

SCIENTIFIC CREATIONISM IN AMERICA:

1963-1982

by

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ABSTRACT

Scientific creationism has been brought forcefully to the attention of the American public in recent years. From a small beginning in 1963, the creationist societies have grown until they now number their membership in the thousands. Not only their growth, but also their tactics and strategies at the local level, the state legislative houses and the courtrooms, are noteworthy.

Most publications dealing with the phenomenon of scientific creationists have dealt with their beliefs; this paper summarises their attempts to have their own beliefs given equal time in the American educational system. Using an historical approach, it is possible to document how the scientific creationists operate, and where their strengths and weaknesses are as a fundamentalist organization. In conclusion, some of the effects of the current resurgence of the creation - evolution controversy are discussed.

RESUME

Le public américain a commencé à prêter attention aux créationistes scientifiques depuis quelques années. Après un début timide en 1963 avec 10 membres, les sociétés créationistes se comptent aujourd'hui par milliers. Il s'agit d'étudier non seulement leur développement mais aussi leurs tactiques et leurs stratégies au niveau local, dans les assemblées législatives et les tribunaux. En adoptant une approche historique, il est possible d'établir un dossier des stratégies d'action des créationistes scientifiques, de leurs points faibles et de leurs points forts en tant qu'organisation intégriste. Nous parlerons de leur doctrine de base selon laquelle on devrait accorder, dans les salles de classe, une importance égale à la Genèse et à l'évolution, mais sans entrer dans les détails. La plupart des articles ne s'intéressent qu'à leurs convictions tandis que celui-ci tentera de concentrer son attention sur la lutte qu'ils mènent intégrer ces convictions dans le système éducatif américain.

Since the time of the Scopes trial and William Jennings Bryan, the people behind anti-evolutionary thought in America have changed their focus and their tactics. They are not the 'simpletons' H.L. Mencken and urban Americans laughed at in 1925. This time they come with Ph.D.s and 'science' to battle over what can and what should be taught in public classrooms. Their main area of concentration has been on biology and science courses, but they also attempt to influence the content of any class which deals with the origin of the universe, earth, life and man (Arkansas 1981: Section 7(a)).

The 'anti-evolution' thinkers are now called scientific creationists, and they are well organized, well financed, and are politically powerful. Although they have been around slightly longer than the 'New Right', the scientific creationists¹ fit in well with the conservative ideology of the early 1980's. Although they may be grouped with the conservatives, the creationists' activities are not solely political. If the scientific creationists do enter the political ring, it is usually at the local, grassroots level, for example on boards of education. This, of course, does not mean the major creationist societies do not lobby higher political arenas. It is just that their forte and success is usually at the local level.

Before discussing who they are, and how scientific creationists operate, we must understand their basic principles. The most recent and complete review of the creationists' governing paradigm was given by Dr. H.M. Morris Director of the Institute for Creation Research. It is as follows:

Tenets of Scientific Creationism

1. The physical universe of space, time, matter and energy has not always existed, but was supernaturally created by a transcendent personal Creator who alone has existed from eternity.
2. The phenomenon of biological life did not develop by natural processes from inanimate systems but was specially and supernaturally created by the Creator.
3. Each of the major kinds of plants and animals was created functionally complete from the beginning and did not evolve from some other kind of organism. Changes in basic kinds since their first creation are limited to 'horizontal' changes (variations) within the kinds or 'down-ward' changes (for example, harmful mutations, extinctions).
4. The first human beings did not evolve from an animal ancestry, but were specially created in fully human form from the start. Furthermore, the 'spiritual' nature of man (self-image, moral consciousness, abstract reasoning, language, will, religious nature, etc.) is itself a

supernaturally created entity distinct from mere biological life.

5. Earth prehistory, as preserved especially in the crustal rocks and fossil deposits, is primarily a record of catastrophic intensities of natural processes, operating largely within uniform natural laws, rather than one of uniformitarian process rates. There is therefore no a priori reason for not considering the many scientific evidences for a relatively recent creation of the earth and the universe, in addition to the scientific evidences that most of the earth's fossiliferous sediments were formed in an even more recent global hydraulic cataclysm.
6. Processes today operate primarily within fixed natural laws and relatively uniform process rates. Since these were themselves originally created and are daily maintained by their Creator, however, there is always the possibility of miraculous intervention in these laws or processes by their Creator. Evidences for such intervention must be scrutinized critically, however, because there must be clear and adequate reason for any such action on the part of the Creator.
7. The universe and life have somehow been impaired since the completion of creation, so that imperfections in structure, disease, aging, extinctions and other such phenomena are the result of 'negative' changes in properties and processes occurring in an originally perfect created order.
8. Since the universe and its primary components were created perfect for their purposes in the beginning by a competent and volitional Creator, and since the Creator does remain active in this now-decaying creation, there does exist ultimate purpose and meaning in the universe. Teleological considerations, therefore, are appropriate in scientific studies whenever they are consistent with the actual data of observation, and it is reasonable to assume that the creation awaits the consummation of the Creator's purpose.
9. Although people are finite and scientific data concerning origins are always circumstantial and incomplete, the human mind (if open to the possibility of creation) is able to explore the manifestation of that Creator rationally and scientifically, and to reach an intelligent decision regarding one's place in the Creator's plan.

In short, the scientific creationist takes the Bible as science and sets about scientifically validating Genesis. The creationists would disagree as to the wording of the above statement, but no one can

deny the parallels between the tenets of scientific creationism and the first chapter of Genesis. The major points are: that the planets, stars and all living things were created in six days by a Creator; the different species of plants and animals were created, they did not evolve from any other species; a great flood was a major factor in the shaping of the earth; and those animals who did not find shelter in the Ark drowned, thus are found as fossils. Some creationists explain the sequence of fossils by density, or by which animals could run to higher ground (L. Godfrey 1982:p.c.). They also use the flood to explain why footprints of man and dinosaurs are found at the same geological level (Henig 1979:513).

The creationists use science to prove their theory (and to hammer away at evolutionary theory). The major points they bring up to support the scientific creationist model are: (1) the lack of transitional forms in the fossil records; (2) the laws of probability; (3) the second law of thermodynamics; (4) the unreliability of dating techniques; and (5) problems in the evolutionary theory (for example, macroevolution is not provable in a laboratory), and the accusation that evolution itself has religious foundations (Pierce 1981:65; Cloud 1977:12; Skow 1981:60).

The creationists are quick to point out that scientists cannot prove that decay rates of radioactive material have always been constant. Therefore, they assert that one cannot use them to date fossils. They also argue that inconsistent dating of the same object demonstrates the inaccuracy of the dating methods (Pierce 1981:65). The laws of probability are used to back up the position that the odds against molecules arranging themselves to produce a life form are astronomical (Skow 1981:60). The odds of the above occurring are sometimes given by graphic illustrations, such as the odds of an explosion in a printing factory that results in the Bible being printed. The second law of thermodynamics is a favourite of the creationists. They argue that evolution goes against the second law, as the law states that order goes to chaos, while in evolutionary theory chaos goes to order (Cloud 1977:9). The fossil record is a usual target when creationists debate evolutionists. They claim that although millions of fossils have been found, no clear transitional forms have been found. When the example of Archaeopteryx is used to show an intermediate between reptiles and birds, D.T. Gish (and most of the others) replies that it had wings, feathers and flew. Therefore, to the creationists, it was a bird--nothing more (Cloud 1977:12). The scientific creationists try to turn the tenets to scientific research against the evolutionists by pointing out that evolution is not empirically testable within a laboratory setting. By this comment, one (hopefully) can assume they mean macroevolution, as microevolution has been proved beyond a scientific doubt (see, for example, the evidence for the microevolution of the pepper moth of industrial England, in Dobzhansky et al. 1977:122). The Harvard experiment where simple amino acids were produced by the combination of electricity and four basic elements (H, O₂, C and N) leaves them unimpressed. They take pains to point out that amino acids are one thing, life is another.

The accusation that evolution has religious underpinnings is interesting, and very dangerous. If the creationists can show that evolution is actually a religious belief, it will remove the 'heat' from them. Evolution and 'creation science' would then stand on the same ground, and the balanced treatment of the two in classrooms would be easily justifiable. Evolutionary theory was simply considered to be a 'Godless' theory in earlier times, but now the creationists claim that it leads to, and is part of, secular humanism, atheism and agnosticism (Arkansas 1981:section 7). These are all, to a degree, 'Godless religions' but now a religious label is being applied to evolution through them and with that label an ideology also becomes attached. As one Georgia judge commented, "This monkey mythology of Darwin is the cause of permissiveness, promiscuity, pills, prophylactics, perversions, pregnancies, abortions, pornotherapy, pollution, poisoning, and proliferation of crimes of all types" (Pierce 1981:66).

The scientific creationists seem to think that either one believes in creation and therefore follows a certain moral behaviour, or one 'believes' in evolution and therefore has no morals or values. The argument seems to be that if you believe that your ancient ancestors were descendants of 'apes', you have nothing to be moral about. Belief in creation, the scientific creationists state, gives a person meaning in his life. They also worry if a child is taught evolution he will think he is no better than a wild animal, and act no better.

It is an all-or-nothing argument; the scientific creationists cannot comprehend a person being a theistic evolutionist. It cannot be done within their mind set. The fundamentalists appear to be the only religious sects which believe in this dichotomy. Persons who belong to orthodox churches (Anglican, Calvinism, Catholicism, and soon) appear to have little trouble in reconciling evolutionary theory with their religious beliefs (Moore 1979). The Pope, in a speech he made in 1981, said that the Bible is not a science textbook but rather a spiritual guide.

Nevertheless, the scientific creationists loudly proclaim that evolution is religious, and even legal decisions to the contrary do not deter them. This viewpoint is strongly expressed within the textbooks they publish. These are usually published by the major scientific creationists groups: The Creation Research Society, the Creation Science Research Center and the Institute for Creation Research.

The Creation Research Society (CRS) was the organization which brought 'scientific creationism' to the attention of the American public. The CRS was formed in 1963 by ten dissatisfied American Scientific Affiliation (ASA) members (Godfrey 1981:4). The American Scientific Affiliation was founded in 1941 by a group of mostly Lutheran scientists who sought a reconciliation between evangelical Christianity and science. The founders of the CRS left the ASA when it refused to take a position on the teaching of evolution. The CRS's objective was "to reach all people with the vital message of the scientific and historical truth about creation" (Nelkin 1977:66). The Society was first settled in California but moved to Lansing, Michigan

in 1970. Due to a struggle for leadership, the Society split in 1970 with several CRS members forming the Creation Science Research Center (CSRC) in San Diego. At the end of 1980, the CRS had 2,500 members and its main functions were to publish a quarterly journal and to give lectures.

The Creation Science Research Center is a small research and publishing organization formed "to take advantage of the tremendous opportunity that God has given us....to reach the 63 million children in the United States with the scientific teaching of Biblical creationism" (Nelkin 1977:67). The research done at the CSRC centres around investigation of the physical aspects of the Flood, and curriculum development. They offer to 'neutralize' textbooks for the public schools, injecting scientific creationism to balance them out. The CSRC is associated with the Southern California branch of the Bible Science Association which runs a radio ministry. Together, the two organizations have a mailing list of 200,000, and have many school, church and textbook committees (Nelkin 1977:68). In 1972, the CSRC was divided by a conflict over copyright questions, and some of the members left to form a new organization, the Institute of Creation Research (ICR).

The ICR is the creationist organization which receives the most press coverage, as it is the most active of the organizations. It is actually the research division of the Christian Heritage College in San Diego. The College, while not an accredited institution, gives undergraduate and graduate courses in scientific creationism (Henig 1979:513). The college had its first graduating class of two in 1973; by 1979 the graduating class was one hundred and one. As well as offering courses, the faculty/research staff distributes books, pamphlets and cassettes. They are famous for their public debates against evolutionists--their timing and delivery are perfect. Like the CSRC, the ICR sponsors research projects to find proof on the Ark and the flood, evidence of co-existing humans and dinosaurs, and concrete evidence that the earth and universe were created recently (Godfrey 1981:4).

The faculty/research staff are fairly well known; people such as Duane Gish and Henry Morris. Morris is the director of the ICR and vice-president for academic affairs at the college. He holds a Ph.D. in hydraulics from the University of Minnesota (1950). During his college years he accepted evolutionary theory, but it went against his religious background (Nelkin 1977:71). It was during his graduate training that he became a creationist. This proved to be a problem for the university he was working for--Virginia Polytechnic Institute. Nelkin mentions that collegial pressures forced him out of a secular university. Even though he still does some work in applied hydraulics, most of his work is centred around scientific creationism. Morris is one of the most prolific writers the Institute has.

It is Duane Gish who is the debator for the Institute. Gish is the associate director of ICR, and his Ph.D. is in biochemistry from the University of California, Berkeley (1953). He held a postdoctoral fellowship at Cornell University Medical School for a few years, but he

spent most of his career at Upjohn and Company as part of its research staff (Nelkin 1977:72). Gish had always read creation theory almost as a hobby, but it was not until 1971 that he began to devote all his time to scientific creationism. Gish claims, and actually believes, that if people understood the nature of scientific evidence, they would be more sympathetic to creation theory.

One of the Institute's staff actually worked for the Biology Science Curriculum Study (BSCS) for a year. The study was the project that introduced evolution into the public classrooms in the early 1960's. Lane Lester, who received his Ph.D. in genetics from Purdue University, left the Biological Sciences Curriculum Study (BSCS) to join the Institution in 1974. For years he was a theistic evolutionist, until he heard Gish speak in 1972 (Nelkin 1977:72). His reason for joining the BSCS was only to study curriculum development so he could apply that knowledge to the Institute. The only person in the ICR who has 'shaky' credentials is Richard Bliss, curriculum development director. He is a graduate of the University of Sarasota in Florida, a 'university' which is not accredited, has no campus, yet specializes in graduate degrees (Michalsky 1981:17).

Many of the active scientific creationists have their Ph.D.s in the fields of applied physical sciences and engineering, rather than in biological sciences. They are usually people, like Gish and Morris, who had trouble compromising their religious background and beliefs with their scientific training. Creationism appealed to them as a means to resolve these dilemmas. The creationists say that the reason applied scientists are interested in creationism is that their feet are firmly rooted on the ground. They also argue that people in technical professions, working in highly structured and ordered contexts, are inclined to think in terms of order and design (Nelkin 1977:73). It is not that they are against science or technology, but they believe that their religious beliefs can, and will, be shown to be true through science.

The United States had always prided itself on the high quality of their public educational system. It was not until the USSR launched its first Sputnik that the American public became aware of the antiquated science courses in their classrooms (Nelkin 1976:33). The scientists had realized for some time that scientific training had to be modernized, as new research in population genetics, biochemistry and other related fields had been increasing rapidly, and it was not entering the classroom. The lack of evolutionary theory was a major topic during the Darwin centennial celebration of 1959 (Nelkin 1977:27). After the centennial, a group of well known scientists formed the Biological Sciences Curriculum Study at the University of Colorado. The purpose of the group was to develop a modern approach to the teaching of biology. The National Science Foundation provided the BSCS with seven million dollars. After five years in preparation, the BSCS marketed three introductory textbooks for high school biology classes. Each book had a slightly different emphasis; one stressed cellular biology, another molecular analysis, and the other ecology (Nelkin 1977:33). The material overlapped about seventy percent, but all three themes were firmly rooted in evolutionary theory.

When the books were introduced, there were areas of the States where they met with incidents of hostility. School supervisors in several southern states refused outright to purchase the material. The New Mexico board of education insisted that all the front covers be stamped to say that the New Mexico official position was that evolution was only a theory, not a fact (Nelkin 1977:29). The most pronounced resistance came from the state of Texas. There was a campaign organized by the Church of Christ against the textbooks. At one point in the fury, the Governor of Texas came out and said the books were 'pure evolution from cover to cover, completely materialistic and completely atheistic' (Nelkin 1977:29). It was not until October 1964, at a public hearing, that the textbooks were approved for statewide use. The hearing forced the BSCS to 'soften' its evolutionary emphasis before the books were allowed to enter Texas. The smoke settled, and the textbooks saw national use in the schools during the sixties.

Most people assume that evolution was allowed to be taught in all the states in the sixties--this was not so. It was not until 1967 that the anti-evolution teaching law was appealed in Tennessee. Gary Scott was dismissed for teaching evolution from a Tennessee school in 1966 (Skow 1981:57). A year later, the Supreme Court declared the anti-evolution law unconstitutional due to Scott's appeal. Mississippi, due to the court's ruling, quietly repealed their similar law. Even though the BSCS material was being distributed, it does not mean it was embraced with open arms throughout America.

Nelkin (1967, 1977) believes that it was because of the Supreme Court rulings that the scientific creationists were forced to change their strategy. They now knew that the tactics of keeping Darwin out of the public schools would not be successful. This is when the public started to hear cries for 'equal time' and 'balanced treatment' for creation-science, as an alternative scientific theory. On the surface it appeared extremely democratic, guaranteed to appeal to Americans, but to anyone who understands the basic tenets of science it was just another way to get Genesis into the schools. Morris presents a point of view which might even persuade liberals:

Let us present as many theories as possible and give the child the right to choose the one that seems most logical to him. We are working to have students receive a fair shake (Nelkin 1977:134).

The concept of 'equal time' for controversial issues originated from the Federal Communication Commission's 1963 Fairness Doctrine (Nelkin 1977:135). The doctrine was developed so that all opposing views on a public issue would be aired within the limited broadcasting resources. This doctrine was to ensure that all groups were given a fair chance on radio and television, rather than just the groups with power and money. Unfortunately, the Fairness Doctrine looks great on paper but is impossible to implement properly.

It was this call for fair play and equal time which resulted in California's Science Framework being plunged into chaos from 1969 to 1973. In 1969, the California State Advisory Committee on Science Education prepared guidelines for its public schools called The Science Framework for California Schools. The advisory committee was a group

of scientists and teachers appointed by the Board of Education. The committee had worked hard for four years and the first draft in 1969 was quite lengthy. The committee intended it to be only a curriculum guide and not a recipe book for all science teachers. The Science Framework had two paragraphs on evolution in Appendix One (Moore 1974:177). These were what caused the ensuing fight over the Framework. There were several creationists on the Board of Education who refused to accept it until Creation Theory was given a place in it. Vernon Grose, an aerospace engineer and Pentecostal, read about The Science Framework in the Los Angeles Times (Nelkin 1977:83). He volunteered to help as a concerned citizen, and on 13 November, 1969 he presented a thirteen page memorandum to the Board of Education. The Board of Education unanimously threw out the two paragraphs on evolution, and included Grose's treatise on creation and evolution instead (Moore 1974:178). One of Grose's condensed paragraphs was:

While the Bible and other philosophic treatises also mention creation, science has independently postulated the various theories of creation. Therefore, creation in scientific terms is not a religious or philosophic belief. Also note that creation and evolutionary theories are not necessarily mutual exclusives. Some of the scientific data (e.g., the regular absence of transitional forms) may be best explained by a creation theory, while other data (e.g., transmutation of species) substantiate a process of evolution (Moore 1974:178; Nelkin 1977:83).

The Advisory Committee was horrified by the revision, and very publicly aired their feelings in a strongly worded statement. The Board ignored its own committee, and formally included Grose's condensed three paragraphs in lieu of the two on evolution. The Board did include a statement that the three paragraphs in the final printed form of The Science Framework (1970) did not meet with the approval of the Advisory Committee. It looked like the Scientific Creationists had won in California.

The 'real' trouble began when California started to use The Science Framework for selecting its approved textbooks. The elementary school books had to be selected in 1972. Grose was responsible for negotiating with the publishers. As California is responsible for ten percent of the market, the publishers were falling over one another to conform to The Science Framework (Nelkin 1977:84). It was in this milieu that the scientific establishment finally got involved.

The State Board of California was deluged with resolutions against the teaching of scientific creationism. Statements came from the American Association for the Advancement of Science, the National Academy of Science, the nineteen Nobel Laureates living in California, the American Institute of Biological Sciences, the American Anthropological Association and the Council of the Academic Senate of the University of California, among others (Moore 1974: 181). If nothing else happened, the Board of Education was made acutely aware that the majority of Californian scientists did not regard 'creation

science' as a science. The outcry, and the wide press coverage forced the Board of Education to hold public hearings on the subject. Due to these hearings, the Board of Education began to re-examine its policies. In December 1972, the curriculum committee announced to the board that its members had agreed unanimously on guidelines that would ensure the neutrality of science textbooks (Nelkin 1977:95). This committee also came out with that famous phrase, "evolution should not be taught as dogma", that has so influenced other educational organizations (for instances the Ontario Ministry of Education). The California Board of Education eliminated 'scientific dogmatism' by changing strong evolutionary statements to weaker versions to suit the creationists, a 'solution' which satisfied neither side.

The scientists still sent statements to the Board of Education, and the creationists lobbied the publishers to add creation science to the biology textbooks. In retrospect, one can only conclude that the scientific creationists came out the overall winners. They made sure that evolutionary theory was 'watered down' in The Science Framework, and evolution was publicly 'demoted' to mere speculation. Any scientist or person knowledgable about science would agree that evolution should not be taught as dogma, but does the general public understand what is meant by this? It would not be an understatement to claim that 'theory' to the public might mean one step above a wild guess. So when the California Board of Education stated that evolution is only a theory, not a fact (or dogma), it actually supported the creationists' position that evolution should not be taught as the only model of life's origins.

This California 'victory' opened the doors for further action by the creationists. In August 1972, William Willoughby, religion editor of the Washington Evening Star, filed suit against H. Guyford Stever, Director of the National Science Foundation and against the Board of Regents of the University of Colorado (on behalf of forty million evangelistic Christians) because the NSF and BSCS's textbooks only presented evolutionary theory (Newell 1974:32, Nelkin 1977:54) Willoughby claimed that taxpayers were coerced into paying for educational materials that violated their religious beliefs; thus, NSF and the BSCS had violated the First Amendment. He declared that through those books the government was attempting to establish secular humanism as the official religion of the United States. Willoughby received many supportive letters but the U.S. District Court in Washington, D.C. threw the case out of court in May 1973. The Court decided that the BSCS books were secular and that the First Amendment does not allow the state to require teaching to be tailored to particular religious beliefs (Nelkin 1977:54). The case was appealed to the Supreme Court, which dismissed it in 1975.

The anti-evolution law in Tennessee was removed in 1967, but this did not accurately reflect the views of the state populace. Some teachers were dismissed or reprimanded for teaching evolution after 1967. In 1972, the New York Times did a poll of highschool students in Dayton, Tennessee (site of the Scopes trial), and found that over seventy-five percent still believed in creation. A few students voiced the opinion that the teaching of evolution led to the moral decay of

America. In 1973, the Tennessee General Assembly passed the following statute:

Any biology textbook used for the teaching in the public schools which expresses an opinion of, or relates to a theory about origins or creation of man and his world shall be prohibited from being used as a textbook in such system unless it specifically states that it is a theory as to the origin and creation of man and his world and is not represented to be scientific fact. Any textbook so used in the public education system which expresses an opinion or relates to a theory or theories shall give in the same textbook and under the same subject commensurate attention to, and an equal amount of emphasis on, the origins and creation of man and his world as the same is recorded in other theories including, but not limited to, the Genesis account in the Bible. (Nelkin 1977:50-51).

This law passed the Tennessee House of Representatives by a vote of 69 to 15, and the Senate by 28 to 1. This law now made it illegal to include evolution in a biology textbook without giving alternate theories equal time in the same chapter. It essentially enforced the Bible as a reference book for biology classes. The statute did not attempt to set scientific creationism up as the only alternate theory, but one can make an educated guess that Hindu, Buddhist or Native American cosmologies were not introduced under this law. American scientists and teachers were understandably outraged.

The National Association of Biology Teachers (NABT) challenged the constitutionality of the statute. The NABT argued that the law interfered with free speech, free exercise of religion, and freedom of the press which are guaranteed by the Fourteenth Amendment (Nelkin 1977:51). It is surprising that violation of the First Amendment, which guarantees separation of the church and state, was not cited in the charges. But when the case finally went to a Tennessee court of appeals in 1975, as the Supreme Court refused to accept it, the court overruled the equal time legislation, claiming that it showed...

a clearly defined preferential position for the Biblical version of creation as opposed to any account of the development of man based on scientific research and reasoning. For a state to seek to enforce such preference by law is to seek to accomplish the very establishment of religion which the First Amendment to the Constitution of the United States squarely forbids (Nelkin 1977:51).

The decision of the Tennessee Court of Appeals was significant not only in Tennessee but across the United States. It was not until the late 1970s, when a new creationist bill was drafted, that the scientific creationists tried again to get equal time laws passed in state legislative houses.

Since the scientific creationists could not get equal time for creationism through the state legislative houses or the courts, their next best approach was the one they had had success with--textbooks. Nelkin has clearly shown that most biology textbooks intended for public school consumption were drastically edited. This trend started in 1972 (Nelkin 1976, 1977; Pierce 1981:65). Whole sections on Darwin and evolutionary theory were either substantially reduced in size, watered down or deleted altogether. For example, a 1969 edition of Modern Biology (Holt, Rinehart and Winston Publishers), stated "Modern man has probably evolved from primitive, more generalized ancestors"; the 1977 version, "Darwin was suggesting that humans may also have evolved from less specialized ancestors" (Pierce 1981:65).

The scientific creationists were also busy writing biology textbooks during this time. They were hoping their textbooks would provide an alternative to the 'scientific dogmatism' of typical textbooks and that their books would be placed on the approved state textbook lists. The first successful creationist textbook was Morris' Biology: A Search for Order in Complexity. In 1975, this book was one of the seven officially approved biology textbooks for the State of Indiana (Henig 1979:514). It was used in seven school districts, and in two of these, it was the only ninth grade biology textbook used. As in all states, the Indiana state textbooks committee approves certain books for school use, and the individual district textbook committees decide which ones will then be used in their schools. The Indiana Civil Liberties Union lobbied against the use of Morris' textbook in Indiana public schools (Henig 1979:514). They obtained a court order forcing the Indiana Textbook Committee to reconsider. The committee met and again voted to keep Biology: A Search for Order in Complexity on the official list. The Indiana Civil Liberties Union then went to the Indiana Supreme Court in 1977. The Court reaffirmed its decision that the use of scientific creationist material and literature in public schools violated the First Amendment. The judge in the case called the creationists' demand for equal and balanced treatment a 'sham', as it was just an attempt to get thinly disguised Biblical literalism into the classroom. It was obvious that to pursue their cause through the legal system was dangerous for the scientific creationists, for although they might get wider publicity and thus gain more support, it was guaranteed that the First Amendment would be a permanent roadblock to their objectives.

During this period the scientific creationists began to declare that evolution was actually religion with a thin coating of science. This tactic was employed during the Segraves vs. the State of California trial in 1979 (Flygare 1981:99-99; Siegal 1981:95-101; Pierce 1981:62). The complaint was filed by Kelly Segraves who argued that the teaching of evolution in public schools violated his and his three children's right to freedom of religion. Segraves, Director of the Creation Science Research Center, turned the tables on the evolutionists and used the First Amendment as a 'weapon' against them. His entire list of charges revolved around the claim that the State of California's Science Framework promoted the religion of secular humanism.

The scientists, the Board of Education, the scientific creationists and the press were looking forward to a Darrow/Bryan style debate between the evolutionists and creationists (Siegal 1981:95). This hope was cut short when the court decided to focus only on the interpretation of various policies of the California Board of Education (Flygare 1981:99). The 'anti-dogmatism policy' of 1972 was given considerable weight in the deliberation. In June 1981, the judge decided that the California Board of Education had taken no action that would deny the plaintiffs free exercise of their religion. The court did, however, reaffirm the 1972 policy that evolution should not be taught as dogma. The court ordered the Board of Education to distribute the 1972 policy to all publishers, school districts, schools, science teachers, and all other persons using and receiving The Science Framework (Flygare 1981:99). Although Segraves did not win his argument that evolution promoted secular humanism, and thus denied him his right to freedom of religion, the court did not issue a strong statement on evolution either. As has been said before, the 'anti-dogma' policy shows a lack of understanding of the methods of science, and of evolutionary theory in particular. The California case started intensely, but did not result in the 'show down' which both sides wanted. Six months later all parties received the confrontation they desired.

The most volatile meeting of the evolutionists and the scientific creationists since the 1925 Scopes Trial took place in Arkansas in 1981. The Arkansas Bill 590 entitled Balanced Treatment for Creation-Science and Evolution-Science was taken to court by the American Civil Liberties Union (ACLU). It was dubbed 'Scopes II' by the popular press who gave the trial wide coverage (albiet without the sage comments of H.L. Menchen).

Bill 590 was actually conceived in 1977 by Paul Ellwanger, a respiratory therapist who was neither trained in science nor in law (Overton 1982:936). Ellwinger is the head of a group known as Citizens for Fairness in Education, based in Anderson, South Carolina. In 1977 he began to collect proposals of acts which required the teaching of 'scientific creationism' alongside of evolution in classrooms (Lewin 1981:1101). With all these proposals and under the direction of some state legislators and lawyers, Ellwanger prepared a model act which called for the balanced treatment of 'creation-science' and 'evolution-science' in public schools. He sent this act to sympathetic individuals and organizations in various states. At first it was thought that it might pass in the California House, but its first passage was in Arkansas in March 1981 (Ruse 1982:1). Both houses of the Arkansas legislature passed it with a wide majority after only ten minutes of discussion. As Michael Ruse of the University of Guelph points out, the Arkansas legislature only meets for sixty days every other year so the fast passage of Bill 590 was not special. Newsweek reported that the Governor of Arkansas actually signed the bill without reading it (Carey 1981:57).

Rather than reproduce Act 590 in its entirety, some of the major sections, which became focal points in the trial, are quoted below:

SECTION 1. Requirement for Balance Treatment. Public schools within this State shall give balanced treatment to creation-science and to evolution-science. Balance treatment to these two models shall be given in classroom lectures taken as a whole for each course, in textbook materials taken as a whole for each course, in library materials taken as a whole for the sciences and taken as a whole for the humanities, and in other educational programs in public schools, to the extent that such lectures, textbooks, library materials, or educational programs deal in any way with the subject of the origin of man, life, the earth, or the universe.

SECTION 2. Prohibition against Religious Instruction. Treatment of either evolution-science or creation-science shall be limited to scientific evidences for each model and inferences from those scientific evidences, and must not include any religious instruction or references to religious writings.

SECTION 4. Definitions. As used in this Act:

(a) 'Creation-science' means the scientific evidences for creation and inferences from those scientific evidences. Creation-science includes the scientific evidences and related inferences that indicate: (1) Sudden creation of the universe, energy, and life from nothing; (2) The insufficiency of mutation and natural selection in bringing about development of all living kinds from a single organism; (3) Changes only within fixed limits of originally created kinds of plants and animals; (4) Separate ancestry for man and apes; (5) Explanation of the earth's geology by catastrophism, including the occurrence of a worldwide flood; and (6) A relatively recent inception of the earth and living kinds.

(b) 'Evolution-science' means the scientific evidences for evolution and inferences from those scientific evidences. Evolution-science includes the scientific evidences and related inferences that indicate: (1) Emergence by naturalistic processes of the universe from disordered matter and emergence of life from non-life; (2) The sufficiency of mutation and natural selection in bringing about development of present living kinds from simple earlier kinds; (3) Emergence by mutation and natural selection of present living kinds from simple earlier kinds; (4) Emergence of man from a common ancestor with apes; (5) Explanation of the earth's geology and the evolutionary sequence by uniformitarianism; and (6) An inception several billion years ago of the earth and somewhat later of life.

(c) SECTION 7. Legislative Findings of Fact. This Legislature finds that:

(a) The subject of the origin of the universe, earth, life, and man is treated within many public school courses, such as biology, life science, anthropology, sociology, and often also in physics, chemistry, world history, philosophy, and social studies.

(c) Evolution-science is not an unquestionable fact of science, because evolution cannot be experimentally observed, fully verified, or logically falsified, and because evolution science is not accepted by some scientists.

(f) Public school presentation of only evolution-science furthermore abridges the Constitution's prohibition against establishment of

religion, because it produces hostility toward many Theistic religions and brings preference to Theological Liberalism, Humanism, Nontheistic religions, and Atheism, in that these religious faiths generally include a religious belief in evolution.

(j) Creation-science is an alternative scientific model of origins and can be presented from a strictly scientific standpoint without any religious doctrine just as evolution-science can, because there are scientists who conclude that scientific data best support creation-science and because scientific evidences and inferences have been presented for creation-science. (Arkansas 1981).

Shortly after Act 590 became law, the ACLU, on behalf of the plaintiffs, filed a suit against Arkansas challenging it on the three grounds (Overton 1982: 936; Ruse 1982:2; Lewin 1981a:1101). The first charge was that the law was so loosely written that it was practically unenforceable, thus violating the Due Process Clause of the Fourteenth Amendment. Second, it was argued that the Act infringed the right to academic freedom which is guaranteed to students and teachers under the Free Speech Clause of the First Amendment. The third, and most important, charge was that Act 590 violated the First Amendment which ensures the separation of Church and State. The suit was therefore filed by the plaintiffs on purely constitutional issues.

Although the ACLU provided lawyers and the funding for the case, they were never listed as plaintiffs. The plaintiffs were all Arkansas taxpayers. They included bishops and clergy from the following churches: United Methodist, Episcopal, Roman Catholic, African Methodist Episcopal, Presbyterian, and Southern Baptist. The representatives of the churches were joined by several parents and a high school biology teacher as the individual plaintiffs. The organizational plaintiffs included the American Jewish Congress, the Arkansas Education Association, and the National Association of Biology Teachers, to name a few. The defendants were the Arkansas Board of Education, and the State Textbooks and Instructional Methods Materials Selection Committee. The State of Arkansas was dismissed as a defendant because of its immunity from suit under the Eleventh Amendment (Overton 1982:942).

Due to the way the Federal District Court operates, the plaintiffs had to present their first. Only after it was shown that the case had merit in the eyes of the court, could the defence mount its case. The ACLU divided the presentation into three parts. The first section was a discussion of religion. This included scholarly thought on the sources of the Old Testament, American Fundamentals and the essence of religious claims as distinct from other claims (that is, science or philosophy). In the second, the plaintiffs, with the help of expert witnesses, tried to show that 'creation-science' was not a science. This, of course, was the crux of the matter, and it was the first time in legal history this had been attempted (Lewin 1981b:1102). The third section was devoted to suggesting the educational consequences should Act 590 be allowed to stand.

Although the American Civil Liberties Union filed the suit on three charges and broke its presentation into three sections the one

basic point they had to prove was that 'creation-science' was not a science, but rather a religious belief.

For this the ACLU relied on the following expert witnesses: Francisco Ayala, Harold Morowitz, Stephen Gould, Brent Dalrymple and Michael Ruse. Each man spoke on his particular field--Ayala on genetics, Morowitz on the second law of thermodynamics, Gould on the fossil record, Dalrymple on the dating methods of rocks, and Ruse on the philosophy and methodology of science (Ruse 1981:16; Lewin 1981:1102; Overton 1982). The major area of the Act which was under attack was the definition of 'creation-science', Section 4(a) (see above).

Ruse and other witnesses gave the essential characteristics of science as the following:

- (1) It is guided by natural law;
- (2) It has to be explanatory by reference to natural law;
- (3) It is testable against the empirical world;
- (4) Its conclusions are tentative, that is, are not necessarily the final word; and
- (5) It is feasible (Overton 1982:938).

As it was stressed during the trial, 'creation-science' does not conform to even one of the above agreed upon criteria of science. Definition 4(a) (1) of Act 590, the sudden creation of the universe, energy and life from nothing certainly opposes all five of the characteristics. It is impossible to test a 'miracle', and equally difficult to try to falsify it. Nor can sudden creation be guided or explained by natural law, as it demands an appeal to the supernatural. In fact, not clause of the definition of 'creation-science' can satisfy the above criteria.

Judge Overton's review of the testimony supports the plaintiffs' claims that 'creation-science' is not science. He pointed out that definition 4(a) fails to meet any of the requirements of science. Overton said that what 'creation-scientists' actually do is take the literal wording of Genesis and then attempt to find scientific support for it. The Act also defines 'evolution-science' incorrectly, and thus 'creation-science' and 'evolution-science' are given as a package deal--both or none. This underlined the fact that 'creation scientists' really do not understand evolutionary theory, or are only willing to deal with the theory of their own terms. Section 2(b)(2) came under fire as Dr. Ayala and Dr. Gould testified that most biologists do not consider mutation and natural selection to be the only processes of evolution (Overton 1982:938). The word 'kind' came under scrutiny as well; none of the expert witnesses had ever heard the word used in a scientific context.

Judge Overton devoted considerable time in his decision, to a review of the textbooks which the 'creation-scientists' said could be used in a public classroom under Act 590. He also heard testimony from Marianne Wilson on this topic. Ms. Wilson was given the task of producing a creation science curriculum guide for the Pulaski Country

Special School District in Arkansas, before Act 590 became law. She, and a committee of school teachers reviewed nearly all of the books published for schoolrooms by creationists. After this, the committee reported back to the School Board that they could not find any acceptable books to be used in public classrooms, as they unanimously concluded that scientific creationism was actually religion, not science. The Board ignored the committee's decision, and still wanted a curriculum guide produced.

The following are examples of the material Ms. Wilson, her committee and Judge Overton reviewed; both are examples of public school editions of scientific creationism textbooks:

The creationist believes that only an omnipotent Creator could design and construct the human brain! He cannot prove such a fact scientifically, of course, but neither can the evolutionist prove that random particles can organize themselves into a human brain, or into anything else but random particles. (H.M. Morris ed. 1974. Scientific Creationism, p. 35. cited in Ruse 1982:8).

Certainly the Christian faith has added meaning and motive to my science. Science has helped me to become a Christian, and my Christian faith has enriched my work as a scientist. I commend to you, then, not only creation, but also Christ the Creator. (G.E. Parker, 1979:148)

As Ms. Wilson and her committee had deemed the creationists' textbooks unusable for public schools, they had to turn elsewhere for the curriculum guide. By this time Act 590 had been passed; so they used Definition 4(a) as their model. An article from Reader's Digest on atomic clocks was also used as it inferred that the earth was less than four and a half billion years old. Ms. Wilson was unable to find scientific evidence for other parts of 4(a), such as proof of a worldwide flood. It was noted in the decision that the defendants did not produce any book or writing in response to Ms. Wilson's testimony. Testimony demonstrated that even to an unbiased witness, 'creation-science' was merely religion.

In his decision that Act 590 was constitutionally illegal, Judge Overton gave no support to the creationists, by stating evolution should not be taught as dogma. In his conclusions, Overton gave the strongest legal decision ever made on the side of teaching only evolution in public schools (Overton 1982; New York Times 1982:B8). The fact that Act 590's only effect was the advancement of religion was stated emphatically. The claim that 'creation-science' was not a science was proved beyond the shadow of a doubt. He said that the Act was self-contradictory, and compliance to the Act was impossible unless public schools elected to forego significant sections of subjects such as biology, world history, geology, zoology, botany, psychology, anthropology, sociology, philosophy, physics and chemistry (Overton 1982:941). The educational consequences are immense and devastating to

the academic goals of the system. Overton could not see, in light of the evidence, how Act 590 could be applied in a secular manner. He was also the only judge who addressed the creationists' charge that evolution was religion, and that the schools should teach creation-science to neutralize its effects. Overton noted the inconsistency that if creation-science was not religious in nature, as the defendants claimed, how then could it neutralize the religious aspects of evolution? Overton concluded that law and common sense proved that evolution was not a religion; therefore, the teaching of evolution does not violate the First Amendment.

In his closing remarks, Judge Overton, quoting the late Judge Frankfurter of the Supreme Court, stated:

We renew our conviction that "we have staked the very existence of our country on the faith that complete separation between the state and religion is best for the state and best for religion....If nowhere else, in the relation between Church and State, "good fences make good neighbors." (Overton 1982:1942).

Clearly the scientific creationists were defeated in the Arkansas trial. Overton very thoroughly went over Act 590 and found the Act in direct violation of the First Amendment. The public opinion polls given as evidence of support of Act 590 held no authority in the court. Overton maintained that no group, no matter how large, may use the organs of government, of which the public schools are the most influential, to foist its religious beliefs on others (Overton 1982:942). The Arkansas decision is a major legal precedent which will shadow any further action of the scientific creationists on state floors and courtrooms.

This does not appear to have deterred the creationists to any great degree. Paul Ellwanger, the designer of Act 590, is already drafting a new Equal Time Bill that avoids some of the problems with Act 590 (Lewin 1981c:1224). Nearly all phrases that might be seen as referring to a supernatural force have been deleted or modified. The draft bill has a new name as well: Unbiased Presentation of Creation-Science and Evolution-Science Bill (Lewin 1981:1124). The bill sets out how many hours should be devoted to creation science, the pages in textbooks, number of books in libraries, and so on, in an effort to get around the complaint that Act 590 was too vague. The bill notes the fact that a majority of Americans favour an unbiased presentation of evolution-science and creation-science. In his article, Roger Lewin (1981c) comments that it is almost impossible to read the draft without getting the impression that both sides should get proper consideration, if creationism is a science. Few scientists will be swayed by the new wording but it might solve some of the creationists' problems with touchy legislators. Do we have to wait until it is adopted by a state, and then perhaps appealed in court, to see if this new tactic of the creationists' will work? Or will the Arkansas decision make such an impact on them that as long as the First Amendment is in, the Constitution 'creation-science' will not legally be permitted in the

schools? It will be instructive to note what happens to Louisiana's Equal Time Bill when that case comes up in the fall of 1982. Unless the creationists change their entire strategy, most scientists believe the Arkansas decision will prevail and the bill will be overturned.

Anyone who is knowledgeable about the scientific creation movement knows that we will be hearing from them over and over again. Every legal battle they have undertaken has ended in defeat, but they keep trying. And perhaps it is this, their blind and undying faith, that makes the creationists so dangerous to the public school system.

The scientific creationists are well organized, well financed and extremely persistent. Undaunted by the legal defeats they have encountered, they go on drafting new bills, engaging in debates, writing books and articles, and lobbying politicians. They believe they will win the battle to have creation-science in the classrooms as soon as the scientists and judges open their eyes and see that the creationists are right. The task they have is to convince people that creation science is as valid as evolutionary theory, and therefore should be taught in public schools. The scientific creationists are winning support in the local levels (especially parents) and even some state legislatures (for example, Arkansas, Louisiana) but they cannot, and will not, get legal sanction for their actions. The First Amendment will always block them. Public polls show the majority of the American public support the doctrine of 'balanced treatment', and the creationists use this 'mood of the people' in their favour. The creationist movement has gained in support, and perhaps also in legitimacy, since 1963. It is not going to disappear in the near future. During every court battle more people become aware of the movement. Scientists with all their facts seem aloof and part of an ivory tower network to the general public. The creationists, on the other hand, portray themselves as champions of the ordinary person, fighting for Christian morals and values within schools.

The creationists' fight is not focused only in the biology classroom; that is just the tip of the iceberg. The true fight is over how and what American children should be taught. Many people hold Darwinism, and its handmaiden secular humanism, responsible for the moral decay of society. That is the true issue at hand. Darwinism has been used as a scapegoat for some of society's problems for the last 123 years. If it was not evolution, there would be another scapegoat. It is a clash of ideologies, and it does not look like the scientific creationists will change theirs in the near future.

Anthropology, as a discipline, stands in direct opposition to the scientific creationists in aims and goals. Loosely defined, anthropology is "the science that deals with the origins, physical and cultural development, 'racial' characteristics, and social customs and beliefs of mankind" (Random House Dictionary, 1980:57). Rather than try to get all people into one view of life and man, anthropology studies the diversity of mankind. It is only recently that anthropologists have looked critically at scientific creationists instead of classing them with groups like the Flat Earth Society.

Anthropologists are not the only ones who have ignored the rising number of scientific creationists and their supporters. Most of the scientists and academics throughout the States and Canada have also done so. Arkansas may have been the turning point--scientists are no longer laughing, but coming out strongly against 'creation-science'. Along with the 'creation science', evolutionary theory is being presented to the lay public. Recently three major magazines have published extensive stories on the theory of evolution (Life, Time and Newsweek). In a way, the scientific creationists may have done the evolutionists a favour by making the issue so topical. Perhaps the public is finally understanding, or at least learning, the basics of evolutionary theory as the scientists are fighting back in the popular press.

The scientific creationists are a threat to the proper teaching of evolutionary theory, and therefore to the teaching of biology and other subjects. I have mentioned that scientists are now confronting the creationists, and winning court cases. But it is not court cases where they are strong. If we really want to eliminate the 'balanced-treatment' ideology of many people, we also have to go to the local levels. All the splashy cover stories of popular magazines will not help as much as going and speaking at local PTA meetings, and getting on the textbook committees. It may seem that I am advocating the use of the creationists' tactics -- I am. It appears to be the best possible route for a 'counterattack'.

Finally, it is worth noting that we do not have the First Amendment in Canada, should the Canadian creationists become more vocal.

NOTES

1. The terms, 'scientific creationists' and 'creationists' will be used interchangeably in this paper.

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