

Review Article

Swinburne's explanation of the universe

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Richard Swinburne, *Is There a God?* Oxford: Oxford University Press, 1996, pp. vii + 144.

I

Swinburne's *Is There A God?* presents a brief, updated version of his book, *The Existence of God*, in which Swinburne argued that criteria used in scientific reasoning could be used to argue that God probably exists. This new book is designed for a wider audience than professional philosophers. Nonetheless, there much that is new and of interest to philosophers in *Is There a God?* For example, there is a discussion of Stephen Hawking's cosmology, some new ideas in the philosophy of mind, and a new way of formulating the argument that theism is a simpler explanation of the universe than is materialism.

II

Perhaps the most interesting aspect of this book is Swinburne's way of arguing that theism is a better explanation of all 'things behaving as they do now' (p. 41) than is materialism. Swinburne's four criteria of scientific explanation are:

- (i) simplicity;
- (ii) fit with background knowledge;
- (iii) predictive extent (the more observed events and kinds of observed items it can explain, the better);
- (iv) predictive novelty (the prediction of things we would not otherwise expect to occur).

An 'ultimate explanation' of everything observable is the object or objects on which everything else depends for its existence and properties (p. 39). Swinburne says there are three possible ultimate explanations, materialism, theism, and humanism. Humanism differs from materialism in that only materialism holds that all mental events are caused by physical events. Swinburne says little about humanism, but it seems to be a conjunction of atheism and libertarianism about free will.

(i) *Simplicity*

Swinburne thinks theism does better than materialism according to the criterion of simplicity since theism posits one cause and materialism an immense or infinite number of causes. This claim may be doubted. The person, *God*, is not the cause of everything in the universe. Rather it is God's *creative acts*, the divine volitions, that are the causes. 'God exists' does not imply 'the universe exists'; rather, 'there occur divine acts of creating the universe' implies 'the universe exists'. God (the agent) is the one cause of the infinite number of creative acts performed by God, one creative act for each thing or event that exists. But being the one cause of his infinite number of creative acts is not the same thing as being the one cause of the universe.

Theism, like materialism, postulates an infinite or immense number of causal events in its ultimate explanation. But it is arguable that materialism is simpler, since materialism implies there exists an infinite (or immense) number of material powers and liabilities, whereas theism implies these *and in addition* an infinite (or immense) number of nonmaterial powers or causal acts (those performed by God).

Thus, materialism seems to have an advantage over theism on the criterion of simplicity.

But there is more to say here, since Swinburne's argument touches on other issues as well. Roughly speaking, Swinburne argues that theism is the simplest hypothesis since God is infinite and infinity and zero are the simplest notions that scientists use. But Swinburne uses the word 'infinite' in several different senses and this may leave him open to some charges about 'equivocation'. Indeed, it seems Swinburne use of 'infinity' expresses at least four different concepts that are not distinguished from one another.

(a) First, 'infinite' is used to refer to a number, the first transfinite cardinal, aleph-zero.

(b) Second, Swinburne uses it in the sense in which some scientists have said that the velocity of the gravitational force, according to Newton, is infinite, or in which some scientists used to say that the velocity of light is infinite. (A contemporary example may be the relation between two spacelike separated events in EPR experiments.) But to say that light travels infinitely fast between the sun and the earth has nothing to do with transfinite cardinals. Velocity is distance per time, e.g., 5 miles per hour. The sun is 93 million miles from the earth. To say that the light travels infinitely fast between the earth and the sun is to say that the light travels 93 million miles in 0 seconds. Since $93/0$ is meaningless if taken as a mathematical expression, this 'infinity' cannot be interpreted as being aleph-zero or any other number. It must be interpreted as meaning that the instant that the light leaves the sun is the same instant as the instant that light arrives at the earth. Here 'infinite' means instantaneous, not aleph-zero.

(c) Third, these two senses are not distinguished from the use of 'infinite' to mean the maximum degree of a degreed property. This is the sense in which God is infinite, but it is not a sense of 'infinite' that scientists employ in scientific theories. God has the maximum degree of power, knowledge and goodness. But this maximum degree is neither instantaneous nor is aleph-zero. It is false that 'God's infinite goodness' means that God performs, or is capable of performing, an aleph-zero number of good acts. This is false if only for the reason that 'performing an aleph-zero number of good acts' is consistent with 'performing an aleph-zero number of evil acts', and thus 'capable of performing aleph-zero good acts' cannot be what 'God is infinitely good' means. 'God is infinitely good' means merely that it is not possible that there be something better than God. It does not even logically imply that if God performs any morally relevant action, that action is good, since 'it is not possible that there be something better than x' implies this uniform goodness only with the added assumption that 'it is possible for some being to perform only morally good actions in each possible situation in which it performs morally relevant actions'.

(d) God is omniscient and knows all numbers. This implies he performs an absolutely infinite number of mental acts, each of which grasps one of the absolutely infinite number of transfinite cardinals. 'Absolutely infinite' is Cantor's technical phrase for the number of all transfinite cardinals (aleph-zero, aleph-one, aleph-two, ..., etc.). One may say that God performs one act of grasping all numbers, but this entire act will consist of absolutely infinite parts, each part being a consciousness of a distinct number.

Accordingly, a critic of Swinburne's argument may say that his thesis that theism is a 'simpler' hypothesis than materialism is the conclusion of an argument based on an equivocation on 'infinity'.

(ii) *Background Knowledge*

Swinburne has an interesting but problematic account of background knowledge and a corrected definition may show that theism is probably false. Swinburne says background knowledge is knowledge of how things work in neighbouring areas (p. 27) and that since there are no neighbouring areas about which we can have knowledge when we are constructing an ultimate explanation of everything observable, the criterion of 'fit with background knowledge' is not relevant to ultimate explanations.

However, background knowledge (if this is meant in the scientific sense, as Swinburne means it) includes not only knowledge of neighbouring areas but also knowledge of general laws governing both the neighbouring areas and the area about which one is trying to gain further knowledge. When we are considering theories about how a particular kind of gas behaves at low temperature, we take into account background knowledge about how other kinds of gases behave at low temperatures. But we also take into account background knowledge of laws that govern the behaviour of gases in general,

laws that govern the behaviour of mass-energy in general, and laws that govern the behaviour of spacetime in general. (Swinburne would not deny all of this; he makes a similar sort of point in his argument that the criterion of background knowledge can be reduced to the criterion of simplicity.)

Accordingly, if we are trying to explain ultimately *everything observable*, there may be general laws governing everything observable that we already know, and these are part of our background knowledge. Even ‘neighbouring areas’ in a relevant sense have a role.

Indeed, Swinburne’s theory itself implies that background knowledge is used in ultimate explanations. To see this, note that Swinburne considers ‘everything observable’ (the ultimate *explanandum*) to include all events that belong to the universe (p. 42) or ‘things behaving as they do now’ (p. 41). He also says an ultimate explanation is an explanation of ‘things now’ and of the present powers and liabilities of things (p. 42). The ultimate explanation provided by materialism (of all events, things, and things’ powers and liabilities) is in terms of the powers and liabilities of material things. For example, an event is explained by the powers and liabilities of the things involved in the event. These powers and liabilities are in turn explained by the powers and liabilities of other things, which in turn are explained by still other powers and liabilities.

If we add to Swinburne’s theory a distinction between temporal and hierarchal explanations, we can see exactly how background knowledge is a part of ultimate explanations.

The temporal direction of explanation involves explaining present events (present exercises of powers or liabilities) by past events (past exercises of powers or liabilities). A glass and a rock are considered neighbouring areas in the chemical study of gases, liquids and solids, since a glass and a rock are two kinds of solids. In some cases, the exercise of a glass’s liability to be broken is explained by the past exercise of the power of a solid in a ‘neighbouring area’, namely, a rock, that impacted the window. These two exercises are also explained in part by the gravitational properties of the glass and rock, and gravitational powers and liabilities are of the most general sort (pertaining to basic laws of the general theory of relativity).

The hierarchal direction of explanation also involves explaining powers and liabilities in one area by those in neighbouring areas and by more general powers and liabilities. A carbon dioxide molecule’s powers and liabilities is in part explained by the powers and liabilities of a carbon molecule, since carbon dioxide is in part composed of carbon. Carbon molecules represent a neighbouring area to carbon dioxide molecules. Likewise, the powers and liabilities of both carbon dioxide and carbon are in part explained by the more general powers and liabilities of the electrons and quarks that compose them, general powers and liabilities that are governed by Schrodinger’s equation, a fundamental law of quantum mechanics.

This implies that background knowledge of neighbouring areas and of

general laws *is* a part of ultimate explanations. Given that background knowledge is used in ultimate explanations, we can infer some interesting consequences for theistic ultimate explanations. In hypothesizing a mental being whose mental acts cause the universe, we rely in part on our background knowledge about mental beings and mental acts, e.g., that there are *mental* kinds of things (or that there is such a thing as mentality), that mental beings have a volitional faculty or volitional states that are distinct from their reason or states of understanding. (I am indebted to Eric Barnes for this point.)

In ultimate explanations, we properly use our background knowledge (from the fields of psychology, cognitive science, neurology, etc.) that all observed mental events are dependent on brain events. But the theistic hypothesis that there are mental events not dependent on brain events, namely, the mental events of some disembodied mind (God), does not fit with this background knowledge. Thus, theism does not meet this scientific criterion of explanation. Since materialism passes this test, materialism does better by criterion (ii), fit with background knowledge.

Indeed, this particular atheistic argument is virtually ignored in the literature (virtually all atheistic arguments are 'arguments from evil'), but it is a powerful one, since it shows that theism is inconsistent with everything that we empirically know about the nature of mentality. If we knew there were disembodied spirits such as angels, ghosts, dead ancestors, etc., then theism would fit in with our background scientific knowledge about mentality.

Note that the background knowledge I am referring to is the observations of relations of dependence of mental events on brain events. This is a province of science and is distinct from the various philosophies of mind. I am talking about relations of dependence that are observed, for example, when a patient is observed to experience certain mental events in correlation with certain, recorded electrical patterns among her neurons and a patient is observed to no longer exhibit mental events when the electrical patterns are observed to cease (brain death). One could be a substance dualist in the philosophy of mind and still hold a theory consistent with our background scientific knowledge of mentality, as long as one held that the mental substance and its acts are dependent on the brain. Of course, one may argue that it is conceivable, logically possible or metaphysically possible that there is a mind that exists independently of any brain, but this is irrelevant to my point that this is nomologically impossible, i.e., inconsistent with scientific laws or scientific knowledge about mentality. It is conceivable and is logically possible that life does not require DNA or that the speed of light in a vacuum is not constant, but this is not nomologically possible. Perhaps one could argue for the existence of a disembodied mind, but this requires rejecting science and scientific criteria of explanation. One could argue that science deals with

‘mere appearances’ and theism is about reality, but then one needs to adopt a different sort of argument than that advanced in Swinburne’s book.

It is interesting that in Swinburne’s own philosophy of mind he has to reject science, i.e., he says God can ‘cause there to be the particular brain event-mental event connections which there are. He can do this by causing molecules when formed into brains to have powers to produce mental events in souls to which they are connected’ (p. 90). According to science, however, what causes neurons to have powers to produce mental events are the physical causes that produce the particular arrangement of neurons in which neurons have powers to produce mental events.

Swinburne thinks he needs to appeal to God in this case since science cannot explain ‘causal connections between particular kinds of brain event and particular kinds of mental event’ (p. 89). Swinburne thinks that since mental events are not physically measurable, whereas brain events are, ‘there could not be a general formula showing the effects of variations in the properties of brain events on mental events, for the former differ in measurable respects and the latter do not’ (p. 83). Contra Swinburne, there are such formulae of varying degrees of generality, for example, the formulae that in a certain statistical percentage of cases when the neurotransmitter serotonin is increased by a certain amount by prozac, the depression experienced by the patient decreases or ceases to exist. Swinburne operates with a too narrow concept of measurability, e.g., measures are stipulated to be of velocities or masses, etc. But measures can also be of the number of patients reporting their depression has lifted, or scores on psychological tests, or even of the increase in smile to frown ratio of the depressed patients. These measures are of behavioural manifestations of mental events, but that does not prevent there being laws connecting mental events, behavioural manifestations and amounts of a neurotransmitter. For example, it could be a law that if serotonin increases by an amount n , then reliable or accurate reports of alleviated depression increase by a corresponding amount n . The reference to mental events is guaranteed by the adjectives ‘reliable’ and ‘accurate’.

(iii) *Predictive Extent*

Materialism predicts the many and varied events we observe. Does theism have a greater predictive extent? Swinburne says that the hypothesis that God creates the universe can explain the most general powers and liabilities of objects, whereas materialism cannot.

But this is not obvious. If God, a concrete object, exists, this object shares with other objects certain general powers, such as the power to affect something physically. But theism cannot explain why all concrete objects possess this general power, since it cannot explain why God possesses it.

It may be said that God and her powers are exempt from the subject matter that needs to be explained in ultimate explanations. Swinburne

seems to stipulate this exemption. But what could demonstrably justify this exclusion? God is something that exists, is a concrete object and has various contingent properties or relations to other concrete objects. Certainly a materialist will object if a theist stipulates that materialists must include *all objects in the materialist world-view* in ultimate explanations, but that the theist is allowed to exempt *some objects in the theistic world-view* in ultimate explanations. God is an unusual object, no doubt, but the materialist will point out that time, the big bang singularity, or the object that is identical with the universe *qua the one and only aggregate of all things* is also an unusual object. If the theist can exempt God from the ultimate explanandum, why cannot the materialist exempt one of his objects?

Swinburne rightly rejects the unjustified assumption that God 'necessarily exists' (and in this sense is 'self-explanatory') and Swinburne would probably agree that the 'modal intuition' that God necessarily exists is no less epistemically suspect than a 'modal intuition' that time or space-time necessarily exists, which the materialist may offer as his countering 'modal intuition' to 'prove' that his world-view is explanatorily on a par with theism.¹

Swinburne says materialism cannot explain the existence of all things or all things behaving as they do now. Ignoring the wave functions of the universe (see below), let us assume for the moment this is true. There is a parallel situation with theism. If materialism is true, then there is no explanation for the existence of all things behaving as they do now. But if theism is true, and God is one of the things that now exist (as Swinburne holds), then theism cannot explain all things behaving as they do now since theism cannot explain why God exists and behaves as he does (as Swinburne acknowledges, p. 49).

Perhaps Swinburne would note that theism explains the universe but not God, whereas materialism cannot explain the universe, and that in this respect theism has greater predictive extent. However, we shall see that it is doubtful that materialism cannot explain the universe.

(iv) *Predictive Novelty (we would not otherwise expect to find these events)*

If we postulate past state S₂ of the universe (where the universe is expanding at a certain rate), this leads us to expect what we would not otherwise expect – the present state S₃ of the universe (where the universe has expanded to a larger size and slower rate). And we expect S₂ because of an earlier state S₁, and so on ad infinitum. This remains true if the universe began to exist, since the first interval of each length can be half-open in the earlier direction; before each instantaneous state, there is an earlier instantaneous state. If each state of the universe is explained, then the universe is explained, since the

¹ For a discussion of the relevant analogy, see Quentin Smith, 'A Defence of a Principle of Sufficient Reason', *Metaphilosophy* 26 (1995): 97–106.

universe is either nothing over and above all of its states or else is a set or aggregate that logically supervenes upon all its states (and an explanation of a subvenient basis is ipso facto an explanation of what logically supervenes upon that basis).²

Talk about states of the universe can be translated into talk about things, their powers and liabilities, and the exercise of these powers and liabilities. This applies to the most general powers and liabilities of things as well as to the less general ones. The reason things exist and possess at time t_3 certain general powers and liabilities is that these things are caused to exist and possess these powers and liabilities by the exercise of the powers and liabilities of the things that exist at time t_2 . Since the same holds of the things at t_2 and t_1 , and so on ad infinitum, the most general powers and liabilities of ‘the things that exist now’ do have an explanation in materialist terms. They have a temporal explanation but not a hierarchal explanation. ‘X has a temporal explanation’ entails ‘X has an explanation’. Thus, the universe does have an ultimate explanation in materialist terms.

Furthermore, this shows that God cannot exist, since God cannot cause something to exist (a state of the universe) that is already caused to exist by something else (an earlier state of the universe). Perhaps one could say we have a case of causal overdetermination, such that God would have caused the state S_3 if S_3 had not been caused to exist by S_2 ; but this sort of relation of God to the universe is inconsistent with the traditional theistic theory of continuous creation. If traditional theism is true, then causal scientific theories (such as Einstein’s general theory of relativity) are false and theism must be formulated in the ‘occasionalist’ version developed by Malebranche and others.

III

One problem with Swinburne’s account is that the atheistic explanation of the universe that is currently most widely discussed by physicists is not mentioned in Swinburne’s book, namely, explanations in terms of a wave function of the universe. The prevalent belief of many mathematical cosmologists is that certain laws of nature (called ‘wave functions of the universe’) may (or in fact do) predict that our universe begins uncaused with a certain structure. Cosmologists have believed for some time that the ‘no boundary’ and ‘tunnelling’ wave functions of the universe that have been developed and extensively discussed since the early 1980s have the ultimate explanatory power traditionally attributed to theism. The editors of the main collection of articles on the subject say without blinking: ‘In principle, one can predict

² This much-debated issue is discussed in Quentin Smith, ‘Internal and External Causal Explanations of the Universe’, *Philosophical Studies* 79 (1995): 283–310. I believe, however, there are logical grounds for rejecting the hypothesis that it is logically possible for God to cause the universe to exist; cf. Quentin Smith, ‘Causation and the Logical Impossibility of a Divine Cause’, *Philosophical Topics*, 24 (1996): 169–91.

everything in the universe solely from physical laws. Thus, the long-standing "first cause" problem intrinsic in cosmology has been finally dispelled'. (Fang and Wu, *Quantum Cosmology*, World Scientific, 1986, p. 3.) The theory in question is that the laws of nature *nomologically explain and predict* an uncaused beginning of the universe. For example, Hartle and Hawking write:

one can interpret the functional integral over all compact four-geometries bounded by a given three-geometry as giving the [probability] amplitude for that three-geometry to arise from a zero three-geometry, i.e., a single point. In other words the ground state [probability amplitude] is the [probability] amplitude for the Universe to appear from nothing. (J. Hartle and S. W. Hawking, 'Wave Function of the Universe', *Physical Review D* 28 [1983]: 2961).

The square of the amplitude gives us a certain probability that a universe such as ours begins to exist uncaused. For those who think that ultimate explanations, or explanations of the initial or boundary conditions of the universe, are not the task of physics, Hawking has this rejoinder:

many people would claim that the boundary conditions are not part of physics but belong to metaphysics or religion. They would claim that nature had complete freedom to start the universe off any way it wanted. That may be so, but it could also have made it evolve in a completely arbitrary and random manner. Yet all the evidence is that it evolves in a regular way according to certain laws. It would therefore seem reasonable to suppose that there are also laws governing the boundary conditions. (S. W. Hawking, 'The Quantum State of the Universe', *Nuclear Physics B* 239 (1984), p. 258.)

This sort of nomological explanation requires a platonic realist theory of laws of nature, such as Michael Tooley defends in *Causation: A Realist Approach*, and so this sort of explanation may be refuted by a refutation of platonic realism. But I am unaware of any such refutation, despite the fact that many philosophers presuppose an anti-platonic theory in their philosophizing. (Hawking rejects platonic realism, but one must separate Hawking's vague and inconsistent philosophical speculations from his rigorous mathematical cosmology, as is argued in W. Craig's and Q. Smith's *Theism, Atheism and Big Bank Cosmology*.)

Swinburne addresses the idea that a law might explain an uncaused beginning of the universe in his 'The Beginning of the Universe and of Time', *Canadian Journal of Philosophy* 26 (1996): 187, n. 15. But he mistakenly says that the law is of the form 'nothing *necessarily* gives rise to something' (my emphasis). The law in question is *probabilistic* in nature. Further, there can be a law that implies there is a 100% probability that there is something without having the consequence Swinburne suggests, namely, that all logically possible universes must have come into existence. The law can be of the form 'the simplest possible thing comes into existence in the simplest possible way'. Since there is only one thing that is the simplest possible thing, this law

implies only that one logically possible thing exists. (But this law is consistent with many other things existing as well.) The simplest possible thing is the big bang singularity, which is spatially and temporally zero-dimensional and has no laws connecting it to any future state and thus anything (or nothing) can come out of the singularity, including our universe.³

Swinburne does discuss Stephen Hawking's cosmology in *Is There a God?* but physicists would reject Swinburne's interpretation of Hawking's theory. Swinburne takes Hawking to be saying that his wave function implies that time is 'closed' in the sense that it has a topology analogous to a circle. Swinburne says Hawking makes the proposal that 'if you live long enough after 1995 into the future, you would find yourself coming from 1994 into 1995 (looking and feeling just like you do now)' (p. 64). Swinburne refers to page 136 of Hawking's book but the assertion or implication that time is cyclical is present nowhere on this page or on any other page of Hawking's book. Hawking asserts that time is non-cyclical and has a beginning and end: 'In real time, the universe has a beginning and end...' (*A Brief History of Time*, p. 139). The theory of a non-cyclical time is also advanced in Hawking's technical articles.⁴

There is a typo on page 64 of Swinburne's book; he says Hawking's *A Brief History of Time* was published in 1985, but the correct date is 1988. On page 41 of Swinburne's book there appears the phrase that '...such as electrons and protons; and these in their turn are made of quarks'. This needs to be changed to 'neutrons and protons are made of quarks'; electrons are not composed of quarks and according to current scientific knowledge they are not composed of smaller types of objects.

Swinburne also does not take cognizance adequately of the epistemic possibility of a certain atheistic explanation of the universe; given the current mathematical problem of non-renormalizability in quantum gravity cosmology, there may turn out to be only one mathematically consistent description of space and time. If 'universe' means a maximal space-time, this suggests:

(1) It is epistemically possible that there is only one mathematically (and logically) consistent theory of a universe.

Swinburne says elsewhere⁵ that (1) can be refuted by the counterexamples of a lawless universe or a universe that is partly lawless. Not so, for a lawless

³ This is argued in more detail in Quentin Smith, 'Simplicity and Why the Universe Exists', *Philosophy* 72 (1997): 125-132.

⁴ For discussion and references, see Quentin Smith, 'An Ontological Interpretation of the Wave Function of the Universe', *The Monist* 80 [1997]: 160-185 and 'Stephen Hawking's Cosmology and Theism', *Analysis* 54 [1994]: 236-243.

⁵ Richard Swinburne, 'Review of W. L. Craig and Q. Smith, *Theism, Atheism and Big Bang Cosmology*', *The Philosophical Review* 104 (1995): 337-339. Swinburne mistakenly attributes to me the false belief that laws of nature must be determinist if God exists. What I said is: 'if God chose to create a universe that has a beginning in time, then its first state is either animate or leads by physical necessity or high probability to an animate state.' (p. 238).

universe is a *universe* and a partly lawless universe is a *universe* and it is not logically possible that *a universe exist whose nature or description is logically inconsistent*. Swinburne should have argued instead that the mathematical self-inconsistency of current attempts to unify general relativity with quantum mechanics (in theories of quantum gravity), of which non-renormalizability is one symptom, does *not* show that it is epistemically possible that there is only one mathematically consistent theory of a universe. But Swinburne offers no such argument and I believe no sound argument of this sort is anywhere in our epistemic vicinity.

Swinburne says (1) is 'hugely implausible'; not so. What is hugely implausible is instead

(2) It is epistemically probable or necessary that there is only one mathematically consistent theory of a universe.

Claims about mere epistemic *possibilities* are far too weak to be hugely implausible. After all, it is epistemically possible for some person p at time t that Santa Claus is now grooming Rudolph and Dasher on top of the Eiffel tower. It is hugely implausible that Santa is now grooming Rudolph on the Eiffel tower, but it is not hugely implausible that this is epistemically possible for some child p at time t . The inference from 'the operand in an epistemic possibility statement is hugely implausible' to 'the epistemic possibility statement is hugely implausible' is a fallacy in epistemic logic.

But Swinburne does not need to address atheistic arguments from epistemic possibility in his book; arguments from epistemic possibility are (by definition) too weak to deserve much attention; what Swinburne needs to address are the wave functions of the universe (developed by Hartle, Hawking, Vilenkin, Linde, Halliwell and many others) that provide a probabilist and acausal explanation of why the universe exists.

IV

Swinburne's intended audience for this book is the general public that 'have been led by journalists and broadcasters to believe that the existence of God is, intellectually, a lost cause and that religious faith is an entirely non-rational matter' (p. 1). He aims to show that theism is not intellectually a lost cause and that one can amount a rational case for theism, although he admits that there are good counterarguments to his arguments. In a passage of intellectual honesty that (in our profession) amounts to a supereoragatory act, Swinburne writes: 'I reach the end of this book with some dissatisfaction. I am well aware of objections other than the ones which I have discussed which can be made to almost every sentence which I have written' (p. 140).

I think Swinburne has succeeded in his endeavour to show (in a short book, addressed to the lay public) that theism is not intellectually a lost cause. An atheist will finish the book with the sense that the burden of proof is on

her to defend her atheism against Swinburne's challenging critique. My 'dialectical duels' with Swinburne in this review article are precisely what Swinburne wants to show to be possible; theism versus atheism *is a matter for rational argument*.

But the importance of Swinburne's work in this area is much greater than some suppose, since Swinburne is not merely contributing new 'arguments for God's existence', but is doing ground-breaking work in discussing how scientific reasoning can be applied to the question of why the universe exists. I am not a theist and I consider the greatest value of Swinburne's work to lie in his ideas about ways to reason inductively about a cause of or reason for the universe's existence. If monotheism goes the way of polytheism, many of Swinburne's original and stimulating contributions to the topic of ultimate explanations will still stand.