

Aquinas and the Big Bang

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One day a little boy asked his mother where he came from. His mother, pleased to have the opportunity to discuss such an important matter with her son, began by offering an elementary account of human biology, even introducing some references to the theory of evolution. Lest she restrict her analysis to the realm of the purely physical, she spoke of God's role in the creation of each human soul, and ultimately of God as the source of all that is. After she had finished, her young son, looking somewhat bemused, said to her that he had wondered about this because his friend next door had told him that he had come from Iowa.

The question of where we come from can be answered in many ways. We need to keep this fact in mind when we turn our attention to the account given by contemporary cosmology of the origins of the universe. The reigning theory among scientists today is that we live in the aftermath, or rather in the midst, of a giant explosion that began about fifteen billion years ago. Most cosmologists refer to the Big Bang as a "singularity," that is, an ultimate boundary or edge, a "state of infinite density" where space-time has ceased. Thus it represents an outer limit of what we can know about the universe since it is not possible to speculate, at least in the natural sciences, about conditions before or beyond the categories of space and time.

Nevertheless, in the past two decades some cosmologists have come to offer theories that account for the Big Bang itself as a fluctuation of a primal vacuum. Just as sub-atomic particles appear to emerge spontaneously in vacuums in laboratories, as the result of what is called "quantum tunneling from nothing," so the whole universe may be the result of a similar process. Other cosmologists, such as Stephen Hawking, contend that the notion of an initial "singularity" that seems to require a temporal beginning to the universe needs to be rejected. The universe, according to Hawking, does not have a boundary: "It is completely self-contained and not affected by anything outside itself." He thinks that the only way to have a scientific theory is if "the laws of physics hold everywhere, including at the beginning of the universe." For Hawking, contemporary quantum theory leads us to reject the very notion of such a privileged point as *the beginning* of the universe.

These recent variations in Big Bang cosmology have led some to wonder whether we are on the verge of a scientific explanation of the very origin of the universe. The contention of the new theories is that the laws of physics are sufficient to account for the origin and existence of the universe. If this be true, then, in a sense, we live in a self-creating universe that has sprung into existence spontaneously from a cosmic nothingness. Or, in Hawking's analysis, since the question of a beginning of the universe becomes meaningless, there is no role for a creator. As Quentin Smith, a philosopher of science, observes, if Big Bang cosmology is true "our universe exists without explanation. . . . It exists non-necessarily, improbably, and causelessly. It exists *for absolutely no reason at all.*"

In such a self-sufficient universe, exhaustively understood in terms of the laws of physics, it would seem that there is no room for the God of Jewish, Christian, or Muslim revelation. The advances of modern science threaten to render traditional doctrines of creation and its Creator as intellectual artifacts from a less enlightened age. Perhaps the God of traditional theology is but a hypothesis now shown to be unnecessary.

Too often contemporary discussions about the relationship between science and religion suffer from an ignorance of history, and our question is an example. For we can save God and natural theology from the

dustbins simply by turning to the sophisticated analyses of the natural sciences and creation that took place during the age of High Scholasticism. In the thirteenth century, brilliant scholars such as Albertus Magnus and Thomas Aquinas wrestled with the implications for Christian theology of the most advanced science of their day—namely, the works of Aristotle and his Muslim commentators, which had recently been translated into Latin. Following in the tradition of Muslim and Jewish thinkers, Aquinas developed an analysis of the doctrine of creation *ex nihilo* that remains one of the enduring accomplishments of Western culture. His analysis provides refreshing clarity for our often confused contemporary discussion of the relationship between science and religion.

It seemed to many of Aquinas' contemporaries that there was a fundamental incompatibility between the claim of ancient physics that something cannot come from nothing and the affirmation of Christian faith that God produced everything from nothing. Furthermore, for the Greeks, since something must come from something, there must always be something—the universe must be eternal.

Recent speculations that the universe began as "quantum tunneling from nothing" reaffirm the ancient Greek principle that you cannot get something from nothing. For the "vacuum" of modern particle physics, whose "fluctuation" some see as bringing our universe into existence, is not absolutely nothing. It is not anything like our present universe, but it still is something. Or else, how could it fluctuate?

An eternal universe seemed incompatible with a universe created *ex nihilo*, and so some medieval Christians thought that Greek science, especially in the person of Aristotle, ought to be banned, since it contradicted the truths of revelation. Aquinas, believing that the truths of science and the truths of faith could not contradict one another—God being the author of all truth—went to work to reconcile Aristotelian science and Christian revelation.

The key to Aquinas' analysis is the distinction he draws between *creation* and *change*. The natural sciences, whether Aristotelian or those of our own day, have as their subject the world of changing things: from subatomic particles to acorns to galaxies. Whenever there is a change there must be something that changes. The Greeks are right: from nothing, nothing comes; that is, if the verb "to come" means a change. All change requires an underlying material reality.

Creation, on the other hand, is the radical causing of the whole existence of whatever exists. To cause completely something to exist is not to produce a change in something, is not to work on or with some already existing material. If, in producing something new, an agent were to use something already existing, the agent would not by itself be the *complete* cause of the new thing. But such a complete causing is precisely what creation is. To create is to give existence, and all things are totally dependent upon God for the very fact that they are. God does not take nothing and make something out of "it." Rather, anything left entirely to itself, separated from the cause of its existence, would be absolutely nothing. Creation is not some distant event; it is the continuing, complete causing of the existence of everything that is. Creation, thus, is a subject for metaphysics and theology, not for the natural sciences.

Aquinas saw no contradiction in the notion of an eternal created universe. For, even if the universe had no temporal beginning, it still would depend upon God for its very being. There is no conflict between the doctrine of creation and any physical theory. Theories in the natural sciences account for change. Whether the changes described are biological or cosmological, unending or finite, they remain processes. Creation accounts for the existence of things, not for changes in things.

Aquinas did not think that the opening of Genesis presented any difficulties for the natural sciences, for the Bible is not a textbook in the sciences. What is essential to Christian faith, according to Aquinas, is the "fact of creation," not the manner or mode of the formation of the world. Aquinas' firm adherence to the truth of Scripture without falling into the trap of literalistic readings of the text offers valuable correction for exegesis of the Bible which concludes that one must choose between the literal interpretation of the Bible and modern science. For Aquinas, the literal meaning of the Bible is what God, its author, intends the words to mean. The literal sense of the text includes metaphors, similes, and other figures of speech useful

to accommodate the truth of the Bible to the understanding of its readers. For example, when one reads in the Bible that God stretches out His hand, one ought not think that God has a hand. The literal meaning of such passages concerns God's power, not His anatomy. Nor ought one think that the six days at the beginning of Genesis literally refer to God's acting in time, for God's creative act is instantaneous.

Adhering to the traditional reading of Genesis and the doctrinal proclamation of the Fourth Lateran Council (1215), Aquinas believed that the universe had a temporal beginning. Aristotle, he thought, was wrong to think otherwise. But Aquinas argued that, on the basis of reason alone, one could not know whether the universe is eternal. Furthermore, if there were an eternal universe it still would be a created universe. To affirm, on the basis of faith, that the universe has a temporal beginning involves no contradiction with what the natural sciences can proclaim, since on their own they leave this question unresolved. Hawking's denial of an absolute beginning to time, while also affirming a finite past, involves complicated speculation about quantum gravity, which itself remains not fully worked out. Regardless of the intelligibility of Hawking's scientific claims, the conclusions about creation he and others draw from them are false.

The Big Bang described by modern cosmologists is a change, not a creation; the natural sciences do not themselves provide an account for the ultimate origin of all things. Apologists for the Christian doctrine of creation ought not to think that the initial "singularity" of traditional Big Bang cosmology offers scientific confirmation of their view. Nor ought those who reject the doctrine of creation think that recent variations in Big Bang cosmology support their view. Even if the universe were the result of the fluctuation of a primal vacuum, it would not be a self-creating universe. The need to explain the existence of things does not disappear. Contrary to the claim that the universe described by contemporary cosmology leaves nothing for a creator to do, were a creator not causing all that is, there would be nothing done.

Aquinas would have no difficulty accepting Big Bang cosmology, even with its recent variations, while also affirming the doctrine of creation out of nothing. He would, of course, distinguish between advances in cosmology and the philosophical and theological reflections on these advances.

The variations in Big Bang cosmology I have mentioned are only theoretical speculations, and there are likely to be more of them. Their status as mere "speculations," however, does not justify their failure to distinguish among the domains of the natural sciences, metaphysics, and theology, nor their encroachment on nonscientific ground. Like the little boy mentioned at the outset, we are being told a great deal that is beside the point of our question. Thomas Aquinas did not have the advantage of the Hubble Space Telescope, but in many ways he was able to see farther and more clearly than those who do.

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