anthro·notes

a newsletter for teachers

vol. 4 no. 1 winter 1982

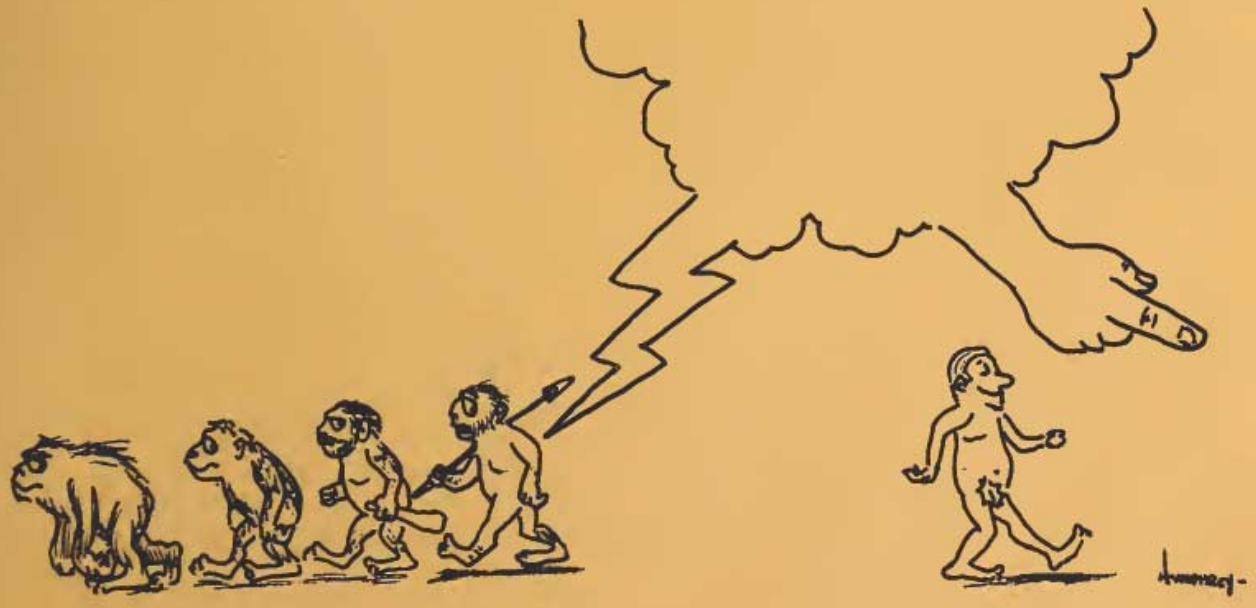
CREATIONISM ≠ SCIENCE

When asked the difference between science and creationism, anthropologist Ashley Montagu answered: "Science has proofs without any certainty; creationists have certainty without any proof." You may agree, and are puzzled by the controversy, but meanwhile students are asking questions, court cases in Arkansas and Louisiana are considering mandated class time for creationism, school boards are being pressured by creationist lobby groups, and some textbook publishers -- bowing to these lobby groups -- are reducing or eliminating the discussion of evolution in high school biology texts.

Sticking our heads in the sand or dismissing the issue as nonsense will not make the controversy disappear. Educating ourselves and our students will help. But to do this it is essential to know what creationism is, and is not. We need to know creationists' objectives for schools and their methods of argumentation. We need to explain why creationism is not science; and why, in spite of that fact, their arguments persuade some members of the public.

What is Creationism?

While it is often difficult to elicit clear explanations from creationists (see Moyer), they agree on a literal interpretation of Genesis from the King James version of the Bible. They believe that: 1) the earth is not older than about 10,000 years; 2) the earth, plants, animals, and humans were created by God in six days and humans have a separate ancestry from apes; and 3) the earth's geological formations and sedimentation were caused by a one-year, worldwide flood that deposited layers of



fossils about 6,000 years ago. They believe that no new species have developed since the original primeval period when a supernatural creator used processes of creation no longer in operation and therefore not subject to scientific measurement and study (Callaghan, p.6).

Creationists and Public Schools

What are the creationists' objectives for schools? Their primary goal is to have creationism qualify as a scientific theory and therefore be given equal time in public schools with evolution. To this end more than 20 states have bills pending that mandate the teaching of a Biblical account of creation. The newest draft of a creationist bill circulating in legislatures eliminates all overt references to God.

Arkansas and Louisiana passed laws in March and July 1981, respectively, requiring that "public schools shall give balanced treatment to creation-science and evolution-science. Balanced treatment to these two models shall be given in classroom lectures..., in textbook materials ..., in library materials..., and in other educational programs in public schools, to the extent that [they]...deal in any way with the subject of the origin of man, life, the earth, or the universe" (Arkansas, Act 590).

The American Civil Liberties Union, on behalf of several groups, filed suit to have the Arkansas Creationism Act declared unconstitutional -- in violation of the First and Fourteenth Amendments to the U.S. Constitution. Their suit argued that the state law (Act 590) "(a) constitutes an establishment of religion, (b) abridges the academic freedom of both teachers and students, and (c) is impermissably vague." The suit concluded with this statement: "By initiating this action, plaintiffs are neither anti-religion nor asserting the final truth of any theory of evolution. Many of the plaintiffs are deeply religious and believe religion is important in personal, family, and community life. Other plaintiffs are science professionals committed to the scientific method of inquiry, which necessarily rejects all claims to final truth and perpetually tests for flaws in existing scientific theories. All plaintiffs are united in the firm conviction that religion is strengthened by its complete separation from government and that government-supported education in science is strengthened by its complete separation from religious doctrine" (Scientific Integrity 1(5):1, August 1981).

In January, at the end of the well-publicized federal court case, Judge Overton ruled that creationism is not science and that the Arkansas law is unconstitutional.

How Creationists Argue

It is useful for students to understand how most creationists argue. First, many focus debate by poking holes in the research of biologists, while rarely focusing on proof for their own views. They attack the inconsistencies, the gaps in knowledge, and the controversies of science -- such as the current question about whether evolutionary change has been gradual or jerky. Questions and gaps, they argue, invalidate evolutionary theory.

Second, creationists quote scientists out-of-context. To buttress their arguments, creationists quote other scientists (but seldom biologists) who have remarked negatively on evolution; however, they usually fail to point out that some of these scientists were Darwin's contemporaries.

While creationists are principally anti-evolution, they also try to explain the origin of energy, the universe, and the earth. In doing so they attack anthropology, and also geology, astronomy, nuclear physics, and molecular biology. They must do so because their world view is contradicted by all the physical and social sciences. For example, creationists

argue that geologists (who actually apply many dating techniques) use circular reasoning because they date strata by their fossils and fossils by the strata in which they occur. Creationists attempt to discredit the findings and interpretations of paleontologists. They say that the pre-Cambrian fossil record is virtually blank (for a long time scientists have known otherwise) asserting that this contradicts slow, continuous evolution. Dr. Duane Gish from the Institute of Creation Research notes that Piltdown Man was a hoax and implies that anthropologists, therefore, are vulnerable to believing in hoaxes.

Furthermore, creationists present themselves as scientists; many do have advanced degrees, but usually from obscure Christian fundamental colleges and often in engineering fields. As happened in the Arkansas court case, the "scientists" defending the creationists' stance had not published anything on the subject of evolution and quoted from books written in the 1920's or 1930's.

While trying to argue that creationism is a science like evolution, creationists sometimes switch tactics arguing that evolution is a "religion". Evolution is not a science, they say, because it deals with origins and to say that these origins must be "natural" is as much a religion as to say that they are "supernatural" (Callaghan, p.1). Both evolution and creationism, they say, require acts of faith, since events of the past cannot be tested in a laboratory (Callaghan p.6). They accuse evolution of being only a "theory", using the laymen's meaning of theory as an educated guess, a personal idea. To the scientist, a theory is an ordered system for explaining empirical data. It is based on decades of observation and, when possible, experiments, and has survived the critical analysis of other scientists.

Perhaps the most misleading argument creationists make is that there are only <u>two</u> ways to explain the natural biological world. Creationism, they argue, is the <u>only</u> other view of the origin of life and the universe besides an evolutionary one. Using this simplistic polarity, any argument against evolution is automatically an argument for creationism. If you believe in evolution, you must be a secular humanist and cannot also believe in religion.

Evolution, however, does not ally itself with any religious denominations. Evolution is accepted by Christians, Jews, Moslems, Hindus, and atheists alike. Science is nonreligious; scientists, however, believe in whatever religion they choose. Yet creationists' polarization and their highly ethnocentric views ignore how many other religious views there are to explain creation and the evolution of life. This is only one of the many reasons religious leaders and scholars from the major denominations in the U.S.A. do not want creationism. taught as science. Not only does it bring about an entanglement of church and state, but it also demands a very primitive and restrictive interpretation of <u>Genesis</u>.

<u>Creationism is NOT Science</u>

Why is creationism not science? Science deals with natural phenomena. It compares alternative ideas about what the world is, how it works, and how it came to be. "Some ideas are better than others, and the criterion for judging which are better is simply the relative power of different ideas to fit our observations. The goal is greater understanding of the natural universe. The method consists of constantly challenging received ideas, modifying them, or, best of all, replacing them with better ones" (Eldredge, p.16).

Creationism is a closed system. The Institute for Creation Research abhors experimentation. Instead, it combs available research to see how evidence might be used to substantiate creationist views. The proselytizing role of their research is not hidden.

(turn to page 13)

(from page 3)

Creationists do not submit papers to scientific journals, or attend scientific conferences, or participate in the other procedures and methods of scientists. Creationism is not able to make any predictions and cannot be disproven because it does not depend on natural, observable phenomena, but on the supernatural. Acts of God elude scientific analysis and cannot be measured by application of scientific methods.

Creationists argue that their "theory" of faith is true and must be true. This is antithetical to the basis of scientific inquiry. Instead of revising ideas to reflect the world as it is observed, they start from the Bible. "To be unwilling to revise a theory to accommodate observation is to forfeit any claim to be scientific. For it is not facts or theories that are essential to the growth of science but rather the process of critical thinking, the rational examination of evidence, and an intellectual honesty enforced by the skeptical scrutiny of scientific peers. By these standards creationism is not science" (Science 81, December, p.57).

Ask yourself, how would you teach creationism as science if an "equal time" law were passed in your state? What is "equal time"? What would you say is the "equal" evidence? How would you scientifically verify events in Genesis?

Why Creationism Persuades

Creationism has a certain appeal precisely because people can believe in it fervently. In addition, Americans are open to arguments for "equality" and "fairness". Creationists sound persuasive when they argue that precluding creationism from science classes is unfair and represents a censorship of free speech. Many people do not realize that creationism is not science and that creationism as a religion is not being censored.

Some people think a school should be a marketplace of ideas in which students choose what is "right" and "wrong". But teachers include those theories and data that have the most credibility, research, and acceptance by the scientific community. There are many out-dated ideas that are not taught, such as the earth is flat or that the sun revolves around the earth.

With the explosion of biological knowledge in the last 20 years and unfortunately with the absence of much of this new information from high school textbooks, a gap in understanding exists today between biologists and the public. If people do not have a solid science background, they can misunderstand what true science is about, and may easily accept pseudo-science.

Education often gives the false impression that science is a rigid obedience to paradigms. Science in many secondary schools encourages far less critical thinking than do the humanities. As a result, students often see science as an absolutist discipline, one that may seem little different in tone from the absolutist quality of creationism.

And, of course, creationists, with their extensive use of the media, can also touch a responsive chord among those who feel society is too secular, that schools are not reinforcing the religious values taught at home, and that scientists "control" their lives too much.

But the panacea to those concerns is not creationism. It will not help students to teach them Biblical literalism as a science, when ways of knowing and terms are confused, when the senses are denied, and when the least knowledgeable people are mandating textbook and curriculum content.

(over)

As Niles Eldredge, Curator of the Department of Invertebrates at the American Museum of Natural History in New York, wrote: "The only real defense against such tactics lies in the true application of the scientific enterprise -- the trial-and error comparison of ideas and how they seem to fit the material universe. If the public were more aware that scientists are expected to disagree, that what a scientist writes today is not the last word, but a progress report on some very intensive thinking and investigation, creationists would be far less successful in injecting an authoritarian system of belief into curricula supposedly devoted to free, open rational inquiry into the nature of natural things"(p.20).

Bibliography

Callaghan, Catherine A. "Evolution and Creationist Arguments," THE AMERICAN BIOLOGY TEACHER 42 (October 1980): 422-427.

Over 20 different arguments that creationists use to attack evolution are given and refuted, in an easy to use form for the classroom.

"The Creationists," SCIENCE 81 (December 1981): 53-60.

The supplement contains two helpful articles -- "Creationism as Social Movement" by John Skow and "Creationism as Science" by Allen Hammond and Lynn Margulis.

Eldredge, Niles. "Creationism Isn't Science," THE NEW REPUBLIC (April 4, 1981): 15-20.

In an excellent article, some of the major differences between creationism and science are explained as well as a refutation of creationists' criticisms of evolution as scientific theory.

Godfrey, Laurie. "The Flood of Anti-evolutionism," NATURAL HISTORY (June 1981): 4-10.

Describes briefly the development of creationist groups since 1963, their methods of argumentation, and most importantly, how they are using the punctualists' ideas incorrectly to attack evolution.

Lewin, Roger. "Creationism on the Defensive in Arkansas," SCIENCE 215 (1 January 1982): 33-34; "Where is the Science in Creation Science?" SCIENCE 215 (8 January 1982): 142-146; "A Tale With Many Connections," SCIENCE 215 (29 January 1982): 484-487.

Moyer, Wayne A. "The Implications of Balanced Treatment," paper presented at the Charlotte meeting of the North Carolina Science Teachers Assoc., November 13, 1981. For a copy contact, Executive Director, National Association of Biology Teachers, 11250 Roger Bacon Dr., #19, Reston, VA 22090. The NABT also publishes the newsletter,SCIENTIFIC INQUIRY,which focuses on the court cases, challenges to school boards, and actions teachers can take.

"The Nature of Knowledge," THE ECONOMIST (26 December 1981): 99-104.

An excellent article that cogently provides a history of scientific knowledge with synopses of the impact of Popper's, Kuhn's and Laudan's philosophies, the role of induction and deduction, the existence of scientific methods, the difference between physics and biology, and the nature of scientific truth.

JoAnne Lanouette