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Fending off Furtive Strategists

R. Brooks Hanson and Floyd E. Bloom

Severe criticism has justly been heaped on the Kansas State Board of Education's decision to purge evolution and cosmology from their science curricula despite the expressed outrage of that state's university leadership. Two aspects of this intellectual cleansing atrocity are most troubling. The first is that no political leaders from either party have as yet elected to step forward and challenge the lunacy of removing from the educational opportunities of the future voters of Kansas two of the best-established theories of our era. Such reluctance emphasizes a growing public ignorance of the methods by which scientific observations are formulated into testable hypotheses and, when sufficiently strongly supported, are elevated into those grand schemes of explanation and rigor called theories. The theory of the origins of the universe and the theory of evolution have attained this level of acceptance, even though certain biblical literalists would prefer that their young listeners not confront scripture with overwhelming scientific evidence. However, Kansas teachers will no longer be required to include these theories in their curriculum, and their performance as educators will be judged on what remains. Paradoxically, the new scholastic achievement standards of Kansas assert that "Students will learn to distinguish between science and other forms of knowledge or beliefs such as philosophy and religion."

Second, and more troubling, is the shrewdness of the strategy employed by the creationists in achieving their ends. No longer are they attempting to overturn the series of court decisions that have banned the teaching of creationism as a science. The new strategy, representing a far more threatening menace to future generations, is not only not to teach evolution and cosmology but to undermine the solidity of their scientific acceptance. What is needed is not a dumbing down of educational standards but exactly the opposite, and not just for students but for all members of an educated, informed electorate.

Evolution is the unifying concept of biology and the basis for all modern biological research, including much research that affects our daily lives and national welfare (see, for example, *Science*, 25 June 1999). It is as fundamental in vaccine and health research as it is in agriculture. Incomprehensibly, Kansas has now decided to stop teaching about the basis of its current and future economy. According to recent surveys, most of the public is unaware of the wealth of data supporting the 4.55-billion-year age of Earth and the long fossil record of evolving life forms on it. Hundreds of thousands of radiometric analyses now provide consistent dates across terrestrial and lunar rocks, meteorites, and other samples. Annual layers exceed 40,000 years in ice cores, 10,000 years in tree ring records, and tens of thousands of years in lake sediments. Plate velocity rates, the depth of the ocean, heat flow data, magnetic reversals, and many additional observations rooted in physics, chemistry, astronomy, and biology provide independent confirmation of Earth's history. The attack on evolution is thus unequivocally an attack on all of scientific knowledge.

Scientists are all trained to be skeptics, but not all skeptics, including those who defy facts on the basis of their religious roots, have scientific training. The Kansas decision flies in the face of the National Academy of Sciences' national standards for science education, those of the American Association for the Advancement of Science's Project 2061, and a recent Academy document aimed at teaching evolution. These efforts thus seem clearly to be insufficient.

In the past, U.S. political leaders understood the connection between scientific research, education, and economic competitiveness. Funding of biological, agricultural, and space research and of energy exploration—wholly reliant on evolution and cosmology—has fostered the U.S. economy. Where are these leaders now? Is rigorous science needed only when there is a Cold War threat? Many of those claiming to be passionate about education remain puzzlingly silent. Science is not an attack on people's beliefs, nor is it irreconcilable with scientists holding religious convictions themselves. The Kansas decision is not an isolated action but the tip of an iceberg of ignorance that is growing, not melting. Unless these new strategies are directly defied, the United States will not for long remain a leader in science and technology

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