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Darwin and the Bible

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Men never do evil so completely and cheerfully
as when they do it from religious conviction.

Blaise Pascal, *Pensées*, 894

On June 19, 1987, the Supreme Court of the United States declared unconstitutional a law mandating in the state of Louisiana that, whenever the theory of evolution is taught in the schools, 'creation-science' be also taught as an alternative version of the origin of man and living things. Creation-science is a concept developed by Christian fundamentalists that holds that the universe was suddenly created from nothing; that man and the different kinds of plants and animals were separately created; that there was a worldwide flood; and that the Earth and living kinds are of recent origin, rather than millions of years old. The fundamentalists' pretense that these are scientific notions and thus appropriate for being taught in science classes was dismissed by the Court as a 'sham', a subterfuge to introduce Biblical teachings in the public schools.

Creation is a religious concept and the tenets of creation-science are not scientific conclusions independently reached by scientists, but notions taken literally from the book of Genesis. The phrase 'creation-science' is therefore an oxymoron, a contradiction in terms. In rejecting the command that creation-science be taught as an alternative to the theory of evolution, the Supreme Court seeks to preserve the separation of church and state enshined in the First Amendment of the U.S. Constitution.

Biblical fundamentalists, who endorse a strictly literal interpretation of the Bible, represent a Christian minority in the United States but they have gained considerable public and political clout. During the decade of the 1920's, the legislatures of more than twenty states debated, under their influence, laws against the teaching of evolution. Eventually, four states – Arkansas, Mississippi, Oklahoma, and Tennessee – banned the teaching of evolution in public schools. A spokesman for the antievolutionists was

William Jennings Bryan, who was three times the defeated candidate of the Democratic Party for the presidency of the United States and served as Secretary of State under President Woodrow Wilson. In 1925 Bryan assisted in the prosecution of John Thomas Scopes, a high school teacher in Dayton, Tennessee, who had admittedly violated that state's law banning the teaching of evolution. Bryan was a gifted orator but a poor courtroom match for Clarence Darrow, chief defense counsel. The trial ended, as expected by both sides, with the conviction of Scopes, who was fined \$100 for violating the State's Law. But the trial had become a sort of contest between fundamentalism and liberalism, in which Bryan was severely humiliated and defeated in the public perception of the events.

The Great Depression, Second World War and the ensuing Cold War provided a hiatus with ebbed public concern for the conflict between fundamentalism and the teaching of evolution, but in the 1960's teachers, scientists, and civil libertarians joined in a court challenge to the antievolution law of Arkansas. In 1968 the Supreme Court declared unconstitutional any law banning the teaching of evolution in public schools. In the late 1970's Fundamentalists saw a way out of this legal hurdle by introducing bills in a number of state legislatures mandating that teachings about the origin of man and the universe should be 'balanced'. In the virtually identical language of the statutes proposed in the various states, the view proposed by 'evolution-science' should be balanced by allocating equal time to teaching the alternative view called 'creation-science'.

The Arkansas' legislature first, and shortly thereafter that of Louisiana, enacted in 1981 'balanced treatment' laws. A dozen other state legislatures were actively debating similar legislation, when the Arkansas' statute was challenged in Federal District Court as unconstitutional by a coalition of parents, educators, scientists, and notably many religious leaders such as Catholic, Episcopal, and other Protestant bishops, as well as Jewish organizations. The trial, in which I participated as an expert witness for the plaintiffs challenging the law, ended with the judge's decision on 5 January 1982 declaring it in violation of the First Amendment of the Constitution.

Although the State decided not to appeal the judge's decision, this was enough to dampen support for balanced-treatment law in other states. But the Louisiana law had already been enacted and was challenged in the courts early in 1982. After long and complex legal maneuvering by various interested parties, in 1985 the Louisiana law was declared, without trial, unconstitutional by a federal judge. This summary decision was appealed by the State first to the Court of Appeals, where the appeal failed, and then to the Supreme Court, which on May 5, 1986, announced that it would hear the appeal. *Amicus Curiae* briefs were filed by various parties, including notably one by the National Academy of Sciences and

another by a group of 72 Nobel Laureates joining several scientific societies and local academies of science. The Supreme Court's decision was endorsed by a 7-2 majority, with Chief Justice William Rehnquist and Antonin Scalia dissenting on the grounds that the statute should be remanded to the lower courts for a full hearing in trial, from which it had been deprived by the summary decision of the district court judge.

Ever since Darwin, some have seen the theory of evolution as incompatible with religious beliefs, particularly those of Christianity. There is on the one hand the apparent opposition to the Book of Genesis narrative of how God created the world and everything in it: animals, plants and men. Moreover, the Christian beliefs in the immortality of the soul and in man as 'created in the image of God' would seem to many as contrary to the evolutionary origin of man from nonhuman animals.

Christianity's attacks started in the United States during Darwin's lifetime. Charles Hodge (1792-1878), an influential Protestant theologian, published in 1874 *What is Darwinism?*, one of the most articulate attacks against evolutionism. Hodge perceived Darwin's theory as 'the most thoroughly naturalistic that can be imagined and far more atheistic than that of his predecessor Lamarck'. He argued that the design of the human eye evinces that 'it has been planned by the Creator, like the design of a watch evinces a watchmaker'. He concluded that 'the denial of design in nature is actually the denial of God'.

A principle of solution was seen by other Protestant theologians in the notion that God operates through intermediate causes. The origin and motion of the planets can be explained by the law of gravity and other natural processes without denying God's creation and providence. Similarly, evolution could be seen as the natural process through which God brought living beings into existence. Thus, A.H. Strong, president of Rochester Theological Seminary, wrote in his *Systematic Theology*: 'We grant the principle of evolution, but we regard it as only the method of divine intelligence'. The brute ancestry of man was not incompatible with his exalted status as a creature in the image of God. Strong drew an analogy with Christ's miraculous conversion of water into wine: 'The wine in the miracle was not water because water had been used in the making of it, nor is man a brute because the brute has made some contributions to its creation'.

Arguments for and against Darwin's theory came from Catholic theologians as well. Gradually, well into the 20th century, evolution by natural selection came to be accepted by the enlightened majority of Christian writers. Pius XII accepted in his encyclical *Humani Generis* (1950) that biological evolution was compatible with the Christian faith, although he argued that God's intervention was necessary for the creation of the

human soul. In 1981, Pope John Paul II addressed the Pontifical Academy of Sciences:

The Bible itself speaks to us of the origin of the universe and its make-up, not in order to provide us with a scientific treatise but in order to state the correct relationships of man with God and with the universe. Sacred Scripture wishes simply to declare that the world was created by God, and in order to teach this truth it expresses itself in the terms of the cosmology in use at the time of the writer... Any other teaching about the origin and make-up of the universe is alien to the intentions of the Bible, which does not wish to teach how the heavens were made but how one goes to heaven.

The Pope's argument is that it is a blunder to mistake the Bible for an elementary book of astronomy, geology and biology. The argument goes clearly against the Biblical literalism of the Fundamentalists and shares with most protestant theologians a view of Christian beliefs that is not incompatible with evolution and, more generally, with science.

The theological or official view of the major Christian Churches, however, has not percolated the rank-and-file Christians, whose limited education in theological issues leads them to see biological evolution as contradictory to the Christian faith. In 1962 a sociological survey of Church members in Northern California revealed that 30 percent of Protestants and 28 percent of Catholics were opposed to evolution (*Skeptical Inquirer*, Summer 1980, p. 20). The situation has not gotten any better in more recent years. A nationwide Gallup poll showed that 44 percent of Americans, nearly a fourth of which were college graduates, believe that 'God created man pretty much in its present form at one time within the last 10,000 years' (*New York Times*, 29 August 1982, p. 22). Only 47 percent of those polled accepted evolution; 38 percent in a theistic version that sees God at the first origin of the Universe and 9 percent in a non-theistic alternative.

The misunderstandings of the Christian faithful about the theory of evolution are likely to persist, and so are the objections of the Fundamentalists, whatever the courts may say. Fundamentalists and many other Christians see evolutionary theory as an atheistic ploy seeking to abolish their faith in God besides other Christian beliefs and moral precepts. They would wish to see the teaching of evolution fully removed from the schools. When the laws prohibiting the teaching of evolution were banned as unconstitutional, they resorted to the balanced-treatment statutes, seeking to place teachers in such an impossible position by the demand that creationism be taught as science that the teachers would choose not to teach evolution at all. This intent was made apparent during the legislative hearings. Senator Bill Keith, who sponsored the Loui-

siana law, said that his objective and preference were that evolution be totally obliterated from the schools. This is the same goal proclaimed by William Jennings Bryan in 1922: 'We will drive Darwinism from our schools'.

Reservations against teaching the theory of evolution in the schools seem to many warranted on the grounds that it is just a 'theory'. (President Ronald Reagan when campaigning for the Presidency in 1980 was reported in the press to have retorted to a questioner: 'After all, it is only a theory, isn't it?' To my knowledge, however, as president he has never endorsed publicly the Fundamentalists' objections against the teaching of evolution). This objection relies, of course, in a monumental misunderstanding of what is meant by 'theory' in scientific discourse. In ordinary language, a theory is an imperfect fact, something not well founded on evidence, as when somebody says 'I have a theory about who was behind the assassination of President Kennedy'. But in science, a theory is a body of knowledge.

I find it astonishing, however, that not only the laymen, but many engineers and scientists in fields other than biology, have a very pejorative view of the epistemological status of the evolutionary theory. The theory of evolution makes statements about three different, though related, issues: (1) the fact of evolution, i.e., that organisms are related by common descent; (2) evolutionary history, i.e., the details of when lineages split from each other and of the changes that occurred in each lineage; (3) the mechanisms or processes by which evolutionary change occurs.

The first issue is the most fundamental and the one established with the utmost certainty. Darwin gathered much evidence in its support, but the evidence has continuously accumulated ever since, derived from all biological disciplines. The evolutionary origin of organisms is, nowadays, a scientific conclusion established with the kind of certainty attributable to such scientific concepts as the roundness of the earth, the motions of the planets, and the molecular composition of matter. This degree of certainty beyond reasonable doubt is what is implied when biologists say that the evolution of organisms is beyond reasonable doubt, a 'fact' indeed. The evolutionary origin of organisms is accepted by virtually every biologist.

The theory of evolution goes much beyond the general affirmation that organisms evolve. It seeks to ascertain the evolutionary relationships between particular organisms and the events of evolutionary history (the second issue, above), as well as to explain how and why evolution occurs (third issue). These are matters of active scientific investigation. Some conclusions are well established; for example, that the chimpanzee and gorilla are more closely related to humans than any of the three species is

related to the baboon or other monkeys; or that natural selection, the process postulated by Darwin, explains the adaptive configuration of such features as the human eye or the wings of birds. Other matters are less certain, others are conjectural, and still others remain completely unknown (such as the characteristics of the first living things and when they came about). But uncertainty about these issues does not cast doubt on the fact that evolution has occurred. Similarly we do not know all the details about the configuration of the Alps and how they were formed, but that is no reason to doubt that these mountains exist.

The theory of evolution has gradually extended its influence to other biological disciplines, from physiology to ecology and from biochemistry to systematics. All biological knowledge is nowadays pervaded by the phenomenon of evolution. As the distinguished evolutionist Theodosius Dobzhansky has said, 'Nothing in biology makes sense except in the light of evolution'.

Hanbury Brown is a distinguished astronomer who has written in *The Wisdom of Science* an articulate apologia of scientists and the scientific enterprise. His vision of the interaction between religion and science is one of unity and cooperation, not by mutual fertilization but rather as the result of a one-way interaction where science provides both a model and a foundation for established religion. A model, first, because science in its pursuit of truth welcomes change and accepts uncertainty as inevitable: 'it is a progressive adventure into the unknown, and in any genuine adventure there is always a risk of being mistaken' (p. 182). Brown sees that Christianity will only survive if, like science, it accepts uncertainty and the possibility of error and, therefore, the necessity to change its understanding of religious truth as time goes by. The statement just quoted about science as an uncertain adventure is tailed by the following pronouncement: 'Unless our Churches can learn to see religion in much the same spirit, then, like many other religions before them, they will pass slowly into oblivion and their place be taken by other, perhaps more adaptable faiths'.

Science is not only a model for religion in its adaptability to new discoveries and the changing needs of society, but also as scaffolding or even a foundation for religion.

Our Christian Churches... should recognize that although a superficial knowledge of science may sometimes encourage religion, a deeper knowledge does not... Modern science tells us that we are an internal part of nature... and that time, space, matter and perhaps consciousness are mysteries which transcend our present understanding. That is a view of the world which is consistent with the basic religious intuition that man is not the measure of all things (p. 183).

Brown argues against the viability of a Christian faith that would provide us with a 'God of the Gaps', a *fata morgana* accounting for those

natural phenomena that science cannot yet explain. Rather, he sees religion as an unavoidable need of most people. Science is religion's ally because it has discovered that beyond what it can know there are unfathomable mysteries.

The Wisdom of Science's justification of religion is consistent with the liberal view of some Protestant theologians, but it would seem at odds with the prevailing theology among Catholics and more traditional Protestant Churches. These are likely to find unacceptable the notion that there is a need to reinterpret the mysteries of Christ, Redemption, and life beyond physical death, according to the demands of advancing scientific knowledge. More unpalatable yet is the expectation that these dogmas might need to be obliterated and replaced in tune with the tenor of the times. If I understand him right, Brown relegates the role of the Christian Churches to little more than providing a fellowship for experiencing the unfathomable mysteries of existence and for helping our brethren in need.

Brown believes that his vision of science as a model and foundation for the Christian faith was also the vision of Medieval Christianity when Christian theology achieved heights never again matched. The magnificent west facade of the Cathedral of Notre Dame of Chartres incorporates that vision. Christ and the symbols of the four evangelists, surrounded by angels and saints, preside over the central door. Over the right-hand door we see, together with more angels and saints, the great philosopher-scientists of ancient Greece: Euclid, Pythagoras, Ptolemy, and Aristotle. But the symbolism of this gorgeous twelfth-century masterpiece may be interpreted in a manner more consistent with the traditional Christian evaluation: science (and philosophy) as the maidservant, not the model and foundation of religion. The secondary location of the carved figures representing the philosopher scientists would seem consistent with this interpretation.

'The religious dimension of science' is the fourth and final chapter of *The Wisdom of Science*. Hansbury Brown has written an eminently readable, well documented and convincing book about science's pivotal role in modern society: because it gives us the most valid understanding of the physical world; because it gives us the means to change it (through technology); and because it is the most significant contributor to modern culture and values.

The notion still persists among some philistines that science is a pedestrian accumulation of facts that constrains the imagination. That view is hopelessly out of date, if it was ever accurate. On the contrary, the discoveries of physics, chemistry, and biology convey a wondrously expansive vision of reality that brings about more imaginative excitement than any

work of literature, music, or visual art. 'Indeed', writes Brown (p. 126), 'if we look at the history of ideas over the last 100 years it is perfectly clear that it is the discoveries of science, more than any humanistic studies, that have enlarged our view of the world'. The culture of our century is more than anything else a scientific culture.