

Intersection of Science and Religion

- John R. Albright¹

Abstract: *The author presents a very personal account of how religion has impacted his career as a scientist. Although many different issues of science/religion arise, two have been most formative: creation/evolution and determinism/chance.*

- Editor

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Creation and Evolution

In North America today very many people see the relation between science and religion² as a conflict, with the battleground centered on the issue of evolution. Too many people would join in asking the question that I was asked a few years ago, “Do you believe in evolution, or do you believe that God created everything?” My response was that I need not choose between these two – I believe that both are correct. I came to this conclusion at the age of fifteen years, when I had to do a biology project for school. I chose to write a library research paper on the topic of whether humans are descended from apes. I learned from my reading that the best scientific view is that although humans are not descended from any existing species of ape, both humans and apes are descended from a common ancestor. Such a conclusion contradicts the most literal interpretation of the Book of Genesis in the Judæo-Christian Bible, but the scientific concept of evolution is based on a great deal of observational evidence. The Biblical account – again in its most literal form – is not.

After writing my paper, I began to worry that tales would drift from the school to the larger community that the son of the local clergyman was questioning the Bible. I was not concerned for myself, but I was afraid that such stories would hurt my father's activities in the church. So I asked him whether he would read my paper, and I told him that it was pretty strong for evolution, but that I would make changes in it if he wished. He took the paper and disappeared into his study. Then he closed the door to his study. I took this as a bad sign, since his door was usually open. When it was closed, it usually meant that something bad was happening, such as serious marital problems for a couple in the congregation. I was quite nervous, until he came out; he handed me the paper, told me to change nothing, and then he offered to help with the typing. After this experience I felt confident that religion and science could be friends rather than enemies.

When I was twenty I was studying French at the University. After a certain level of competence had been achieved, the examinations were usually in the form of questions written in French, to which we were required to make a written response. The questions could be on anything that might make for interesting discussion, and our score on the test were based not so much on the substance of our answers as it was on the variety of vocabulary and grammatical structures that we could bring to bear on writing the essay. One time there was a question about whether we believed a conflict exists between science and religion. A simple yes-or-no answer was not the way to make points, so I proceeded to say that the alleged conflict mainly hinged on the question of biological evolution and the belief that some people have that evolution takes away from the power and grandeur of God the Creator. I stated that *my* God was more splendid for having created a universe in which life would evolve over a time lasting several (French/American) billion years. It was far less impressive to consider a God who by finger snapping could produce all the species in six days. The French teacher was pleased with what I said.

When I was in my late twenties, living in Tallahassee, Florida, I was asked to lead the adult Sunday morning discussion group at our church. They were about to begin a study of the book of Genesis. I was filled with trepidation because I was afraid that there would be a

disagreement about evolution, since this was after all in the Deep South. At the first meeting of the class I discovered that everyone in it agreed with me that evolution was the right way to explain the observed diversity of living organisms. All my carefully constructed arguments were not needed.

In the academic year that marked the centennial of the death of Charles Darwin, a colleague from the Department of Religion at Florida State University was arranging a series of interdisciplinary lectures on Darwin. He asked me to present the first in the series, with the rather vague assignment of presenting a physicist's view of evolution. I chose to open the talk by reading from Chapter 1 of Genesis, from the first verse until "God said, let there be light." I keyed on the concept of light as a basis for both halves of the talk; the two subjects were stellar evolution and special relativity.

Stellar evolution is not nearly so controversial as biological evolution, although it too is in conflict with a literal reading of Genesis. The case for some form of stellar evolution can be made by simply considering our star, the sun. Because of conservation of energy, it is evident that the sun has not been shining forever, nor will it shine for an eternal future. Hence some notion of change over long periods of time must be built into a reasonable theory of astrophysics. The combination of such theory with observations of distant galaxies leads to ages of the universe that far exceed the results of computations based on a literal reading of Genesis.

Albert Einstein's special theory of relativity is based on light. It arose from Einstein's insistence that Maxwell's equations should keep the same form as formulated in reference frames that move uniformly with respect to each other. Propagation of light is one of the more interesting phenomena described by Maxwell's theory. Special relativity is not in obvious conflict with the creation stories of Genesis. Rather it gives substance to God's creation of light. Yet this theory has been attacked – often maliciously – during the years since 1905 when it was announced. There are two important reasons for the attacks on relativity. First, there is an inevitable tendency for some people to confuse it with relativity in ethics. Whether ethical decisions should be made relative to the conditions of time and place is an interesting question, but whatever

its answer may be, it does not speak to relativity in physics. In fact Einstein's theory is in most ways more absolutist than its Newtonian predecessor is. The second reason for a history of attack was the racism in Nazi Germany that branded relativity as *Judenphysik* because Einstein was Jewish; teaching relativity was prohibited at German universities for those years. Some physicists – notably Werner Heisenberg – ignored the ban.

The conclusions to be drawn from these two subjects are that physicists are happy to provide biologists with a long time interval for evolution to happen, and that physicists will fight against those who oppose solid scientific ideas solely from religious (including pseudoreligious or antireligious) dogma.

Determinism and Chance

In years of teaching quantum mechanics to physics majors, I had to deal with Heisenberg's uncertainty principle, which I consider to be best understood as a direct consequence of the basic postulates of quantum mechanics. If the uncertainty principle is wrong, then the postulates must be wrong, and we are left with no theory at all that has any predictive power at the scale of molecules, atoms, and nuclei. Quantum mechanics is so useful that very few physicists would want to give it up. Yet there are many who want to hold to a metaphysical belief in determinism, even on a microscopic scale. I have always told my students that if they do not like the probabilistic nature of quantum mechanics, they need not believe it, but they must learn enough about to pass their examinations.

When I was invited to lead a doctoral seminar for the Program in Humanities at Florida State University, I agreed to do it. I was told I could choose any topic that could connect the sciences with the humanities, and because of my fascination with quantum mechanics, I chose to run a semester-long seminar on causality and chance.

The history of the struggle between causal/deterministic and probabilistic/aleatory ideas goes back a long way. The religious dimension of the problem is the question of predestination against free will. Those who would look in the Judæo-Christian Scriptures to find answers can find whatever answer they wish, since not all parts of the Bible were

written at the same time or by the same person. The prophets and others who wrote long before the Babylonian exile³ tend to emphasize free will as a component of ethical behavior. Shortly before and during the captivity the mood favored predestination.⁴ In later centuries there was a revival of concern for free will.⁵ In the New Testament the earliest writings were by St. Paul, who is well known for his adherence to predestination. The opposite attitude is strongest in the Letter of James. The Gospels are not so clear about what Jesus really taught about this issue. Most of Jesus' teachings were about other topics. Several centuries into the Common Era there was a big controversy about predestination and free will; Augustine argued the former, and Pelagius argued the latter. The resolution for that time was symbolized by the reference to St. Augustine and the Pelagian heresy.

The position of classical Islam on this issue is relatively simple. As a thoroughly theistic religion, Islam teaches the omnipotence of God, including a predestinarian view.

During the reformation period the question was one of great interest. The state churches of Europe managed to formulate conclusions on predestination by about 1620. Catholics (Decretals of Trent), Lutherans (Formula of Concord), and Anglicans (39 Articles of Religion) all achieved compromises that leave room for a variety of opinions. The Reformed solution (Synod of Dort) was far less ambiguous, choosing John Calvin's predestination over the Pelagian teachings of Jakob Arminius. In each case the subject was declared to be closed, and no further debate was encouraged. The result was that the issue became the property of philosophers, including natural philosophers, who were the scientists of their day.

For several centuries the cause of determinism prospered. Isaac Newton produced a systematic science of mechanics for which the usual examples all show completely deterministic properties. The prestige attached to Newton's ideas led to their establishment as shining truth for the Age of Enlightenment, for which the religious dimension was deism. Pierre Simon de Laplace extended the realm of determinism by his authoritative treatment of celestial mechanics.

Chance as a practical matter came into view with the invention of the theory of probability, initially used to strategize games of chance and to perform actuarial calculations. Laplace himself wrote a treatise on probability that advanced the subject. The work of James Maxwell, Josiah Willard Gibbs, and Ludwig Boltzmann led to the establishment of classical statistical mechanics, in which molecules are treated as though their motion is random, even though Newton's laws still apply. The development of quantum mechanics in 1925-1927 by Werner Heisenberg, Paul Dirac, Erwin Schrödinger, and Max Born led to the probabilistic interpretation of microscopic phenomena that is today the majority position. The development of chaos theory has shown that even Newtonian mechanics is not so deterministic as was once thought. For a chaotic system, the slightest change of initial conditions leads to unpredictable consequences in the subsequent behavior of that system.

Applications of notions of determinism and chance can be made in ways that are of interest to the humanistic enterprise. Literature is full of potential for this sort of analysis. Music is another art where predictability is an important ingredient in the aesthetics. The list is easily extended.

The seminar on causality and chance was repeated several times at Florida State. It was transported to the Chicago Center for Religion and Science (now called the Zygon Center). I led additional doctoral seminars in the Humanities Program at Florida State, one on Creation and Creativity, also one on Metaphor, Mythos, and Model. The latter earned a course award in 1995 from the John Templeton Foundation Science and Religion Course Program.

I also began teaching an undergraduate course on Science and Religion for the Department of Religion at Florida State. This course was one of the first six to be chosen by the Templeton Foundation as model courses at the start of their multiyear program to foster the teaching of religion and science. When regional programs were established, I became Director of the Southern Region of the USA. When the Center for Theology and the Natural Sciences in Berkeley took over the program, they decided that since I had moved to Chicago from Tallahassee, I should no longer direct the Southern Region. Instead, my wife and I

became co-directors of the Midwest Region, at which we continued until 2001.

My career as a scientist has been influenced greatly by the science/religion dialogue, to the point that nearly all my research is now aimed in that direction. My teaching is still primarily in physics, but I regularly teach the undergraduate introductory course; ordinarily it is cross-listed under physics and philosophy.

There is still a lot of teaching to be done. Too many scientists and humanists hold to a strictly scientific view that religion is just so much superstition, with nothing to add to our understanding. Too many religious people have a dogmatic stance that precludes certain types of scientific concepts. Proper understandings can help people to come to the condition of dialogue between these two great causes.

Notes

1. John R. Albright is a Chicago based theoretical physicist. He was the director of the Southern Region of USA for the John Templeton Foundation's Science-Religion course programme.
2. Ian G. Barbour, *Religion and Science: Historical and Contemporary Issues* (San Francisco: Harper, 1997), pp. 77-103.
3. See for example Hosea, Amos, and Deuteronomy.
4. See for example Jeremiah, Ezekiel, Isaiah chapters 40 et seqq.
5. See for example Sirach (Ecclesiasticus).