

Cosmological Argument [excerpts]

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The cosmological argument is less a particular argument than an argument type. It uses a general pattern of argumentation (*logos*) that makes an inference from certain alleged facts about the world (*cosmos*) to the existence of a unique being, generally identified with or referred to as God. ... The argument arises from human curiosity as to why there is something rather than nothing. It invokes a concern for some complete, ultimate, or best explanation of what exists...

The *Kalām* Cosmological Argument, [which argues] for a first or beginning cause of the universe, has a venerable history, especially in the Islamic tradition. Although it had numerous defenders through the centuries, it received new life in the recent voluminous writings of William Lane Craig. Craig formulates the *kalām* cosmological argument this way (in Craig and Smith 1993, chap. 1):

1. Everything that begins to exist has a cause of its existence.
2. The universe began to exist.
3. Therefore, the universe has a cause of its existence.
4. Since no scientific explanation (in terms of physical laws) can provide a causal account of the origin of the universe, the cause must be personal (explanation is given in terms of a personal agent)

This argument has been the subject of much recent debate, some of which we will summarize here.

The Causal Principle and Quantum Physics

The basis for the argument's first premise is the Causal Principle that undergirds all cosmological arguments [that every contingent thing has a cause]. Craig holds that this premise is intuitively obvious; no one, he says, seriously denies it (Craig, in Craig and Smith 1993, 57). Although at times Craig suggests that one might treat the principle as an empirical generalization based on our ordinary and scientific experiences (which would not be strong enough for the argument to succeed), ultimately, he argues, the truth of the Causal Principle rests “upon the metaphysical intuition that something cannot come out of nothing” (Craig, in Craig and Smith 1993, 147).

The Causal Principle has been the subject of extended criticism. [...] As Hume argued, there is no reason for thinking that the Causal Principle is true *a priori*, for we can conceive of effects without conceiving of their being caused and what is conceivable is possible in reality (1993, IV). Neither can an argument for the application of the Causal Principle to the universe be drawn from inductive experience. Even if the Causal Principle applies to events in the world, we cannot extrapolate from the way the world works to the world as a whole (Mackie, 85).

Defenders of the argument reply that [the Causal Principle is] necessary to make the universe intelligible (Taylor). Without such presuppositions, science itself would be undercut; utilization of [the principle] best accounts for the success of science, and indeed, for any investigatory endeavor (Koons). But even then, critics reply, the principle has only methodological and not ontological justification. As Mackie argues, we have no right to assume that the universe complies with our intellectual preferences for causal order. We can simply work with brute facts...

Others raise objections based on quantum physics (Davies, 1984, 200). On the quantum level, the connection between cause and effect, if not entirely broken, is to some extent loosened. For example, it appears that electrons can pass out of existence at one point and come back into existence elsewhere. One can neither trace their intermediate existence nor determine what causes them to come into existence at one point rather than another. Neither can one precisely determine or predict where they will reappear; their subsequent location is only statistically probable given what we know about their antecedent states. Hence, "quantum-mechanical considerations show that the causal proposition is limited in its application, if applicable at all [...]" (Smith, in Craig and Smith, 1993, 121-23, 182)...

Impossibility of an Actual Infinite?

Craig develops both *a priori* [purely philosophical] and *a posteriori* [based on scientific evidence] arguments to defend the second premise [that the universe began to exist]. His primary *a priori* argument is...

5. An actual infinite cannot exist.
6. A beginningless temporal series of events is an actual infinite.
7. Therefore, a beginningless temporal series of events cannot exist...

In defense of premise (5), Craig argues that if actual infinities ... were to exist, we would have rather absurd consequences. For example, imagine a library with an actually infinite number of books. Suppose that the library also contains an infinite number of red and an infinite number of black books, so that for every red book there is a black book, and vice versa. It follows that the library contains as many red books as the total books in its collection, and as many red books as red and black books combined. But this is absurd; in reality the subset cannot be equivalent to the entire set. Hence, actual infinities cannot exist in reality...

Critics fail to be convinced by these paradoxes of infinity. When the intuitive notion of "smaller than" is replaced by a precise definition, finite sets and infinite sets behave somewhat differently. Cantor, and all subsequent set theorists, define a set *B* to be smaller than set *A* (i.e., has fewer members) just in case *B* is the same size as a subset of *A* [i.e., the members of *B* can be linked one-to-one with members of *A*], but *A* is not the same size as any subset of *B*. The application of this definition to finite and infinite sets yields results that Craig finds counter-intuitive but which mathematicians and logicians see as our best understanding for comparing the size of sets... So while Craig thinks that Cantor's set theoretic definitions yield absurdities when applied to the world of concrete objects, set theorists see no problem so long as the definitions are maintained. [See also Smith, in Craig and Smith 1993, 85; Oppy 2006, 137-54.]...

The Big Bang Theory of Cosmic Origins

Craig's *a posteriori* argument for premise 2 invokes recent cosmology and the Big Bang theory of cosmic origins. Since the universe is expanding as the galaxies recede from each other, if we reverse the direction of our view and look back in time, the farther we look, the smaller the universe becomes. If we push backwards far enough, we find that the universe reaches a state of compression where the density and gravitational force are infinite. This unique singularity constitutes the beginning of the universe — of matter, energy, space, time, and all physical laws. It is not that the universe arose out of some prior state, for there was no prior state. Since time too comes to be, one cannot ask what happened before the initial event. Neither should one think that the universe expanded from some initial 'point' into space. Since the Big Bang initiates the very laws of physics, one cannot expect any physical explanation of this singularity; physical laws used to explain the expansion of the universe no longer hold at any time before $t > 0$.

One picture, then, is of the universe beginning in a singular, non-temporal event roughly 13-14 billion years ago. Something, perhaps a quantum vacuum, came into existence. Its tremendous energy caused it, in the first fractions of a second, to expand and explode, creating the four-dimensional space-time universe that we experience today. How this all happened in the first 10^{-35} seconds and subsequently is a matter of serious debate; what advocates of premise 2 maintain is that since the universe and all its material elements originate in the Big Bang, the universe is temporally finite and thus had a beginning.

The Big Bang Is Not An Event

[One response is to say] the Big Bang is not an event at all. An event takes place within a space-time context. But the Big Bang has no space-time context; there is neither time prior to the Big Bang nor a space in which the Big Bang occurs. Hence, the Big Bang cannot be considered as a physical event occurring at a moment of time. As Hawking notes, the finite universe has no space-time boundaries and hence lacks singularity and a beginning (Hawking 116, 136)... And without a beginning the universe requires no cause. The best one can say is that the universe is finite with respect to the past [i.e., there is an upper bound on the number of years old the universe is], not that it was an event with a beginning.

[This view effectively holds that for each positive real number, there is a corresponding time in our universe, but that there was no time zero. Now, there isn't a smallest positive real number — for each positive real number half of that number will be a smaller positive real number. So, on this view, there was no earliest time — instead each time was preceded by an earlier time half as far from the singularity. So, there is no earliest event, and hence no beginning point for the universe.]

A Non-finite Universe

Some have suggested that since we cannot "exclude the possibility of a prior phase of existence" (Silk 2001, 63); it is possible that the universe has cycled through oscillations, perhaps infinitely, so that Big Bangs occurred not once but an infinite number of times in the past and will do so in

the future. The current universe is a “reboot” of previous universes that have expanded and then contracted (Musser 2004).

The idea of an oscillating universe faces significant problems. [Physical laws, as currently understood, do not allow] for a series of cyclical universe-collapses and re-explosions...

Personal Explanation

Finally, something needs to be said about statement 4, which asserts that the cause of the universe is personal. Defenders of the cosmological argument suggest two possible kinds of explanation. *Natural explanation* is provided in terms of precedent events, causal laws, or necessary conditions that invoke natural existents. *Personal explanation* is given “in terms of the intentional action of a rational agent” (Swinburne, 1979, 20). We have seen that one cannot provide a natural causal explanation for the initial event, for there are no precedent events or natural existents to which the laws of physics apply. The line of scientific explanation [in terms of physical laws] runs out at the initial singularity, and perhaps even before we arrive at the singularity (at 10^{-35} seconds [after the singularity]). If no scientific explanation (in terms of physical laws) can provide a causal account of the origin of the universe, [then we’ll need either to settle for no explanation, or seek an explanation not in terms of physical laws. Defenders of the cosmological argument take the only viable alternative explanation to be] personal, i.e., in terms of the intentional action of a rational, supernatural agent...

The issues raised by the *kalām* argument concern not only the nature of explanation and when an explanation is necessary, but even whether an explanation of the universe is possible... The dispute rests on whether there needs to be a cause of the first natural existent, whether something like the universe can be finite and yet not have a beginning, and the nature of infinities and their connection with reality.

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