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Science and Religion

The myth of conflict

by
Professor Stephen M. Barr

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The Big Bang, the beginning and creation

As atheists often tell the story, Copernicus and Galileo overthrew, or at least unsettled, the Christian view of the universe, which was that man dwells at the very center, as befits the only creature made in the image of God. The truth, however, is quite different. The medieval picture of the cosmos, in which there were transparent celestial spheres rotating around a centrally located and spherical earth, did not come from any Jewish or Christian source, but from ancient Greek science, specifically Aristotle and Ptolemy. (The Old Testament Jews, like their Near Eastern neighbors, had the older, more primitive conception of a flat earth supported by pillars and covered by a dome-like sky or "firmament".) Moreover, neither the ancient Greeks nor the medieval Christians who borrowed their astronomical ideas saw the center of the universe as being the most glorious place. The center of the universe was for both the *lowest* place; the farther a thing was from it the more exalted it was in every way. Man dwelt in an intermediate position, neither in the dismal underworld nor in the splendid heavens.

Jews and Christians have always based their cosmology (or picture of the universe) on the science or

commonly held ideas of the time. There was, however, one point of the cosmology of Jews and Christians that set them apart from the pagan peoples among whom they lived. It was not about space and whether it had a center, but about time and whether it had a beginning.

A beginning

The philosophers of ancient Greece, including Plato and Aristotle, believed that the world had always existed. It was the Bible - indeed, its very first words - that introduced the idea of a "Beginning" into Western thought. The pagans often ridiculed the Jews and Christians for this idea, asking them what their God was doing for all that infinite time before he finally got around to making the world. St Augustine (354-430) had a profound answer. He said that it made no sense to ask what God was doing "before" he made the universe, because there was no such thing as a time "before the universe". He pointed out that time, as a feature of the created world, is *itself* something created. Therefore, time can only exist *after* creation has taken place, not before. Indeed, the very idea of "before" creation is meaningless. As St Augustine put it, "Why do they ask what God was doing 'then'? There was no 'then' where there was no time." In other words, *the beginning of the universe was also the beginning of time itself*. Both the Fourth Lateran Council (1215) and the First Vatican

Council (1870) spoke of God creating the world “from the beginning of time”.

For centuries, modern science found no evidence of a “Beginning”. In Newtonian physics, it was natural to think of time, like space, having no limits. In the nineteenth century, physicists discovered the law of “conservation of energy”, which says that “energy can neither be created nor destroyed”. Chemists found that the amount of matter does not change in chemical processes; so matter too could neither be created nor destroyed. Almost every indication from science was that matter, energy, time, and space had always existed and always would. Consequently, many scientists came to believe that the ancient pagan philosophers were right and that the world had always existed. This was the view of most American physicists and astronomers even as late as 1959, according to one survey. The idea of a Beginning was seen by many of them as an outdated religious myth.

The Big Bang theory

However, things began to change when Einstein proposed his theory of gravity (“General Relativity”) in 1916. In the 1920s, a Russian mathematician named Alexander Friedmann and a Belgian physicist named Georges Lemaître (who was also a Catholic priest) found solutions to the equations of Einstein’s theory that described a universe in which space itself is expanding. In 1927, Fr

Lemaître proposed that the universe had started off as an extremely small dense ball, which he called the “primeval atom”, which exploded and expanded to form the vast universe we see today. This came to be called the Big Bang Theory. Scientists were very slow to accept this theory, in part because they found the idea of a beginning hard to swallow. But in 1964 it was discovered that the universe is filled with faint radiation (called the “cosmic background radiation”), which turned out to be the afterglow of the Big Bang explosion. Since then, the evidence in favor of the Big Bang Theory has grown so strong that now few scientists seriously doubt it.

Was the Big Bang the beginning of the universe? Possibly not. Some interesting theories have been proposed in which the Big Bang was only the beginning of one phase of the history of the universe. But there are very strong theoretical physics arguments (based on the Second Law of Thermodynamics and on some theorems proved by the physicists Borde, Guth and Vilenkin a few years ago) that suggest that the universe must have had a beginning at *some* point, whether it was the Big Bang or some earlier point.

Moreover, physics says that the beginning of the universe was also the beginning of time itself. Physics came to this conclusion by an argument very similar to the one St Augustine used 1,600 years earlier. St Augustine started with the idea that time is something

created. Modern physics starts with the idea that time is something *physical*: "space-time" according to Einstein's theory is a physical fabric that can stretch, bend, and vibrate. So time, being a feature of the physical universe, can only exist after the universe begins. St Augustine's famous reply to the pagan scoffers has been vindicated. So profound were St Augustine's insights that it is common for technical research papers on "quantum cosmology" to quote his writings on the nature of time.

Creation

In recent decades, some physicists have suggested that science will someday be able to explain the Beginning, possibly through the idea of "quantum creation of universes". In a certain sense, that may be true. That is, the Big Bang (or the Beginning, whenever it was) may have been "natural" in the sense that it obeyed the laws of nature. It is quite possible that the fundamental equations of physics correctly describe everything that happened at the beginning of the universe. Would that be the same as "explaining creation"? Would that mean that no Creator was necessary? No. That is confusing two ideas. Let us go back to the analogy of a play. The "beginning" of the play *Hamlet* consists of its first words in Act I, Scene I. One may explain this beginning - i.e. why the play begins in a particular way, with particular

words - by the laws of English grammar, by the principles that govern the proper writing of plays, by the way the opening scenes fit into the play's overall plot, and by various other factors. But while all these things may explain why the play begins as it does, they do not explain *why there is a play at all*. The reason there is a play at all is that William Shakespeare decided to write one and conceived it in his mind.

Science may discover the ultimate laws of physics (it may already have, if M theory turns out to be correct). And it is quite possible that the mathematics of those laws might require that any universe described by them have a beginning and that its beginning happen in a certain way. But that would still not tell us why there actually exists a universe described by those laws - rather than no universe at all or a universe described by other laws. A story may tell of real events or of fictitious events; and the mere fact that a story tells of something beginning does not mean anything really does begin except in the story. Similarly, a set of mathematical equations may describe a really existing universe or a fictitious one; and the mere fact that they might describe a universe that has a beginning does not make them a description of anything real. What gives *reality* to the universe is not the equations that describe its structure, but God, who is the ultimate reality and source of being.