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The Origin of the Universe

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What Was the Big Bang?

"If you're religious, this is like looking at God."(1)

A mystic, describing his vision in a trance? A poet, looking at the beauty of nature and seeing God? No, a Berkeley astrophysicist, commenting on the data he was making public in 1992 that seemed to confirm a basic expectation of the Big Bang theory.

Just what is the Big Bang theory of the origin of the universe? One scientist summed it up succinctly by saying: "The explosion from zero volume at zero time of a corpuscle of energy equivalent to the mass and radiation that now constitute the Universe."(2) What does that mean? It means that everything we now see or know about was once compacted into an unimaginably small blip that suddenly expanded in a huge explosion that created the very space and time it was expanding into. Or as Calvin of *Calvin and Hobbes* put it, "The Horrendous Space Kabloolie."

The Big Bang has become as much a part of our common science knowledge as dinosaurs, something we speak about with the same sense of familiarity we talk about atoms. But, like atoms, how much do we really know about this wondrous explosion of everything?

In this essay we'll talk about what scientists mean by the Big Bang theory, why it's often in the news, why some scientists oppose it, what it tells us about our home the universe, and what we as Christians can learn from all of this.

Science is often seen as attacking the God of the Bible, but in this case scientific discoveries seem to be revealing God's work. The Bible begins with the statement that God created the heavens and the earth, leaving no doubt that all we see had a beginning and had a Creator.

But by the 1700s many people accepted an earlier theory that Immanuel Kant made more popular. The theory held that the universe is an infinite expanse with no beginning and no end. This fit the philosophy of the time, as people did not want to think that they might have to face judgment by a God who had the power to both begin and end the universe.

In the roaring twenties, Edwin Hubble had begun to investigate mysterious masses of stars called nebulae. Some thought we were all part of one giant galaxy; others thought there might be a whole world of galaxies outside our own. Hubble was able to show that there are many galaxies besides our own. In 1929 he announced we were in a huge universe, so big it would take light billions of

years to travel across it. Not only was it immense, but every part was moving away from every other part at incredible speeds, some receding at 100 million miles an hour!

Priests do not enter into this story very often, but in the late 20s and early 30s a Belgian priest and mathematics teacher by the name of Georges Lemaître (who was fond of saying "There is no conflict between science and religion") first constructed and then published a theory that changed the course of cosmology in the twentieth century. Taking Hubble's observation that the galaxies were rapidly receding from one another, he ran the theory backwards to a time when all the matter in the universe was very close together. He called this the "primordial atom" and imagined a beginning when the whole universe exploded like "fireworks of unimaginable beauty" with a "big noise." (3) Thus was born the Big Bang theory.

Why Is Everybody Excited?

Geffory Burbidge has been complaining recently that his colleagues in astronomy have been all too quick to join "the First Church of Christ of the Big Bang." And what is causing this big rush? Findings from the Hubble Space telescope and the COBE (Cosmic Background Explorer) satellite that are confirming the Big Bang theory in unprecedented detail.

When the Big Bang was originally formulated about sixty years ago, not much thought was given to the conditions of the universe at the very beginning. But by the early 60s some scientists had realized that such an incredibly hot origin might have left slight traces behind. There might still be a whisper of the beginning of everything. This whisper would be a very small remnant of the heat of that first fiery instant.

In 1965 two Bell scientists announced they had indeed found such a remnant, a cosmic background radiation. This radiation, the signature of the heat of a long ago creation, was very close to what several theorists had rather off-handily predicted some years before. Their paper had gone unnoticed because there was at that time no way to measure such a small signal, but when Arno Penzias and Robert Wilson, of Bell Laboratories, published their short article, it was quickly seen as confirmation of the Big Bang, and they received the Nobel Prize in 1978.

Then, in 1989, the United States launched the COBE satellite to look for details of the cosmic background radiation. The first evidence looked promising, but showed a background radiation so smooth that it was hard to understand how any cosmic structures like stars or galaxies could have formed. Unless there were some differences in the initial temperature of space, there would have been no reason for matter to cluster and form stars.

Then, in a dramatic press conference in 1992, George Smoot and others announced that they had found ripples of temperature differences in the radiation data. Even Stephen Hawking, the wheelchair-bound English astrophysicist, proclaimed, "It is the discovery of the century, if not of all time." (4) Every major newspaper in the world carried stories about the "echoes of creation." And many assumed that the Big Bang was proved.

But even as many scientists exulted in the new data, new questions also began to arise, but they were not questions about whether the Big Bang happened, but about how it progressed. For most scientists, the Big Bang theory is not "in trouble" as is sometimes reported. What is in question is how this sea of energy that was there in the first moments of the Big Bang was transformed into the myriad of galaxies, clusters, quasars, and other astronomical oddities.

Science, by its very nature, attempts to find the best explanation for observed phenomena. But the Big Bang has drawn an impenetrable curtain across the stage of history. For some this is a frustration: "This view of the origin of the universe is thoroughly unsatisfactory . . . [because] the origin of the Big Bang itself is not susceptible to discussion," fumes the editor of *Nature*. (5) But for others, the very impossibility of going behind the creation points to God in a powerful way. "For

since the creation of the world His invisible attributes, His eternal power and divine nature, have been clearly seen, being understood through what has been made, so that they are without excuse" (Rom. 1:20).

"Big Bang Theory Collapses"

The banner headline in *Nature* magazine read "Down with the Big Bang." (6) Sounding more like a 60s chant about the Establishment, the editorial was, however, very serious. And *Nature* magazine is perhaps the most respected science publication in the world. Why was the editor so exercised about the leading cosmological theory? Because it was "philosophically unacceptable." "The origin of the Big Bang is not susceptible to discussion," fumed John Maddox. And besides that "Creationists . . . have ample justification in the doctrine of the Big Bang." So, for Maddox, a scientific theory that is only rivaled in acceptance by evolution is "thoroughly unsatisfactory" because (1) it says that scientists cannot know everything and (2) the theory might encourage belief in a creator. But materialists like Maddox are not alone.

"Big Bang Theory Collapses" shouted the title of an article written in a creationist journal. It went on to make such remarks as "The Big Bang theory has received one body blow after another" and "A cruel fate has befallen the grandest theory of all." They reported the "death knell of the cold-dark-matter theory" as if this were the main theory cosmologists had developed. Remarks suggesting results from the COBE satellite "should really make them wish they had gone into some other field" came across as very unprofessional. The description of scientists as "smug in their assurance" about the cosmic background radiation seemed more descriptive of this article itself than the theory it was attempting to criticize. (7)

Young earth creationists find the Big Bang theory a failure primarily because it does not fit an interpretation of Genesis 1 that requires the universe be created less than 50,000 years ago. But what are the scientific problems with the Big Bang?

One continuing problem surrounding theories of the origin of the universe has been "How much matter is there in the universe?" It is generally agreed that there is indirect evidence of far more matter in the universe than we have been able to detect. But what form is this matter in? This so-called "missing mass" may, by some estimates, make up 90% of all the matter in the universe. But where is it? Several theories attempt to answer this question, but at the moment, there are not many ways to test competing theories.

Another continuing problem is finding out what caused the clumpiness of the universe? When we look out into the sea of galaxies that surrounds our own, we find that the swirling pools of stars are not evenly distributed in space but rather segregated into "walls" separated by "voids." It is not yet known what accounts for this foam-like structure, but any theory of galaxy formation needs to provide an answer.

So, while the Big Bang certainly has difficulties, and may be replaced some day, it has also been the basis for many correct predictions about the structure of the universe. Like any scientific theory, the Big Bang is not a static idea but a theory that is always open to new information that may change its basic form, or lead to its rejection, or merely confirm that it is indeed correct. But, especially for Christians, it's ironic that while most scientists have been searching for a naturalistic answer for the origin of the universe, they have instead, ended up with a theory that points strongly to a Creator.

A "Just Right" Universe

Imagine piles of dimes stacked on all of North America as high as the moon. More than you could possibly ever count. Then imagine a billion other continents covered over with more dimes. Now, somewhere in those billion piles, hide one red dime. What are the chances of taking a blind-folded person out into these piles and having them pick up the one red dime on the first try. Not likely? Well, the odds of the universe just happening to have the correct number of protons and electrons is the same as the odds

for getting the red dime the first time. And if the universe did not have just the right ratio of these particles, galaxies, stars, and planets could never have formed, let alone people and all the rest of nature.(8)

In the last fifteen years, scientists who study the make up of our solar system, and the stars in our galaxy, have come to the conclusion that unless conditions had been perfectly fine-tuned for us, life could never have arisen on planet Earth even by evolution. Every time we learn something about the form of the universe, we find new reasons to glorify God, and to thank Him for His creation.

Arno Penzias, who with Robert Wilson was awarded the Nobel Prize for detecting the cosmic background radiation in 1965, much later remarked that: "Astronomy leads us to a unique event, a universe which was created out of nothing, one with the very delicate balance needed to provide exactly the conditions required to permit life, and one which has an underlying (one might say supernatural) plan."(9)

Robert Griffiths summarized it nicely when he said: "If we need an atheist for a debate, I go to the philosophy department. The physics department isn't much use."(10) Obviously those physicists know too much.

When Paul talks about what all people know about God, he points to the natural world as the foremost witness (Rom. 1:20). And, in these last years of the twentieth century, as we discover more and more about the conditions necessary for life, we find everywhere signs that we could not possibly be here by chance. Every detail of the basic structure of nature, even such things as how far away the moon is from the earth, must be fine-tuned to an unprecedented degree for us to live here on earth.

In the design of the universe, in the construction of our solar system, and in the very systems of our own earth, there is immense evidence of planning. The Big Bang theory provides strong evidence of fine tuning so clear that even a dogmatic atheist such as Sir Fred Hoyle was moved to affirm that "a superintellect has monkeyed with physics, as well as with chemistry and biology"(11) to create a world for humans to live in.

Will we give glory to God for His great creation, or will we continue to proclaim that we are merely the chance creations of a random process of undirected evolution? The choice is ours.

What Can Christians Learn?

"The scientist's pursuit of the past ends in the moment of creation. This is an exceedingly strange development, unexpected by all but the theologians. They have always accepted the word of the Bible: In the beginning God created heaven and earth."(12) This has been a difficult lesson for scientists, and many have yet to learn it. But what lessons can Christians learn from the search for Big Bang?

One of the primary lessons is that we need to know what it is a theorist is trying to prove. Often, as one reads the literature, one sees some rather clear statements about why certain possibilities are chosen. As is often the case, Sir Fred Hoyle is a good example: "This possibility [of a steady state universe] seemed attractive, especially when taken in conjunction with the aesthetic objections to the creation of the universe in the remote past."(13) Hoyle is very clearly saying that, because he disliked the idea that the universe might have been "created" sometime in the past, perhaps by God, he would seek to develop another theory that avoids that possibility.

A second lesson is that we must be careful of the role we give to science. A scientist very astutely observed that "We live...in an age obsessed with scientific sanctification and technological authority.' If creationism is judged scientific, America will respect it."(14) His point is that Christians, like everyone else, have fallen prey to the idea that if an idea is judged "scientific" it must be right. The phrase "scientific creationism" is an excellent example of this tendency. But is science really

the final judge of truth? For the Christian, and anyone else who believes that not all of what makes humans both beautiful and unique is measurable, the answer must be "No." Science is a good companion, but not a good guide. Whenever Christians have wedded themselves to a scientific theory they have suffered through painful divorces when that theory has proved to be an unfaithful guide to the world. The church's acceptance of an Aristotelian unmoved earth is but one example of the church not recognizing that science can and will change. The Big Bang may be today's best theory, but, as one of the best scientific authors on the Big Bang has written: "[O]ne ought to take the extrapolations back to the beginning of time with a healthy dose of skepticism. The Big Bang cosmology may yet be superseded."(15)

Whether we are young earth creationists or materialistic evolutionists, this warning is equally true. The Big Bang is the best answer we have at this moment. It may change next year, and by next century it will almost surely have changed, perhaps dramatically. If science fully supports our view of Scripture now, will we be willing to change it when science changes? The Bible is beautifully clear that "The heavens are telling of the glory of God; And their expanse is declaring the work of His hands" (Psalm 19:1), but we must admit that we are not always clear exactly what the details of the message are. It is God's glory that we must be clear about.

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Notes

1. *Scientific American*, July 1992, 34.
2. *Nature*, 356:731 (30 April 1992), unsigned opinion.
3. Los Angeles Times, 12 January 1933. Quoted in Timothy Ferris, *Coming of Age in the Milky Way* (New York: William Morrow, 1988), 211.
4. Hugh Ross, *The Creator and the Cosmos*, second expanded edition (Colorado Springs, Col.: NavPress, 1995), 19.
5. *Nature*, John Maddox, 340:425 (10 August 1989).
6. *Ibid.*
7. Duane T. Gish, "Big Bang Theory Collapses," *Impact* # 216, June 1991.
8. Hugh Ross, *The Creator and the Cosmos*, chapter 14.
9. *Ibid.*, 122.
10. *Ibid.*, 123.
11. *Ibid.*, 121.
12. Robert Jastrow, *God and the Astronomers* (New York: W.W. Norton, 1978), 115.
13. Hugh Ross, *The Fingerprint of God* (Orange, Calif.: Promise Publishing, 1989), 76.
14. *Discover*, March 1987, 6.
15. *Nature*, Joseph Silk, 322:505 (7 August 1986).

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