Why Christians should not use the Kalaam argument

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I've heard all kinds of well-meaning and well-educated Christian apologists use variations of the Kalaam argument for the existence of God. Although I strongly support the use of logical and rational arguments in apologetics, this one is one that I think should be dropped. It comes originally from the difficulties that philosophers had with the concepts of infinity in ancient days. Our math and the philosophy of mathematics has progressed, however, and many concepts of infinity that were problematic in old days simply are not problems now.

The Kalaam argument is essentially as follows, although there are many nuanced variations of it. First, the argument is made that there cannot be any real infinity in the universe (real in the sense of physically obtained and occurring). It therefore follows that time cannot be infinite in the backward direction, since there are no real infinities. One therefore must have an initial starting point to time. But because something cannot come from nothing, that starting point must have some sufficient cause outside itself. That starting point, or sufficient cause, must be something outside of time, which can be identified with God.

My main problem with this argument is its starting point, in rejecting the idea of any real infinity. It may very well be that the universe has a definite starting point in time, which we can identify as the Big Bang. But in modern physics and mathematics, there is nothing inconceivable or illogical about the idea of an infinitely old universe. If we reject that, it is because of the data and observations, not because it is a logical impossibility.

1. Why infinities shouldn't bother us

Much of the argumentation against any real infinities strikes me as fundamentally similar to the argumentation about Zeno's paradox. Zeno's paradox notes that to move any finite distance, we must move through an infinite number of spatial points. For example, we must first move half the distance. Then in the remaining interval, we must again move half the distance. And so on, and so forth, until we move through an infinite number of points.

Some have tried to solve the problem by positing that space is not infinitely divisible, but instead has a granular nature; for example, finite size elements with dimension of the Planck scale. Like the finiteness of time, that might turn out to be true based on some future observations, but it is a misguided solution to Zeno's paradox. First, it doesn't ultimately solve the problem. We can still say that each granule of space must have some spatial extent. Therefore, we can write down a number for half that spatial extent, and half of that half, and so one, even if we cannot actually divide the granule. So there would still be an infinite number of points inside the granule.

But more importantly, it wouldn't matter. The calculus of limits tells us how to traverse an infinite number of points in a finite time. Suppose we have a finite distance L. We can define a set of *N* points within this interval equal to *L/dx*, where *dx* is a small but finite distance. As $dx \to 0$, the number of points rises to infinity. However, we can write the velocity

$$v = \frac{dx}{dt}$$

where *dt* is the time needed to traverse the distance *dx*. This implies *dt = dx/v*. We can then take the limit $dx \to 0$. The time interval *dt* is proportional to *dx*, since *v* is a constant. Thus the time needed to traverse one point also has a limit of zero. The total time to traverse the distance *L* is

$$T = Ndt = \frac{Ndx}{v} = \frac{N}{v}\left(\frac{L}{N}\right) = \frac{L}{v}$$

which is finite.

In other words, even supposing that there is an infinite number of points in the interval, it does not follow that it takes an infinite time to traverse through all of them. The calculus of limits has many ways of treating limits of ratios, such that the ratios are finite even while the factors in the ratio are infinite (or zero). Thus there is no logical barrier to having a truly infinite number of spatial points in reality.

Once we accept that a finite interval can have an infinite number of really existing points, it is no problem to then move directly to a semi-infinite interval having an infinite number of really existing points. Points labeled by *x* in a finite interval [0,1] can be mapped one-to-one to points with value 1/*x* in the semi-infinite interval $[1,\infty]$. This, of course, can also be mapped one-to-one to the semi-infinite interval $[-\infty, -1]$.

The example here of a spatial range with an infinite number of points of course can be applied to time, as well. Thus a universe with infinite spatial extent or infinite temporal extent is not logically impossible.

What about the Hilbert hotel? Fans of the Kalaam argument, and fans of Hilbert's "finite mathematics," often try to create conundrums to prove that real infinities can't exist. One example is the "Hilbert hotel". In this scenario, there is a hotel with an infinite number of rooms. One night, each of the rooms is occupied. A new guest arrives and asks for a room, and is told they are all full. The guest suggests the following ingenious scheme: ask the occupant of room 1 to go to room 2 ask that occupant to move to the next room. The occupant of room 1 then sleeps in room 2, and the occupant of room 2 goes to room 3, displacing that occupant, and so on, until everyone has moved one room number higher. Since there is an infinite number of rooms, everyone will find a room, and the new guest can sleep in room 1.

This seems to imply a contradiction, since all the rooms were occupied at the start, with no empty spaces, but an empty space was found. For a physicist, though, this scenario is easily dealt with by the principle of *locality*. It takes a finite time for an occupant to move from one

room to the next. So really what has happened is that the new guest has set up a *traveling wave* in the chain of rooms. At all later points in time, there will be one guest walking from a one room to the next, while the other rooms are all occupied. There has not been a new room discovered, but rather a moving "excitation" (to use physics language).

Some may object to the physical example I have used here (although what is at stake here is the physical reality of infinities). An alternate version may be posed only in terms of numbers. Suppose we take the infinite set of integers, and map each value n to $n+1$. Since this is a one-to-one mapping, the number of integers in the range $[0, \infty]$ is the same as the number of integers in the range $[1, \infty]$. This seems to be a self-contradiction. But it is not. It is no different from saying that $\infty + 1 = \infty$, which is the same as saying that the limit of $(n+1)/n = 1$, as n goes to infinity, which is a well known mathematical result.

This is exactly what Cantor showed in his theory of infinities. For example, the set of all integers n can be mapped one-to-one to the set of all even integers $2n$. Hilbert's "finite mathematics" lies in the dustbin of history, as a curiosity, while Cantor's theory of infinities is taught in every introductory math course sequence. Hilbert had many other notable contributions to mathematics, but his "finite mathematics," or "finitism," is not one of them.

2. Theological objections

The rejection of real infinities may be said to "prove too much." For example, it would seem that the same argument proves that no one can have eternal life. It is standard Christian theology to say that people live on a semi-finite time interval, with a finite past and infinite future (eternal life). But as discussed above, the time interval $[t_0, \infty]$ can be mapped one-to-one to the time interval $[-\infty, t_0]$. If we reject the reality of infinities into the past, we must reject the reality of infinities into the future, since mathematically the same logic applies to both, by a simple reflection operation $t \rightarrow -t$. (Again, *observational* constraints may cause us to reject one or the other. But if we accept the Kalaam argument we must reject forward infinities as well as past ones.)

The argument also seems to imply that God cannot be eternal or infinite. Those holding to finitism sometimes argue that God is "outside" of time and space, and therefore the terms eternal and infinite have no meaning in regard to him. But classically these terms have indeed been applied to God, and not meaninglessly.

Although we may decide to drop the aspects of eternity and infinity with respect to God, the finitist argument again seems to prove too much—it would seem to strike at any of the attributes of God to which infinity is applied. For example, by this argument, God can only create a finite number of things, in a finite universe. His omnipotence is therefore not infinite; he is limited to a finite creation. In addition, his love is not infinite, because he can only love a finite number of creatures. Now, it may be that he chooses to only love a finite number of creatures, but the finitist argument says that he *cannot* love an infinite number. Furthermore, it would seem that he can only love for a finite duration, because only finite durations can exist.

One might construct a whole alternative approach to talking about God to address these problems, but as discussed above, it is unnecessary. There is no logical problem with having real infinities.

3. An alternative construction of the Kalaam argument

There is a way to recast the essential argument in a way that does make sense, however. The main point of the argument is that an infinite regress of causes and effects, in which each the causes is a sufficient cause of the later effects, can't be an adequate explanation for the state of things.

Why not? Because such a chain would by its nature imply that something eternal exists. Consider, for example, an infinite sequence of numbers which represent the state of some system at various points in time:

… -4, -2, 0, 2, 4, 6, … .

The state of the system at each successive point x_n is equal to the state at the preceding time plus 2. Each state could then be said to be determined by the previous state in an infinite chain; thus each state represents the local cause of the next state. But note that the *rule,* $x_{n+1} = x_n+2$, is unchanging, outside of the sequence of the values. If these values represent times, then the rule is "outside of time," i.e., eternal. Thus it is possible to have a real infinity (the chain of numbers), but it is not possible to have a state of affairs in which there is *nothing but* a set of changing things. One could imagine a rule that changed from state to state, but then there would have to be a rule for how that rule changed, and that macro-rule would be unchanging. If there were no rules at all, then by definition there would not be sufficient cause for the change of the states.

On this argument, then, the debate between the atheist and the theist is not whether there is something eternal. There must be something eternal. The debate is over the *nature* of what is eternal, i.e., whatever it is that plays the role of the overarching rule outside the system, in our example here. The atheist says, implicitly, that the eternal is impersonal or machine-like (which means, at minimum, that there is no forward-looking *intention* at the grand scale), while the theist says that the eternal is personal, i.e., that among other aspects, the ground of all being has intention, in looking forward. To resolve this debate one must depart from pure logic and look empirically at the state of things the way they really are, in our experience. This takes one to issues such as the appearance of design of life and the universe, evidence for supernatural communication, etc.

The line of argument, focusing on what makes the rules that govern changes of state, can be extended to eliminate polytheism. Suppose that there are two eternal, intentional beings. Now suppose that they disagree in their intentions. How do they work out who wins? If they fight it out, there must be some controlling entity which determines the rules by which they fight. If that entity is personal, then that is the real God. If the entity which determines the rules of the fight is impersonal, i.e., "laws of nature," then the fundament of the universe is really impersonal, as the atheist believes. Polytheism is then just a type of atheism, in which gods may appear as people do, as the products of forces in an overall impersonal eternity.

On the other hand, suppose that these entities never fight, never disagree, and are always in accord. This is then precisely the case of the Trinity, i.e. poly-unity. There is really just one eternal intention, or will.

Conclusion

Although the Kalaam argument appeals to many people as an argument for the existence of God, it "proves too much," removing the concepts of infinity and eternity from the Christian religion, and for no good logical reason. One might get around the implication that there is no eternal life for people by saying that they are "translated into eternity" outside of physical reality, but the Bible will have none of that—the Bible presents a very real, concrete view of our eternal life in heaven, not a disembodied ethereal state.

Rather, one can see the kernel of the Kalaam argument as the (correct) rejection of an infinite regress of causes and effects as a *full description* of the nature of the universe. Not one of the causes in such a chain is able to sufficiently account for the *chain itself*. Each lies within the chain, which itself is governed by rules outside the chain.