

HOW DID THE UNIVERSE BEGIN?
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Faith and Reason: Believe Your Beliefs, Doubt Your Doubts
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Thank you very much. It is just a delight to be here with you sharing in this apologetics weekend at Saddleback. This is Jan and my first visit to Saddleback. So you can imagine how excited I am to have the privilege of standing behind this podium where Rick Warren preaches. It's just great to be here.

I can't resist commenting on this marvelous thing-a-ma-jig, this camera boom. I've never seen anything like this in church. It reminds me of something from *Jurassic Park*. In fact I have got a great idea. Why doesn't somebody get Stephen Spielberg to donate to the church a left over brachiosaurus head and neck that you could put around this thing? Wouldn't that be cool? In fact it would be very useful if the guest speaker went over time. It could kind of sweep down and whisk him away.

But seriously it really is extraordinary that Rick would devote the weekend services to the exploration to the relationship between faith and science. And to explore some of the deepest questions that we human beings can ask. I think it is vitally important that we as Christians be able to understand and interact with a modern, scientific view of the world. Otherwise we're going to be simply culturally irrelevant in the twenty-first century of western society.

The topic that I've been asked to speak on today is one of the hottest topics in contemporary cosmology: How Did the Universe Begin?

What I want to do in our time together this morning is to show that we have very good grounds for accepting the biblical world view that the universe was created out of nothing, by God, at some point in the finite past.

I'll introduce our topic by first saying a word about the historical background of the debate over the origin of the universe. Then I'll share a classic argument for creation and unfold some of the philosophical and scientific support for its premises. Finally I'll wrap up by reflecting a bit theologically on the significance of this conclusion.

As a boy I used to wonder about the existence of the universe. I wondered about how big it is. I wondered about how it began. I remember lying in bed at night trying to think of a beginningless universe. Every event would be preceded by another event. Back and back and back into the past with no stopping point. Or rather no starting point. An infinite past with no beginning. My mind just reeled at the prospect. It just seemed inconceivable to me. It seemed to me that there had to be a beginning at some point in the past in order for everything to get started.

Little did I realize that for centuries, millennia really, men had grappled with the idea of an infinite past and the question of the absolute beginning of the universe. Ancient Greek philosophers like Plato and Aristotle believed that matter was necessary and uncreated, and

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therefore eternal. God may be responsible for introducing order into the cosmos but he didn't create the universe itself.

This Greek view was in contrast to even more ancient Jewish thought about the subject. Hebrew writers held that God created the universe out of nothing at some point in the finite past. As the first verse of the Bible states, "*In the beginning God created the heavens and the earth.*"

Ancient Hebrew in which the book of Genesis was written had no word for "the universe." When an ancient Hebrew speaker wanted to refer to the universe he would use the expression "the heavens and the earth." So Genesis 1:1 states in effect, "*In the beginning God created the universe.*" It therefore implies that God created everything that exists without any preexisting material.

Some scholars have tried to deny this fact by translating Genesis 1:1 as a subordinate clause. "*When God created the universe in the beginning, the earth was without form and void.*" Which might make it sound as if the earth was already there. But most scholars today recognize this to be a mistranslation of the Hebrew. In the Hebrew there is a conjunction between verses 1 and 2; and when you have a grammatical construction like this, what you have is two main clauses with the first one providing background information for the second.

So verse 1 states, "*In the beginning God created the universe.*" Then in verse 2 the focus radically narrows "*and the earth was without form and void.*" So in contrast to the Greek view, the Hebrew world view was that matter and energy are not eternal but were created at some time in the finite past by God.

This is also the worldview of the New Testament Christians. The gospel of John opens with words that are very reminiscent of Genesis 1:1 "*In the beginning was the word and the word was with God and the word was God. All things were made through him and without him was not anything made.*" John 1 verses 1 and 3.

Eventually these two competing traditions began to interact. There arose a debate in western philosophy that lasted well over a thousand years on whether or not the universe had a beginning. Although the debate began between great pagans and Christians it eventually pulled in Jews and Muslims as well as Christians both Catholic and Protestant. It finally sputtered to something of an inconclusive end in the thought of the great German philosopher Immanuel Kant in the eighteenth century. Kant held ironically that there are rationally compelling arguments for both sides. So that the problem is insolvable and exposes the bankruptcy of reason itself.

What were some of the arguments for the beginning of the universe? Let's let one of the greatest medieval champions of the doctrine of creation speak for himself. Al-Ghazali was a twelfth century Muslim theologian from Persia or modern day Iran. And he was concerned that Muslim philosophers of his day were being influenced by Greek philosophy to deny the beginning of the universe. They held that the universe flows necessarily out of God and is therefore beginningless.

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After thoroughly studying the teachings of these philosophers, al-Ghazali wrote a devastating critique of their views called The Incoherence of the Philosophers. And in this fascinating book he argues that it is impossible that the universe be beginningless. The universe must have a beginning he argues. And since nothing begins to exist without a cause there must therefore be a transcendent creator of the universe.

Ghazali frames his argument very simply. Let me quote him: "Every being which begins has a cause for its beginning. Now the world is a being which begins. Therefore it possesses a cause for its beginning."

We can summarize Ghazali's reasoning in three simple steps.

- One, whatever begins to exist has a cause.
- Two, the universe began to exist.
- Three, therefore the universe has a cause.

This argument is so marvelously simple that it's easy to memorize and share with another person. Moreover this is a logically airtight argument. If the two premises are true then the conclusion follows necessarily.

So I'd like to look at this argument with you this morning more closely. Starting with the second premise that the universe began to exist.

During the Middle Ages before the rise of modern science people had no scientific evidence for the beginning of the universe. But Ghazali presented some ingenious philosophical arguments for why the past has to be finite.

For example Ghazali points out that if the universe never began to exist then the number of past events in the history of the universe is infinite. Think about it. If the universe never began to exist then the number of past events is infinite. But al-Ghazali argued this is impossible because an actually infinite number of things cannot exist.

The way in which Ghazali shows the impossibility of an actually infinite number of things is by imagining what it would be like if such a collection could exist and then drawing out the absurd consequences from it.

Let me share with you one of my favorite illustrations called Hilbert's Hotel which is the brainchild of the great German mathematician David Hilbert. As a warm up Hilbert first invites us to imagine an ordinary hotel with a finite number of rooms. Let's suppose that all the rooms are full. If a new guest shows up at the front desk asking for a room the manager apologizes, "Sorry. All the rooms are full." And the guest has to be turned away.

But now, Hilbert said, let's imagine a hotel with an infinite number of rooms. And let's suppose once again that all the rooms are full. This fact has to be clearly appreciated. There is not a

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single vacancy throughout the entire infinite hotel. Every room already has a guest in it. Ok? Stay with me here.

Suppose a new guest shows up at the front desk asking for a room. What will the manager say? "No problem!" he says. And he moves the guest who is staying in room one into room two. He moves the guest who was in room two into room three. He moves the guest who was in room three into room four. And so on out to infinity so that everybody moves into the room number next highest to his own.

As a result room number one now becomes vacant and the new guest is easily accommodated. Yet before he arrives all the rooms were already full.

If that seems weird hang on to your hat because it gets even worse. Let's suppose, Hilbert said, that an infinity of new guests shows up at the front desk asking for rooms. "No problem!" says the manager. And he moves the guest who was staying in room one into room two. He moves the guest who was in room two into room four. He moves the guest who was in room three into room six. Putting each guest into the room number twice his own. One into two, two into four. Three into six. Four into eight. And so on out to infinity.

Think about that. Since any number multiplied by two is always an even number all of the guests wind up in the even numbered rooms - two, four, six, eight, ten and so forth. As a result all of the odd numbered rooms become vacant. And the infinity of new guests gratefully check in. Yet before they arrive all the rooms were already full. In fact the proprietor could do this an infinite number of times and always be able to accommodate more guests.

As one student remarked to me after class, Hilbert's Hotel, if it could exist, would have to have a sign posted outside: No vacancy. Guests welcome.

Hilbert's Hotel is absurd. Mind you, it's logically correct for the mathematician. But it's impossible for something like Hilbert's Hotel to really exist. You can describe it on paper but it cannot exist in reality.

Illustrations like these show that the existence of an actually infinite number of things is impossible.

Sometimes people react to Hilbert's Hotel by saying that these paradoxes result because we can't understand the infinite. It's just beyond us. But this reaction is in fact mistaken and naïve. Infinite set theory is a highly developed and well understood branch of modern mathematics. These absurdities result not because we do not understand the infinite. But because we do understand the nature of the actual infinite. Hilbert was a smart guy and he knew well how to illustrate the bizarre consequences of an actually infinite number of things.

Now what are the implications of all this? If you can't have an actually infinite number of things then you can't have an actually infinite number of past events. That means that the number of past events in the history of the universe must be finite. But in that case, the past is finite and therefore the universe began to exist just as al-Ghazali claimed.

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So I think that al-Ghazali's argument is a good one. I think that it shows that the number of past events must be finite and that therefore the universe must have had a beginning.

Al-Ghazali had philosophical arguments for the beginning of the universe. But in one of the most startling developments of modern science which al-Ghazali could never have anticipated, we now have pretty good scientific evidence that the universe began to exist. The evidence of observational astronomy indicates that the entire universe is expanding in the sense that the distances between the galaxies grows greater and greater and greater as time goes on. This has the startling implication that as you trace the expansion back in time the universe gets denser and denser and denser until it finally collapses down to a point before which the universe literally did not exist. That initial event has come to be known as the Big Bang.

What makes the Big Bang so startling is that it represents the origin of the universe from literally nothing. For all matter and energy, even physical space and time themselves come into being at the moment of the Big Bang. As the British physicist P.C.W. Davies explains, the coming into being of the universe as discussed in modern science is not just a matter of imposing some sort of organization upon a previous incoherent state; but literally the coming into being of all physical things from nothing. The standard Big Bang model thus predicts an absolute beginning of the universe. If this model is correct then we have amazing scientific confirmation of the second premise of al-Ghazali's cosmological argument.

So the question is, Is the standard model correct? Or more accurately: Is it correct in predicting an absolute beginning of the universe?

Though there is a good deal of evidence in favor of the standard Big Bang model, we know that it will need to be modified in certain ways. The standard model is based upon Albert Einstein's general theory of relativity. But Einstein's theory breaks down when the universe is shrunk down to sub-atomic proportion. At that point we'll need to introduce sub-atomic physics in order to describe the universe. And nobody knows how this is to be done. Moreover the expansion of the universe is probably not constant as it is in the standard model. It's probably accelerating and may have had a brief period of super rapid expansion in the past.

But none of these adjustments need affect the fundamental prediction of an absolute beginning to the universe. Ever since the standard model was first proposed back in the 1920s scientists have proposed scores of alternative models over the decades. Those that do not have an absolute beginning have been repeatedly shown to be unworkable. To put it more positively, the only viable non-standard models are those that involve an absolute beginning to the universe.

That beginning may or may not have a beginning point. But on theories like Stephen Hawking's, where the universe does not have a sharply defined point at which it originates, nevertheless the past is still finite not infinite. The universe has not existed forever according to such models. But it came into existence even if it didn't do so at a sharply defined point.

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So in a sense, the history of twentieth century cosmology can be seen as a history of one failed attempt after another to avert the prediction of the beginning of the universe predicted by the standard Big Bang model.

Unfortunately the impression arises as a result in the minds of laymen that the field of cosmology is in constant turnover with no lasting results. What the layperson doesn't appreciate is that this parade of failed theories simply goes to confirm the prediction of the standard model that the universe began to exist. That prediction has now stood for well over eighty years throughout a period of enormous advances in observational astronomy and creative theoretical work in astrophysics.

In fact, something of a watershed appears to have been reached in the year 2003. In that year three scientists, Arvin Borde, Alexander Vilenkin and Alan Guth were able to prove that any universe which is on average expanding throughout its history cannot be infinite in the past, but must have a past space time boundary.

What makes their proof so powerful is that it holds independently of any physical description of the early universe. Because we cannot yet provide a physical description of the very early universe, this has been fertile ground for speculation. This early region has been compared by some scientists to the regions on ancient maps labeled "Here there be dragons." It could be filled with all sorts of fantasies. But the Borde theorem is independent of any physical description of that early beginning of the universe.

Their theorem implies that even if the universe is just part of a wilder multi-verse of many universes, even then the multi-verse itself must have an absolute beginning. Vilenkin is blunt about the implications. I quote: "It is said that an argument is what convinces reasonable men and a proof is what it takes to convince even an unreasonable man. With the proof now in place cosmologists can no longer hide behind the possibility of a past eternal universe. There is no escape. They have to face the problem of a cosmic beginning."

We can fully expect that new theories of the universe will be proposed attempting to avoid the universe's absolute beginning. Such proposals are to be welcomed and we have no reason to expect that they'll be any more successful in averting the absolute beginning of the universe than their failed predecessors.

Of course, scientific results are always professional. Nevertheless, I think it seems pretty clear in this case which way the evidence points. Today the proponent of al-Ghazali's argument stands solidly within mainstream science in accepting that the universe began to exist.

On the basis then of both philosophical argument and scientific evidence, I think we have good grounds for believing the second premise of al-Ghazali's argument - that the universe began to exist.

But that takes us back to the first premise of Ghazali's argument. That whatever begins to exist has a cause. I think that this principle that whatever begins to exist has a cause is so obvious that it is virtually undeniable for any sincere seeker after truth. For something to begin to exist

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without any cause of any sort would be to come into being from nothing. That is surely impossible. Let me give three reasons in support of this premise.

First, something cannot come from nothing. To claim that something can come into being from nothing is literally worse than magic. Think about it. When a magician pulls a rabbit out of a hat at least you've got the magician, not to speak of the hat. But if you deny this premise then you've got to think that the whole universe just appeared at some point in the finite past for no reason whatsoever. But nobody sincerely believes that things, say a horse or an Eskimo village, could just pop into being uncaused, out of nothing. Nobody here this morning is worried that while you're listening to this lecture a horse may have popped into being uncaused back in your living room right now and is there defiling the carpet as we speak.

Sometimes skeptics will respond to this argument by saying that in modern physics there are subatomic particles, virtual particles that can come into being from nothing. Or again, certain theories of the origin of the universe have been touted as showing that you can get something from nothing, because the universe comes into being out of the vacuum. So the universe is the exception to the proverb "There ain't no free lunch."

This skeptical response represents a deliberate abuse of science. The theories in question have to do with particles or the universe's coming into being as a fluctuation of the energy contained in the vacuum. And the vacuum in physics is not what the layman means by vacuum - nothing. Rather for physics the vacuum is a sea of fluctuating energy, a sea of violent physical activity having a physical structure and governed by physical laws. To go out and tell lay people that on such theories something comes into being from nothing is a deliberate distortion of those theories. Properly understood, nothing does not mean just empty space. Rather "nothing" is the absence of anything whatsoever. Even the absence of empty space. As such nothingness literally has no properties at all because there isn't anything to have any properties.

So how silly it is when popularizers say things like "nothingness is unstable to vacuum fluctuations." Or "the universe tunneled into being out of nothingness."

Secondly, if something can come into being from nothing then it becomes inexplicable why just anything or everything doesn't come into being from nothing.

Think about it: why don't bicycles or Beethoven or root beer just pop into being uncaused out of nothing? There can't be anything about nothingness that favors universes because nothing has no properties. So what makes nothingness so discriminatory? That only universes can pop into being from nothing. Nothing cannot be constrained by anything either because there's nothing to be constrained.

At this point the atheist is likely to retort "Ok, then what is God's cause if everything has to have a cause?" I'm always amazed at the self-congratulatory attitude of people who pose this question. They've imagined that they've said something really profound or important here. When all they've done is simply misunderstand the premise. Premise one does not say that everything has a cause. It says everything that begins to exist has a cause. Something that is

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eternal and never began to exist wouldn't have cause. So al-Ghazali would say that God is simply eternal and uncaused.

Notice this isn't special pleading for God. Because this is what the atheist has always said about the universe. The universe is eternal and uncaused. The only problem is we now have good evidence that the universe is not eternal in the past but had an absolute beginning. Therefore the atheist is backed into the corner of having to affirm that for no reason whatsoever the universe just popped into being uncaused out of absolutely nothing. Which is absurd.

Thirdly, common experience and scientific evidence confirm the truth of premise one. Premise one is constantly verified and never falsified. It's hard to understand how any atheist committed to the truth of modern science could deny in light of the evidence that premise one is plausibly true. So I think that the first premise of al-Ghazali's argument is clearly true - that everything that begins to exist has a cause.

When I first published my work on the cosmological argument I did hear that atheists would attack the second premise that the universe began to exist. But I never dreamed that they would go after the first premise that whatever begins to exist has a cause. For to do so would expose them as people not sincerely looking for truth but just looking for an academic reputation of the argument. Looking for loopholes. What a surprise it was then to hear atheists denying premise one in order to escape the conclusion of the argument.

For example, my collaborator Quinton Smith, atheist philosopher at the University of Western Michigan, has responded that the most rational position to hold is that the universe came from nothing by nothing and for nothing. A good conclusion to a Gettysburg address of atheism perhaps.

This is simply the faith of an atheist. In fact, I think it takes a greater leap of faith to believe this than to believe in the existence of God. For it is, I repeat, literally worse than magic. If this is the alternative to belief in God then unbelievers can never denounce believers as irrational. For what could be more irrational than this.

It follows from the two premises of the argument that therefore the universe has a cause. What then is the theological significance of this conclusion? The prominent atheist philosopher Daniel Bennett denies that it has any theological importance. Bennett agrees that the universe has a cause. But he thinks that the cause of the universe is itself. Yes. He's serious. He thinks that in the ultimate boot strapping trick (those are his words) the universe created itself.

Somebody needs to say that the emperor is wearing no clothes. Bennett's view is patent nonsense. Notice he's not saying that the universe is self caused in the sense that it is eternal and beginningless. No. He's saying that at some point in the finite past the universe brought itself into existence. But this is clearly impossible for in order to create itself the universe would have to already exist. It would have to exist before it existed which is a self-contradiction.

So Bennett's view is patent nonsense. It is logically incoherent.

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The cause of the universe must therefore be a transcendent cause beyond the universe. This cause must itself be uncaused because we've seen there cannot be an infinite regress of causes. It is therefore the first uncaused cause.

What properties then must this first uncaused cause of the universe possess?

First it must transcend space and time because it created space and time. Since it is not in time it must therefore be changeless. Since it is not in space it must therefore be immaterial or non physical. It must be unimaginably powerful since it brought all matter and energy into being. Finally this first uncaused cause plausibly must be personal being. As al-Ghazali argued this is the only way to explain how a timeless cause can give rise to a temporal effect with a beginning like the universe.

Here's the problem: If a cause is sufficient to produce its effect, then if the cause is there the effect must be there as well. For example, the cause of water freezing is the temperature being below zero degrees centigrade. If the temperature has been below zero degrees from eternity past then any water that was around would be frozen from eternity past. It would be impossible for the water just to begin to freeze a finite time ago. Once the cause is given its effect must be given as well.

The cause of the universe never began to exist since it is timeless. So why isn't the universe beginningless as well? Why did the universe come into being only about thirteen billion years ago? Why wasn't it as beginningless as its cause?

Al-Ghazali maintained that the only answer to this problem is that the cause must be a personal being who has freedom of the will. His creating the universe is a free act of the will independent of any prior condition. Thus his creating of the universe can be something spontaneous and new. So the cause can exist eternally, but a finite time ago freely willed to create a new effect and bring the universe into being. Thus we are brought not merely to a transcendent cause of the universe but to its personal creator.

Al-Ghazali's argument thus gives us I think good grounds for believing in the existence of a beginningless, uncaused, timeless, spaceless, changeless, immaterial, enormously powerful, personal creator of the universe.

I've already told you how Daniel Bennett responds to this argument. Would you like to hear how Richard Dawkins responds?

Like Bennett, Dawkins doesn't deny either premise of the argument. Instead he merely questions the theological significance of the argument's conclusion. He writes "Even if we allow the dubious luxury of arbitrarily conjuring up a terminator to an infinite regret and giving it a name, there is absolutely no reason to endow that terminator with any of the properties normally prescribed to God - omnipotent, omniscient, goodness, creativity of design, to say nothing of such human attributes as listening to prayers, forgiving sins, and reading innermost thoughts."

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Notice that Dawkins doesn't dispute that the argument proves the existence of a beginningless, uncaused, timeless, spaceless, changeless, immaterial, enormously powerful, personal creator of the universe. He merely complains that this creator hasn't also been shown to be omnipotent, omniscient, creative of design, listening to prayers, forgiving sins, and reading innermost thoughts.

To which I say, So what? The argument doesn't aspire to prove such things. It would be a bizarre form of atheism. Indeed one not worth the name to believe that there exists a beginningless, uncaused, timeless, spaceless, changeless, immaterial, enormously powerful personal creator of the universe who may also, for all we know, possess the properties listed by Dawkins.

If al-Ghazali's argument is right then Dawkins' atheism is philosophically bankrupt.

By contrast, Jews, Christians, Muslims and all who believe in the biblical doctrine of creation have solid ground indeed philosophically and scientifically for believing that God created the universe a finite time ago out of nothing. The blessed in heaven are said to sing, *"You are worthy our Lord and God to receive glory and honor and power for you created all things and by your will they were created and exist. Amen and amen."*

Our great and good heavenly Father, we thank you so much for your creative power that is evident in nature around us and especially in your magnificent creation of this universe in which we dwell. Father, we pray that you would make us bold ambassadors for Christ, able to interact with the culture in which we live and able to give a reason for the hope that is within us. So Father, as we go out this week rubbing shoulders with co-workers, friends, family, we pray that you would make us effective witnesses and ambassadors for Christ. In Jesus' name we pray. Amen.