

Is God a A Catholic Astronomer Looks at Evolution Scientist?

by George Coyne, SJ

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WHEN Niels Stensen (1638–1686) a Danish scientist and Catholic priest, discovered in the mountains of Tuscany the fossil of a shark's tooth almost identical to one that came from a shark caught off of the coast of Livorno, Italy, he intuited that Tuscany must have once been inundated by an ocean. His published work on such themes founded three sciences: paleontology, crystallography, and historical geology. He identified different geological strata and proposed a temporal sequence for the formation of Earth's crust. And, for the first time, the biblical flood was considered the source of the inundations. From then on, the mistaken attempt to employ the Bible as a source of scientific knowledge has unduly complicated the evolution debate.

It was not Charles Darwin (1809–1882) who caused problems for theologians with implications that might be drawn from the theory of evolution. It was about a hundred years before Darwin that the College de Sorbonne, a kind of French Holy Office or Inquisition in Paris, condemned French naturalist Georges Buffon (1707–1788) for having proposed that it took billions of years for the Earth's crust to form. Darwin's contribution to the growing scientific evidence for evolution was not so much evolution as such but rather the adaptation of living organisms to the environment, one of the two great pillars of evolutionary theory: internal mutations in an organism and natural selection.

The British intellectual and Roman Catholic Cardinal John Henry Newman (1801–1890) stated in 1868: "The theory of Darwin, true or not, is not necessarily atheistic; on the contrary, it may simply be suggesting a larger idea of Divine Providence and Skill." Newman's intuition fits very well the implications to be drawn from our scientific knowledge of an evolutionary universe.

The Catholic position

A half century after Darwin, research on evolution by Catholic scholars was a veritable minefield. Many saw another "Galileo affair" in the making. Nonetheless, in 1996, Pope John Paul II declared in a message to the Pontifical Academy of Sciences that "New scientific knowledge has led us to the conclusion that the theory of evolution is no longer a mere hypothesis." This has also led to what is called neo-Darwinian evolution, for the most part in continuity with Darwin but obviously progressing beyond his science.

A recent episode in the relationship of the Catholic Church to science is the affirmation by Cardinal Christoph Schönborn in a *New York Times* article (July 7, 2005) that neo-Darwinian evolution is not compatible with Catholic doctrine, and he opts for Intelligent Design.

In my estimation the cardinal is in error on at least five fundamental issues: (1) The theory of evolution is (as are all scientific theories) completely neutral with respect to religious thinking. (2) John Paul II's message, dismissed by the cardinal as "rather vague and unimportant," is a fundamental Church teaching that advances the



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evolution debate. (3) Neo-Darwinian evolution is not, in the words of the cardinal, “an unguided, unplanned process of random variation and natural selection.” (4) The apparent directionality seen by science in the evolutionary process does not require a designer. (5) Intelligent Design is not science, despite the cardinal’s statement that “neo-Darwinism . . . [was] invented to avoid the overwhelming evidence for purpose and design *found in modern science*” [my emphasis].

I will address some of these issues by discussing the best modern scientific view of the universe in evolution—physical, chemical, and biological—and then, as a Christian believer, draw some implications from the science presented.

The cosmos and life

Stars are born by the laws of physics. A cloud of gas and dust, containing about 100 to 1,000 times the mass of our sun, gets shocked by a supernova explosion or something similar, begins to break up, and chunks of the cloud collapse. The mass is so great that the internal temperature reaches millions of degrees, turning on a thermonuclear furnace. A star is born. Thermonuclear energy is the source whereby a star radiates to the universe. You need a very hot piece of the universe to do this, and so you can only get this thermonuclear furnace by having a cloud collapse and raise the temperature. You can only get it in stars or in the very hot early universe before galaxies or stars were born.

Stars also die. A star at the end of its life can no longer sustain a thermonuclear furnace and so

it can no longer resist gravity. It collapses again, explodes, and expels its outer atmosphere into the universe, and succeeding generations of stars are born out of this material that had been made in a thermonuclear furnace.

In order to get the chemical elements to make the human body, we have to have three generations of stars. As stars live, they convert the lighter elements into the heavier elements: hydrogen to helium, helium to carbon, carbon to oxygen, to nitrogen, all the way up to iron. Stars have to regurgitate carbon and silicon and other elements to the universe. If this did not happen, you and I would not be here.

How did we humans come to be in this evolving universe? We do not know everything about this process. After the universe became rich in certain basic chemicals, those chemicals got together in successive steps to make ever more complex molecules.

It would be scientifically absurd to deny that the human brain, the most complicated machine we know, is a result of chemical complexification in an evolving universe. When I call the brain a machine, I am not excluding its spiritual dimension but talking about it as a biological, chemical mechanism.

Chance or design

Did this happen by chance or by necessity in this evolving universe? The question is not formulated correctly. It is not just a matter of chance or necessity because it is both, and there is a third very important element, which I call “fertility”

The Crab Nebula is the spectacular result of the death of a star, a critical step, according to the author, in the development of the universe.



Georges Buffon’s eighteenth-century proposal that Earth was billions of years old ran counter to Church teachings.



or “opportunity.” The universe is so prolific in offering the opportunity for the success of both chance and necessity.

For 13.7 billion years the universe, which contains 100 billion stars, has been playing the lottery. When we speak about a small chance we mean that it is very unlikely that a certain event would happen. The “very unlikely” can be calculated mathematically by taking into account the size of the universe, the number of stars, how many of these would have developed planets, and so on. This is not guesswork; there is a foundation in fact for making each successive calculation.

A good example of a chance event would be two simple molecules wandering about the universe, meeting, and becoming a more complex molecule because that is their nature. But temperature and pressure conditions are such that this chemical bonding cannot happen. Those two molecules may wander off, but others meet billions and billions of other times until, finally, at the correct temperature and pressure, a more complex molecule is formed.

From an analysis of the mathematics of nonlinear dynamics, as this process goes on and more-complex molecules develop, there is more and more direction to this process. As the complexity increases, the future complexity becomes more and more predetermined. In such a way did the human brain come to be and it is still evolving. Can we call this process “destiny”?

Science for a believer

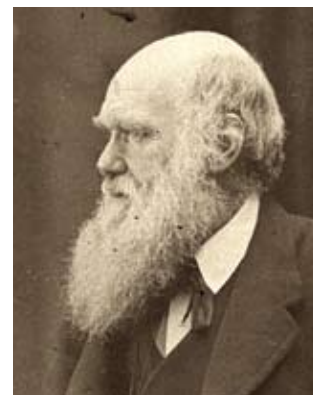
How are we to interpret the scientific picture of life’s origins in terms of religious belief? Do we need God to explain this? Very succinctly, no. In fact, to need God would be a very denial of God. God is not the response to a need. But God is the creator of the universe. It is unfortunate that, especially in America, creationism has come to mean some fundamentalistic, literal, scientific interpretation of Genesis. Judaism, Christianity, and Islam are radically creationist, but in a totally different sense in that they are rooted in a belief

that everything depends upon God, all is a gift from God. The universe is not God and it cannot exist independently of God. Neither pantheism nor naturalism is true.

If we take modern science seriously, what it tells us of God must be very different from God as seen by medieval philosophers and theologians. For the religious believer, modern science reveals a God who made a universe that has within it a dynamism and participates in God’s creativity. Such a view of creation can be found in early Christian writings, especially in those of St. Augustine in his comments on Genesis. Religious believers who respect the results of modern science must move away from the notion of a dictator God, a Newtonian God who made the universe as a watch that ticks along regularly.

Perhaps God should be seen more as a parent or as one who speaks encouraging and sustaining words. Scripture is very rich in these thoughts. It presents, indeed anthropomorphically, a God who gets angry, who disciplines, a God who nurtures, who works with the universe that has a certain vitality of its own as a child does. It has the ability to respond to words of endearment and encouragement. You discipline a child, but you try to preserve and enrich the individual character of the child and its passion for life. A parent must allow the child to grow into adulthood, to come to make its own choices, to go on its own way in life. Words that give life are richer than mere commands or information. In such ways does God deal with the universe. It is for reasons of this description that I claim that Intelligent Design diminishes God, makes him an engineer who designs systems rather than a lover.

These are very weak images, but how else do we talk about God? We can come to know God only by analogy. The universe as we know it today through science is one way to derive analogical knowledge of God. For those who believe modern science does say something to us about God, it provides an enriching challenge to traditional beliefs about God. God in his infinite freedom continuously creates a world that reflects that freedom at all levels of the evolutionary process to greater and greater complexity. He does not intervene but rather allows and loves. Is such thinking adequate to preserve the special character attributed by religious thought to the emergence not only of life but also of spirit, while avoiding a crude creationism? Only a protracted dialogue will tell. ■



“A half century after Darwin [above], research on evolution by Catholic scholars was a veritable minefield,” writes the author.



Cardinal John Henry Newman defended Darwin. “The theory of Darwin,” wrote the cardinal, “true or not, is not necessarily atheistic; on the contrary, it may simply be suggesting a larger idea of Divine Providence and Skill.”



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