a mass point; that is, it contains a zero amount of matter.

Something is simpler than something else if (all else being equal) it instantiates fewer laws and has fewer kinds of positive, essential properties. Examples of kinds of positive, essential properties are being rational, being sensate and being animate. The big bang singularity is governed by no laws (except for the Law of the Simplest Beginning). The singularity has only negative or zero-

type essential properties (and whatever is entailed by these properties); it has zero spatial dimensions, zero temporal dimensions, zero mass, instantiates zero laws (apart from the Law of the Simplest Beginning). It essentially has the positive property of being the simplest thing, but this is entailed by its zero-properties. There is nothing besides the singularity that could both (a) instantiate fewer laws and have fewer positive, essential properties and (b) instantiate the Law of the Simplest Beginning.

The Law of the Simplest Beginning says that the simplest possible thing, the big bang singularity, comes into existence in the simplest possible way. The simplest possible way for something to come into existence is for the thing's coming into existence to have no positive relations to any grounds for coming into existence. The simplest possible way to come into existence is to come to exist *from nothing* (from no previously existent material, no material cause), to come to exist *by nothing* (by no efficient cause) and to come to exist *for nothing* (for no purpose or final cause). If the Law of the Simplest Beginning is true, then the big bang singularity occurs without being caused by God.

Is the Law of the Simplest Beginning confirmed? The Law of the Simplest Beginning predicts that there is a big bang singularity, and since there is such a singularity, the law is confirmed. Indeed, the law is highly confirmed, since we would not otherwise expect there to be a big bang singularity.

The Law of the Simplest Beginning also explains the big bang singularity, for explanation is the converse of confirmation; if something confirms a law, then the law explains that thing. Of course, the explanation is not causal, since the singular point has no cause. But it is a nomological explanation; the singularity is subsumed under a law that provides an answer to the question 'why does the singularity exist?'. The explanation is that the big bang singularity exists because it is the simplest possible thing and it is a law that the simplest possible thing exists uncaused.

There cannot be several other big bang singularities coming into existence uncaused, since there is only one simplest possible thing, the big bang singularity. Any other putative candidate would be indiscernible from and identical with the big bang singularity. Further, the evidence is that there is only one big bang singularity.

III

How may the theist respond? It is logically possible that the simplest possible thing is created by God, in which case it would not

come into existence 'by nothing and for nothing' and thus would not instantiate the Law of the Simplest Beginning. In this case, the law would be false; the simplest thing would not come into existence in the *simplest* way. But this logical possibility is consistent with the existence of this thing confirming the Law of the Simplest Beginning. For example, the recession of galaxies is logically compatible with Steady State Cosmology, but nonetheless highly confirms Big Bang Cosmology.

The evidence that *the simplest possible thing exists* does not provide equal or more confirming evidence for the theistic hypothesis than it does for the Law of the Simplest Beginning. If the Law of the Simplest Beginning is true, we expect to a high degree of probability, indeed, with certainty, that there is a big bang singularity. But the hypothesis that God exists does not lead us to expect with certainty or a high degree of probability that there occurs a big bang singularity. The hypothesis that God creates a universe also does not lead us to expect that there is a big bang singularity (for there are an infinite number of different ways God could begin a universe and there are infinitely many possible beginningless universes that God could create).

Could God ordain that the Law of the Simplest Beginning obtains? The definition of God is that he is the cause of any universe that exists. Thus, it would be inconsistent with this definition to suppose that he ordains a law that implies there is a universe that begins to exist without a cause.

The theist may point to a potential weakness; if God does not exist and the Law of the Simplest Beginning obtains, then we are left with a brute fact. The law explains the singularity, but what explains the obtaining of the law?

There is no explanation; the law is contingently true. Does this mean that the atheistic theory leaves us with an ultimate brute fact, the obtaining of this law, whereas theism does not leave us with an ultimate brute fact?

The theistic hypothesis also has an unexplained contingency. This contingency is not God's act of creating the big bang. This act is explained in terms of agent causality; God performs the act and in this sense is the cause of the act. The creative act has a causal explanation in terms of its agent. But there is another event that has no explanation, namely, the event of God causing the creative act. Note that this is not the event of *causing the big bang*. The event of *causing the big bang* is a relation of God's creative act to the big bang. This event is caused by God. The uncaused event is the event of *God causing* his creative act, or, in other words, of God performing his act of creation. There is nothing that causes

God to perform this creative act; God's causing or performing his creative act is free (in the libertarian sense) and thus is an ultimate brute fact.

We cannot introduce into the present argument familiar theistic principles such as 'it is necessary that each contingent concrete object is created by God' or 'it is impossible for something to begin to exist uncaused', since the restricted intention of the present argument is to advance the theist/atheist debate about big bang cosmology by introducing only new hypotheses. If the theist responds to my argument with one of these old refrains, nothing new will be added to the case that theists (Craig, Swinburne, Leslie, Sullivan, Deltete, etc.) have already made.

The atheistic hypothesis, the Law of the Simplest Beginning, is new; it is not entailed by previous atheistic positions. It is not even entailed by a probabilistic principle about simplicity, viz., 'the simpler an existent is, the more likely it is to exist [causally] unexplained'[8], since this principle of simplicity does not imply the simplest possible thing exists. The Law of the Simplest Beginning implies that there is a 100% probability that the big bang singularity exists without a cause, but the above-mentioned principle of simplicity is consistent with supposing that there is only a 0.0005 probability that the big bang singularity exists uncaused (with each other thing having a probability less than 0.0005 of existing uncaused).

The theist may argue that the proposition, *the simplest possible thing comes into existence in the simplest possible way*, cannot be a law of nature since it does not have the proper form of a law of nature. She may argue that no law of nature can be about only one thing (the simplest possible thing) and assert that this thing exists. She may contend that Galileo's law of falling bodies, which seems to imply that the earth exists, may be formulated in a way that does not refer to the earth or imply that it exists, e.g., *for any x, if x has the property of being earth-like, then all free-falling bodies on x accelerate at a rate of 9.81 meters per second squared.*

But this 'argument' is merely an unsupported assertion about the form that a law of nature must possess and I see no reason to accept it. There is no non-question-begging argument for the thesis that a law of nature cannot mention a particular thing and imply it exists. Even if it is true that all laws that have previously been formulated do not mention a particular thing or imply that a particular thing exists, this does not show it is logically impossible for there to be such a law.

In any case, I can avoid the issue about whether my atheistic

[8] Craig and Smith, p. 250.

hypothesis is a law of nature by paring down my argument. All that is strictly necessary for the atheistic argument to succeed is the claim that the evidence of the big bang singularity confirms the hypothesis, *the simplest possible thing comes into existence in the simplest possible way*, to a higher degree than it confirms the theistic hypothesis.

Given the premises I mentioned in section I of this paper, the new atheistic hypothesis about the simplest beginning implies that big bang cosmology confirms atheism to a higher degree than it confirms theism. Whether or not the theist can respond by introducing a novel hypothesis that shows that the atheist interpretation of big bang cosmology is improbable remains an open question.

Western Michigan University