Cosmic question: God in a world explained by science

by J. B. Stump in the December 26, 2012 issue

Science has figured out many things that we once thought could be explained only by positing a supernatural intervention. We might still pray for rain, but we can trace the cause of thunder without invoking bowling gods. Sudden outbreaks of disease or a return to health were once so poorly understood that it seemed God must have been directly responsible for them. The question then arises: Is there still a place for God in a world explained by science—and if so, what is it?

The 19th-century British mathematician and philosopher Augustus De Morgan told a famous story (probably embellished a bit) in which Napoleon asks one of the leading scientists of the day, Pierre-Simon Laplace, why he has not mentioned the Creator in his new book, *Systeme du Monde*. Laplace answers, “I had no need of that hypothesis.”

In making that claim, Laplace was not advocating atheism. Rather, he was making a statement about the comprehensiveness of his scientific explanation. Laplace believed that he had gone beyond the remarkable achievements in mathematical physics that Isaac Newton had made in the previous century. Despite giving precise formulas to account for some empirical evidence—showing, for example, how gravity causes both cannonballs and the moon to trace out the paths they

do—Newton was not able to account for other phenomena, like why the “fixed” stars don’t collapse together from the force of gravity. On such points, Newton could only say, “and then a miracle happens.” Laplace (and scientists generally) were not satisfied with retaining a miracle in scientific explanations. His equations and scientific explanations were better than Newton’s and didn’t need to appeal to supernatural intervention to make the system work.

But this move appeared to squeeze God out and threatened to undermine a theistic view of the cosmos. If God resides in gaps in the natural order that science can’t explain, then modern science gives God an increasingly smaller place to reside.

In the 20th century, however, the natural scientific explanation of the cosmos ran into something unexpected. Cosmologists posited something called the Big Bang—an absolute beginning point, a time before which there were no further times—no earlier events that could be appealed to in order to explain the world.

Before the 20th century, scientific orthodoxy held the cosmos to be eternal. There was always an earlier state of things to which science could appeal. But Albert Einstein’s equations for general relativity implied that the universe does not stand still; it is always expanding or contracting. Just as an object propelled upward will eventually either escape earth’s gravity or succumb to that gravitational force (despite the evidence of the cartoon coyote, it can never just hover there), so too the enormous masses of the universe must always be moving apart from each other or collapsing together.

Einstein initially resisted this conclusion and added a fudge factor to his equations to prevent it (a move he later called the greatest blunder of his scientific career). But Edwin Hubble soon found empirical evidence that the newly discovered galaxies were indeed receding from each other as we progress through time. If we were to run time backward, we’d eventually get to the spot at which all matter, energy and space itself are condensed into one point. Other empirical evidence, like the incredible confirmation of cosmic microwave background radiation, eventually convinced even the staunchest critics that there had been a Big Bang. But where did that come from?

Now the cosmologists needed a self-explaining event to get things started: a First Cause or an Unmoved Mover. Groping around in that conceptual territory, they stumbled into theology. Reflecting on this development in 1978, the agnostic

cosmologist Robert Jastrow (*God and the Astronomers*, 1992) expressed many scientists' sense of dismay: "For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries."

With the Big Bang theory being embraced by science, it seemed to Jastrow that theologians had found a permanent seat at the table of scientific explanations for the cosmos. If scientists were unable to provide a purely natural explanation for how the cosmos got started, then it seemed reasonable to appeal to something supernatural.

The Big Bang proved to be a big boon for the dialogue between science and religion. It is no coincidence that science and religion emerged as an academic discipline in the wake of the cosmological discoveries of the mid-20th century. Many theists saw in the Big Bang unmistakable evidence of God's involvement in the natural world. They took the Big Bang to be scientific proof of the theological doctrine of creation ex nihilo. Even biblical literalists (once they got over their literal reading of the Bible's timeline) decided that the true meaning of "Let there be light" was to be found in the explosion of our universe into being some 13.7 billion years ago. This was fantastic stuff. Even now we imagine the moment of creation by using a film clip of the Big Bang in which a camera, stationed a safe distance away, records an incredible explosion.

But that is a popularized and cartoonish version. In its scientific guise, the Big Bang is not some fiery explosion that came out of nothingness; the term really just names a placeholder for we know not what. Current scientific theories can't penetrate to time zero and describe what was going on. Theorists have precise things to say about what was going on one second after the Big Bang, backed up with impressive empirical evidence. At that point the universe was already about 1,000 times the size of our solar system. Modern physics can describe its further development, but before that first second, things are a bit sketchy.

The problem is that we don't know how two highly confirmed theories—general relativity, which describes the world on a large scale, and quantum mechanics, which describes it on a small scale—fit together. These two scales have to be integrated for us to make sense of things, because the whole universe was once only

the size of an atom. Our current inability to articulate a unified physics precludes anything more than speculation about the first microseconds of the cosmos.

In recent years, however, some scientists have contended that they can figure out the origins of the cosmos without positing something like God. Stephen Hawking's *The Grand Design* (2010) speculates that time folded back on itself in the earliest moments of the universe, just like direction folds back on itself on the surface of the globe at the north and south poles. It becomes meaningless then to ask what came before the Big Bang, just as it is meaningless to ask what is north of the North Pole. You can travel north for only so long before you're forced to start heading back south. If the analogy is correct, on Hawking's model we can go back in time only so far with our explanations before we're forced to move in the other direction. Echoing the Council of Nicea's condemnation of the Arian view of Jesus, we cannot say of the universe, "There was when it was not." So according to Hawking, there is no need to invoke a Creator to bring it about.

Cosmologist Lawrence Krauss takes a different approach to render appeals to God obsolete in cosmogony. He argues in *A Universe from Nothing* (2012) that a natural explanation of something coming from nothing can be found in quantum theory. No material particles or energy, no space or time, exist in a relativistic quantum field vacuum. But according to the highly confirmed laws of quantum physics, it is to be expected in such a vacuum that little packets of space can pop in and out of existence in a kind of random flux. Some of these will undergo massive inflation and develop into full-blown universes complete with matter and energy. Nothingness, Krauss argues, is inherently unstable and will naturally develop into something—many somethings, it seems.

It has also become popular to speculate on this subject of multiple universes. Brian Greene's *The Hidden Reality* (2011) details some nine different kinds of "multiverses" that have been postulated. The most promising version of this approach intimates that rapid cosmic inflation and some versions of string theory would give rise to an astonishing number of universes, each with different laws of physics. Such a scenario undermines the appearance of cosmic "fine tuning" according to which some philosophers think we must invoke God to explain why our universe defies the odds and is hospitable for life. It would be no mystery that, out of the possible 10500 universes that the theory predicts, we find ourselves in one where the laws are in our favor.

None of these theories is without its critics on scientific grounds. They all reach well beyond the available empirical evidence and so remain in the arena of speculation. But they are consistent with the available empirical evidence and in some cases suggested by the mathematics. And so it is not beyond the realm of possibility that one of them or something similar will eventually succeed in giving a complete and fully natural description of the origin and development of the cosmos.

Objections might be made on philosophical grounds as to whether science could ever give an ultimate explanation of the universe (a topic explored engagingly by Jim Holt in *Why Does the World Exist? An Existential Detective Story*, 2012). Regardless of how that part of the story plays out, Christians should learn something from the science of the past 100 years: it is a risky business to bet on God standing in the gaps in our understanding of scientific theories. Whether the gap is explaining why the stars don't collapse, or how bacterial flagella could have evolved, or how all this matter and energy got here, science has proven to be remarkably successful at explaining things on its own terms.

Does that success come at the expense of God? Too many people—both Christians and atheists—have seemed to think that the completeness of scientific theories obviates any role for the divine. When some scientists or news reporters trumpet the latest scientific discoveries as rendering belief in God obsolete, I say that I'm already an atheist with respect to the kind of god they're talking about. That god is just one of the causes in and among other natural causes. If we're looking for God in those kinds of gaps, we'll soon be left with Napoleon wondering what happened to God.

We shouldn't try to squeeze God into the gaps in scientific explanations. Some try to preserve a role for God in this way, thinking that unless we keep God involved in at least part of the day-to-day business of the natural world, we'll wind up with deism. The god of deism may start things off, but then just sits back and watches the world go according to the natural laws.

But there is only a slight difference between the god of deism and a god who watches the world go most of the time but every once in a while steps in and tinkers with the natural systems a bit to make them work right and then goes back to sitting and watching during the parts of the processes we do understand. And as science progresses and explains more of the gaps, there will be ever more sitting and watching by such a god.

In that sense, science has exposed a flaw in our theology. We've been seduced by our lack of understanding into thinking that God is the sort of creator who designed natural systems that were incapable of being described consistently in natural terms. We've thought that God's interaction with the world has to do with filling in causal gaps that appear in the normal operation of those systems. (This is to say nothing of positing moments of miraculous intervention.) We should allow the success of science to correct this understanding of God. God's interaction with and sustaining of all creation must operate at a different level than the forces of nature.

We should consider God's relationship to creation to be more like that of a personal agent, rather than a force of nature. Then we can talk about God's actions in personal terms like "willing" or "governing" or even "loving," and we don't need to worry that a new scientific discovery will prove this wrong.

This is the approach taken, for instance, by British physicist and theologian John Polkinghorne when he asks us to consider the kinds of explanations that could be given for why a tea kettle is boiling. The physicist might give an explanation in terms of the closed electrical circuit with such and such resistance in the heating element of the stove, which conveys heat to the bottom of the kettle, which in turn causes the water molecules to move more rapidly within the kettle, whereby the increasingly rapid motion of the molecules eventually becomes sufficient to push the vapor pressure of the water higher than the atmospheric pressure—and the water boils. That is a perfectly legitimate and scientifically complete explanation. We don't have to appeal to anything supernatural to explain that process.

But another correct description of the situation is to say that the kettle is boiling because I want a cup of tea! This second kind of explanation is what we might call a personal explanation. It appeals to a different sort of reality—the reality of persons—and provides an explanation in terms more appropriate to that reality. If God is a personal being, as our creeds attest, then it is perfectly legitimate to explore that personal aspect of reality in theological terms, while at the same time encouraging others to explore the level of description more appropriate to the fundamental laws and forces of nature.

Science may well be comprehensive within its domain. When speaking as scientists we need not appeal to supernatural intervention to make our equations work. But theology should persuade us that there are limits to that domain. Natural explanation does not exhaust reality. Chemists might give an exhaustive analysis of

the elements and properties of an oil painting, or acoustic engineers might comprehensively describe the action of sound waves in a symphony hall. But if those descriptions were all that were given, we'd be missing the central point of art and music.

So too with explaining the origin of the universe. Is the Big Bang as far back as we can go with a scientific explanation? Maybe, maybe not. I see no reason to take a definitive stand on that question. If scientists can figure out ways to push their explanation back further, Christians can remain committed to the claim that they will not have explained all of reality. Scientists may give a more comprehensive account of one aspect of reality, but if Christians are right, there is another aspect to reality. Indeed, the central point of reality is a personal being who loves and sustains the world and who cannot be exhaustively described by science any more than art or music or love can be.