ESSAYS ON SCIENCE AND SOCIETY

Not (Just) in Kansas Anymore

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In August of 1999, after months of wrangling, the Kansas State Board of Education passed its state science education standards. Against the recommendations of a committee of 27 scientists and teachers, the board voted to strip from the standards all mention of the Big Bang, the age of the Earth, and any reference to organisms having descended with modification from common ancestors: in other words, evolutionary astronomy, geology, and biology. Teachers were informed that evolution would not be included in the state high-school assessment exams, greatly decreasing the likelihood that the subject would be taught.

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The *New York Times*, the *Washington Post*, Associated Press, and other national media covered the story widely. *Nature*, the *Economist*, the BBC, and other British media—as they tend to do when antievolutionism makes the news—presented their usual spin of "aren't the colonials an odd bunch?" As the media probed for more stories, the National Center for Science Education (where I work) informed the sometimes incredulous press that, yes, indeed, antievolutionism is a widespread problem in American kindergarten through high school or "K–12" education. The experience of the committee that wrote the Kansas science education standards is mirrored in many other states; such committees are regularly lobbied by antievolutionists either to include some form of creationism or to omit, decrease, or set apart the teaching of evolution from all other sciences. Months before the Kansas school board acted, Nebraska watered down evolution in its science standards. A few years ago, Illinois adopted science standards that ignored the e-word, and Arizona and New Mexico include evolution in their current standards largely because scientists, teachers, and other citizens fought for revisions of these documents after initial passage of what can only be referred to as substandards omitting evolution. Many other states treat evolution in only a cursory fashion.

Even though the Supreme Court has ruled that teaching creationism and creation "science" are unconstitutional, we still get calls from parents, teachers, or school board members asking whether some impending resolution in their district requiring "equal time" for creationism is appropriate. We get a disturbing number of questions about teachers who give equal time to creationism and evolution, even though their districts do not (and cannot) require them to do so. We are still being consulted about school assemblies where, in the name of "fairness," a creationist is invited to tell students that the scientifically well-accepted idea that living things shared common ancestry is a "theory in crisis" with many "serious flaws"—and also that the world is only 10,000 years old. Some of these assemblies violate the U.S. Constitution's requirement that schools be religiously neutral, by providing a forum for a speaker who openly proselytizes students to reject evolution in favor of a literal Biblical interpretation of history.

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More frequently, we are asked for help when school districts are considering leaving out the teaching of evolution ("if they can't teach both, they won't teach either," as one board member put it), or limiting or separating out evolution as somehow different from other scientific fields. Disclaimers that teachers must read to students or paste into textbooks are becoming more popular. Typically, they declare that evolution is "only a theory" (in other words, a guess, hunch, or half-baked idea) and therefore by implication nothing that students should take seriously. Shortly after the Kansas incident, Oklahoma's textbook commission voted to place in biology textbooks a disclaimer identical to the one currently in Alabama textbooks, which states that evolution is a theory, not fact, because "no one was present when life first appeared on Earth." No other subject in the science curriculum is so disclaimed.

Whereas "balancing" evolution with creation science was advocated before the Supreme Court struck down laws requiring equal time for creation and evolution, the neocreationist approach is to balance evolution with "evidence against evolution." Scientists unfamiliar with such "evidence" soon discover that evidence against evolution is just a euphemism for creation science. In fact, as I write this, a law is making its way through the Arizona legislature that would require that evidence against evolution be taught along with evolution. Don't be misled: Such evidence-against-evolution regulations are not proposing that teachers

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*L. Witham, *Washington Times*, 11 April 1997, p. A8.
†See, for example, N. W. Blackstone, *Q. Rev. Biol.* **72**, 445 (1997); J. A. Coyne, *Nature* **383**, 227 (1996); R. Dorit, *Am. Sci.* **85**, 474 (1997); A. H. Orr, *Boston Rev.* **21**(6):28 (1997).
‡See, for example, B. Fitelson, C. Stephens, E. Sober, *Philos. Sci.* **66**, 472–88 (1999); E. Eells, *Philos. Books* **40**(4) (1999).
§G. Gilchrist, *Rep. NCSE* **17**(3), 14 (1997).

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present controversies about how evolution occurs, but that teachers pretend there is a serious debate taking place among scientists over whether evolution occurs. A lawsuit scheduled for trial in Minnesota State Court this spring concerns a high-school teacher who wishes to teach an evidence-against-evolution curriculum indistinguishable from creation science. Only the terminology has been changed in order to circumvent the First Amendment's prohibition against establishment of religion.

The degree of public acceptance of evolution in the United States differs sharply from that within the scientific community. In a 1996 survey of a sample selected from *American Men and Women of Science*, Witham and Larson asked scientists the same Gallup poll questions regularly asked of the general public.* Whereas in 1997, 47% of Americans answered "agree" to Gallup's question about whether humans were created in their present form 10,000 years ago, only 5% of scientists did. (I for one was surprised it was that high!) To Gallup's question on agreement whether evolution occurred without God's involvement, 45% of scientists answered affirmatively, but only 9% of nonscientists. Disproving the idea that all evolutionists are atheists, scientists and nonscientists had the same response to the "theistic evolution" question (evolution occurred, but was guided by God): 40% agreed. So while fewer than half of Americans accept evolution, an overwhelming majority of scientists do.

The United States stands out among developed countries in its low acceptance of one of the major organizing principles of science. I believe these statistics reflect the unique settlement and religious history of our nation, in which frontier communities set up their own school systems largely independent of state and federal influence, much less control. The decentralization of American education is a source of wonder to Europeans and Japanese, for example, who have state curricula that are uniform across all communities in their nations. In the United States, even schools within the same district may not teach the same subjects in the same order, or even in the same year!

American religious history reflects an equally decentralized, "frontier" orientation. We were initially settled, after all, by religious dissidents, who formed congregational rather than hierarchical religious systems in which decisions largely were made locally. The United States also has been the nursery for a wide variety of spontaneously generated, independent sects, often inspired by charismatic leaders. It was in the United States that the Seventh Day Adventists, the Church of Latter Day Saints, Jehovah's Witnesses, Christian Science, and extinct sects such as Shakers and Millerites were founded, reflecting our decentralized, nonhierarchical religious past. But perhaps the most important reason modern antievolutionism developed here rather than in, say, Europe, was the founding in 1910–1915 of Fundamentalism, a Protestant view that stresses the inerrancy of the Bible. Fundamentalism was not successfully exported to Europe or Great Britain, but it formed the basis in the United States for the antievolutionism of the 1920s Scopes trial era, as well as the present day.

Because of its deep religious and historical roots, creationism will not go away any time soon. "Young Earth" creation science organizations such as the Institute for Creation Research (ICR) and the newer (but almost as large) Answers in Genesis ministries have been joined by scores of local and regional organizations. Their constituency is literalist conservative Christians, an estimated 30 to 35% of the American public. But nonliteralist Christians (about 50% of the American population) are being reached by a newer creationist movement, "intelligent design creationism" (IDC), that advocates the idea that evolution (and modern science in general) are stalking horses for philosophical materialism and atheism. IDC stresses existential issues, claiming that if evolution is true, there is a substantial price to pay in loss of purpose and meaning of life. Although they rarely express traditional creationist positions on a young age of the Earth, IDCs echo their predecessor's claims that evolution is a theory in crisis, which scientists are rapidly abandoning.

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Some IDC proponents are also deliberately targeting intellectuals. IDC leader Phillip Johnson has published opinion pieces (opposite the editorial page or "op-ed") in the *New York Times*, the *Wall Street Journal*, and other major national media. An IDC think tank in Seattle, the Center for Renewal of Science and Culture, supports several postdocs who organize conferences on university campuses and write op-ed pieces and books in an effort to persuade the intellectual elite that IDC and "theistic science" are legitimate scholarly enterprises.

Although IDCs agree on the philosophical issues, when it comes to the scientific issues, they are vague—and very much disunited. Some support a 10,000-year-old Earth; others accept the Big Bang, an old earth, and radiometric dating, but reject biological evolution's core idea that living things descended with modification from common ancestors. Two ideas not already present in creation science have emerged from IDC: biochemist Michael Behe's "irreducible complexity" (developed in his book, *Darwin's Black Box*) and philosopher William Dembski's "the design inference," the subject of his book of the same name. Behe argues that natural selection is incapable of explaining certain kinds of complex molecular structures that supposedly would not function without a minimal number of interacting components; hence, we must seek an "intelligent" (divine) explanation. Dembski claims that a logical procedure heavily dependent on probabilities can filter out designed phenomena from those produced by either natural processes or chance.

Scientists and philosophers have examined these concepts and have found them wanting. Biologists have rejected irreducible complexity,† and philosophers have been similarly unresponsive to the design inference.‡ Although IDC proponents seek validation by university colleagues and intellectuals, they have not yet produced scholarship accepted in scientific circles.§ Just as creation science was rejected by the scientific community, but accomplished its goals politically by "equal time" laws, IDC is being promoted to school boards for inclusion in the science curriculum without having contributed anything substantial to our understanding of either science or philosophy of science.

Scientists and educators have been calling for improvement of both college-level and precollegiate science education. This necessarily involves assuring that local schools and school boards do not further weaken evolution education. According to the neutralist principle in biology, a mutation will eventually replace the wild type unless it is opposed by natural selection. It is an unsubtle metaphor: if scientists do not oppose antievolutionism, it will reach more people with the mistaken idea that evolution is scientifically weak, and further, that scientists are clinging to it only because of a previous commitment to atheism—and perhaps a selfish desire to keep the grant money flowing. The subsequent further reduction of scientific literacy (to say nothing of a decline in confidence in the scientific community) is not something we should passively let happen.