FOLLOWERS OF PROCRUSTES

by

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Chit-Chat Club

May 10, 1982

San Francisco, CA

INTRODUCTION

During recent years there has been increasing activity by members of a school of thought that seek to reinterpret the findings of scientists. The reinterpretation consists of fitting natural phenomena into a literal interpretation of the Book of Genesis. According to this procedure, the dating of rocks and fossils is allowed a maximum time of 10,000 years, and the same length of time, about 10,000 years, is said to represent the age of the entire universe. As further constraints, fossilized animals are said to be the remnants of creatures that perished in the Flood described in Genesis, of which Noah and his fellow passengers on the Ark were described as the only survivors. I have termed, for purposes of our discussion tonight, the people who are members of this school of thought, "followers of Procrustes." The Procrustes of Greek mythology placed his victims on a bed. If they were too long for the bed, he lopped off their extremities until they fitted his accommodation. If they were too short for the bed, he stretched them until they died. I believe that these procedures are analogous to the treatment of science by the creationists.

The Greek legend had a happy ending when Theseus slew Procrustes. The end of the mistreatment of science by the creationists is not yet in sight. As we shall see, schoolteachers are told to adjust their teaching to the Procrustean demands of the creationists.

My presence here tonight is actually the direct result of my interest in creationism, for it was in 1972 that Julian Bartlett and I attended public hearings in Sacramento, on November 9, held by the State Board of Education. Of that occasion it was said, "probably those most effective in urging the Board not to mandate the teaching of creationism of science were important representatives of Catholic, Jewish, protestant and Buddhist religions. These individuals made it abundantly clear that they did not regard the controversy as one between religion and science, but as one

between fundamentalism and science. Julian was one of the clearest speakers there, as he has been since on similar occasions. A few weeks later, he introduced me to the Chit Chat Club. A few months ago I asked him to speak on the subject of creationism at the Annual Meeting of the American Society of Biological Chemists in New Orleans. Julian responded magnificently, and I believe it was the first time that a priest had spoken on the subject of religion at the meeting of the Society, which was founded in 1906, and has met annually during most of the intervening years.

Early activities against teaching evolution in California were described by Maynard Shipley in The War on Modern Science, published by Alfred A. Knopf in 1927. Chapter 7 is "Decivilizing California." It states that 400 delegates to the convention of the World's Christian Fundamentalist Association in Los Angeles, July 1, 1922, resolved to wage a relentless warfare on evolution and modernism, and on textbooks and teachers that attempt to undermine the Christian faith by expounding the modern doctrine of evolution. In July 1924, a group of fundamentalists protested to the State Board of Education against the use in high schools and junior colleges of textbooks teaching evolution, on the grounds that "Darwinism is clearly subversive to Christianity." A large number of resolutions from fundamentalist clergymen and churches were read before the State Board of Education, April 3, 1925. A counter-statement from the Science League of America was neither mentioned nor read. The State Board, without discussion, passed the resolution that high school teachers might continue to teach evolution "as a theory, but not as an established fact." No members of the board had any training in natural science.

In August 1926, the president of the British Association for the Advancement of Science said: "We still see in magazine articles, the statement that evolution is not a fact, but merely an unproved hypothesis. No doubt it may be said that in one sense absolute proof is unknown to science, but taking the word 'proved' as we use it in ordinary life, we are completely justified by the data of embryology and paleontology in stating that evolution is a definitely proved fact." Edwin Linton pointed out (Science, November 26, 1926):

> "The term evolution is a convenient name for the processes of nature which we see going on about us, and of which we are a part, of which also a partial record is preserved in the earth's crust, and elsewhere in the visible universe."

The California State Board of Education, acting on a request by fundamentalists, referred 12 textbooks in general science--biology, zoology and astronomy--to a

committee composed of the presidents of nine California universities, with Dr. W.W. Campbell of UC Berkeley as chairman. The committee concluded:

> "The theory of evolution could scarcely be omitted from any textbook on biology, astronomy or geology. These books have treated the subject with moderation and circumspection. There appear to be no statements derogatory to the Bible, and the writers have taken special pains to assure the readers that there is no conflict between science and religion. Evolution is presented as a theory, and not an established fact, although it is stated here and there that the theory of evolution is commonly accepted by scientists and that it is true. The textbooks before us are concerned with presenting scientific facts and theories of which any person with any pretense to an education in the subjects treated should be informed."

The committee's report was criticized by the Baptist Central News, Detroit, April 18, 1925, from which I quote:

> "Now let us suppose that these nine presidents were asked to decide whether poisons were deadly, and whether the packages dealt out to the public should not be labelled 'Poison,' and decorated with deathshead and crossbones, and their verdict should be 'poisons are not deadly when taken in small quantities, and hence there is no call for labels or decorations.' Would not their patrons wonder about their sanity?"

It is noteworthy that the events of 1922 to 1926 contain all the elements of the controversy that is before us today.

Shipley drew attention to a statement by Father McHugh of San Francisco that "Evolution is as a theory taught in parochial schools of the state," also that in Roman Catholic colleges, evolution is taught by biology teachers. Shipley also says, "The Fundamentalist demands eye witness evidence for the truth of evolution, but he flies into a rage if one even asks for proof that his Bible stories are inerrant."

He quotes Billy Sunday, the well-known evangelist preacher, as saying, "If a minister believes and teaches evolution, he is a stinking skunk and a liar. The consensus of scholarship can go to hell for all I care. Old Darwin is in hell." Another well-known evangelist, Aimee Semple MacPherson made a sensation in June 1926 when she disappeared for 35 days, and returned saying that she had been kidnapped by direct order of the Devil himself, and gave her opposition to evolution as one of the causes.

William Jennings Bryan, presumably warming up for the Scopes trial of the next year, said in October 1924, at Mountain View, California:

> "All the ills from which America suffers can be traced back to the teaching of evolution. It would be better to destroy every other book written and just save the first three verses of Genesis."

Following Bryan's death, a press dispatch from Turlock said:

> "The Bryan Bible League, formed to honor the memory of William J. Bryan, and to continue the fight he so nobly began in opposing the teaching of evolution, was launched here at a mass meeting of 2500 persons."

Sympathizers were asked to get in touch with Bryan's widow and with other leaders in the fight against evolution.

However, many religious groups took stands opposing fundamentalism. Among these were the Methodist Episcopal Church Conference, which met in Santa Cruz, September 1924, and the Northern California Congregational Conference, who met in Sacramento, August 25, 1925. They expressed the hope that the State Board of Education would be "firm in its stand to permit the teaching of evolution, as a theory, in the public schools." The Western Association of Jewish Ministers adopted resolutions in 1925 urging the teaching of evolution, and said in a letter to the State Board of Education:

"Biblical folklore is only incidental to the spiritual truths in the Bible. The stories of creation in the Book of Genesis are poems not to be literally interpreted."

A confrontation occurred in July 1925 at the San Francisco meeting of the State Board of Education. A group of fundamentalists submitted a resolution stating that the State Board "dare not permit the continuation of this opposing atheistic faith, evolution." The resolution also requested that books teaching evolution as a theory should be removed, because, "A theory that cannot be proved in the course of 3,000 years should once and for all be abandoned," and that evolution tended to "atheism, bolshevism, socialism and anarchy." (The same assertions are made today by Henry Morris, Director of the Institute for Creation Research, in a book by Morris distributed by the Reverend Jerry Falwell in 1981.) A telegram from the Glendale City Council read, "Evolution undermines the moral and religious foundations of our state, and accomplishes no good whatsoever. It has been repudiated by the best scientists in the world today."

The scientific opposition was represented at the hearing by Dr. Charles A. Kofoid, Chairman, Dept. of Zoology, University of California, Berkeley. A pro-evolution religious viewpoint was given by Dr. Louis I. Newman, Rabbi, Temple Emmanu-El, San Francisco, who said:

"I believe in God, but I am not going to ignore the plain lessons that nature spreads before me. Science, knowledge and investigation should be free. You must not make hypocrites of our authors and teachers. You must not strait-jacket the human mind."

All the books objected to were finally passed favorably by the Board, and the fundamentalists returned to their homes declaring that the fight had just begun.

Shipley says that a few months later, Dr. Kofoid had been asked to address the ministerial association of Los Angeles, on evolution. He pointed out the marked skeletal similarity between the anthropoid apes and man, when the entire clerical audience burst into the noisy singing of a hymn. This continued until Dr. Kofoid was completely drowned out, and was obliged to leave the platform to which he had been invited.

In his later years, Dr. Kofoid's office was in the new Life Sciences building, where the creationist, Duane Gish, spoke at a large meeting on April 9, 1982. An account of this is given below.

In 1925, the science department of a new high school in Alameda was asked to choose two representative names to be inscribed on the walls of the building. They chose Newton and Darwin. The school board rejected Darwin's name, and the compliant science teachers then proffered the name of Agassiz, which was accepted because he was an opponent of evolution.

It is pleasant to record that the Alameda High School Alumni Association filed a protest against the removal of the name of Charles Darwin.

The Eastern Baptist Association of California and Oregon, at their annual convention in June 1926, stated that "Members of this organization will take an active part in securing the legislative suppression of the teaching of evolution in California and Oregon."

Shipley states that, following the example of the fundamentalist sects, the Christian Science Publication Committee sent a letter of protest to the State Board of Education at Sacramento demanding the elimination from state textbooks of any findings of modern science which conflict with Science and Health by Mary Baker Eddy. The Board complied with their request, and assured the Christian Scientists that objectionable passages advising that diphtheria antitoxin, rather than the mind, was needed to protect a child from diphtheria, would be removed from future editions of a physiology text.

It is interesting that, 55 years ago, the defense of evolution in California was led by the presidents of the University of California, Berkeley, and Stanford University. Today these dignitaries delegate such work to lower echelons.

In January 1927, a bill introduced in the California State Assembly added a new section to the Political Code, reading, "The theory of evolution shall not be taught as a fact in any public elementary or secondary school of this state." In the hearings, the author of the bill extended it to forbid the teaching that "man descended from a lower order of animals," in colleges and universities. He argued that since the teaching of religion in schools is banned, evolution, "which is obviously an anti-religious theory, should also be banned." Then, as now, many California pro-evolutionists refused to enter the argument.

THE CREATIONISTS, 1982

Two organizations, both of them apparently well funded, are active in promoting the creationist cause, and both are located in San Diego. They were originally a single unit, but a disagreement, not related to their beliefs, apparently arose that made them go separate ways. However, each quotes the other quite frequently, and there are evidently no ideological differences between them.

One of them is the Creation Science Research Center. It is headed by the Segraves family, consisting of Mrs. Nell Segraves and her son, Kelly. They were plaintiffs in the court trial in Sacramento in March 1981.

Mrs. Segraves was prominent in the audience during the Board of Education Hearings in 1972, when she and her colleagues were sponsoring the teaching of creationism in California Public Schools. Mrs. Segraves made the following forthright statement in 1980:

"We want 50% of the tax dollar used for education to our point of view. We have a lot to undo. Creation/evolution is only the beginning."

The CSRC, headed by Kelly Segraves, with his mother as treasurer, was founded in 1971 "to promote Christian education, work and study in establishing belief in the special creation of the world, and in promoting the truth of a literal and natural interpretation of the Bible, divine design and purpose in nature, and encourage acceptance and belief in a young world."

As aims, its charter includes, "to print, publish, produce and distribute film and visual aids, writings, books and radio and television productions in furtherance of the work and study of this corporation."

A leading scientist for CSRC is Robert E. Kofahl, a Cal Tech Ph.D. in Chemistry. Kofahl and Segraves have written The Creation Explanation, sold by CSRC, and Kofahl has written The Handy-Dandy Evolution Refuter. CSRC publishes a price list of materials available for classroom use, and also lists publications by the Institute for Creation Research, including books by Duane Gish.

The Institute for Creation Research (ICR) is headed by Dr. Henry Morris, a hydraulic engineer. Morris is probably the most prolific, belligerent and sanctimonious of the creationist authors. At least nine of his books, with numbers of printings ranging up to 24, are on sale. He edits "Acts and Facts," a "periodical" published by ICR. Morris takes an exorcistic approach to evolution.

> "The Devil . . . must without any doubt be the one who has fathered evolution, for he is the father of lies . . . . This God-rejecting, man-exalting philosophy of evolution spills its evil progeny-- ... materialism, modernism, humanism, socialism, fascism ... communism and ultimately Satanism in terrifying profusion all over the world."

Geology, because its findings support those of evolution, is included in his imprecations:

> "The so-called geologic ages are essentially synonymous with the evolutionary theory of origins. The latter . . . is . . . the anti-God conspiracy of Satan himself."

Morris's pronouncements on astronomy include the formation of asteroid belts by battle between the Archangel Michael and Satan, and the revelation that there are no "man-like intelligences living on other planets or stars."

One of the most visible creationists is Duane Gish, who is Assistant Director of ICR. He is a tireless and peripatetic lecturer on what he terms "creation science." Gish poses as an authority on geology, paleontology, anthropology, biochemistry and genetics, but when cornered, he takes refuge in piety. His three publications (1) Dinosaurs, Those Terrible Lizards, (2) Have You Been Brainwashed, and (3) Evolution, The Fossils Say No, allegedly have a distribution exceeding two million copies. The treatise on dinosaurs, slanted to a juvenile readership, emphasizes the presence of a full complement of dinosaurs on Noah's Ark. This theme appears elsewhere in the creationist literature because the Great Flood, as set forth

in Genesis, is central to creationist descriptions of geology and paleontology.

Since the dimensions of the Ark are set forth in Genesis, its capacity can be calculated and estimated as equivalent to approximately 550 railroad boxcars by creationist authors, which seems reasonable. Padian (personal communication) estimates the number of genera of dinosaurs as 300, "of which only a handful were in the chicken-to-dog size range, 30% in the rhinoceros or smaller range, and the rest varying from a small elephant to the weight of 30 or 40 elephants in size." Dinosaurs alone would have filled the Ark, disregarding their food supply, which had to include meat for the Tyrannosaurus and other terrifying carnivores. The children's book, Dry Bones, shows Noah in bed beside a dinosaur. The food supply for dinosaurs for 1 year, even though they were cold-blooded, would probably have been quite sizeable.

A science teacher in Livermore, California, 1980, was instructing his classes in creationism using a large variety of books, periodicals and filmstrips. These included five copies of Dry Bones, which states that evolution is incompatible with religion. A vigorous protest was mounted by some implacable parents, including Sheila Karlson, Marion Finger and Susan Steinberg, who made great efforts to recruit support by scientists. This resulted in a public meeting of the local school board on February 3, 1981, at which the teaching of creationism in science classes was voted down five votes to none. The following week-end, speakers came from ICR in San Diego to hold a teach-in at Livermore, a feature of which was to be an evolutionist-creationist debate. The debate was cancelled, because no evolutionist volunteered to spend Saturday afternoon arguing with individuals who believe that Eve was constructed from Adam's rib. The local creationists have promised to campaign against school board members at the next election.

Two important activities of creationists are, first, removal of descriptions of evolution from school science textbooks, second, harassment of teachers and

educational authorities. The textbook efforts have been well described by Nelkin, by Grabiner and Miller, and by May. Nelkin's studies are the most complete. The creationist campaign against the official adoption of textbooks that do not please them has been highly effective for many years, and its effects are currently increasing so that descriptions of evolution are decreasing in length and the word "evolution" is often absent from the index of such books.

The adoption of a textbook in California is often essential to its financial success. Publishers cannot afford to publish separate editions for various states, so they take the "easy way out." In my official capacity as a reviewer of science teaching materials for the California State Board of Education a few years ago, I found that evolution was seldom described at any length in any science textbooks except for the BSCS series edited by Dr. William Mayer.

In another setting, the Institute for Creation Research has issued its 1982-1983 General Catalog of Graduate Studies. This is a sort of "Mein Kampf" of creationism. Henry M. Morris, President of ICR, informs us that all ICR degree programs have received the approved rating of the Office of Private Postsecondary Education of the California State Department of Education, "and we confidently invited qualified men and women who desire to make the best possible investment of their lives and talents in the service of their Creator and Redeemer, to consider coming to ICR." He also says that creationist science is unique in modern history, and that the programs are designed for significant service in the cause of creation. It is stated that ICR was established to demonstrate "that evolutionism could be effectively displaced by creationism as the integrating framework in all fields and disciplines." It is evident that the graduate school plans to train teachers for infiltration of public schools.

The catalog says that ICR's research expeditions in search of Noah's ark have been "most widely publicized," also that all theories of origins or development which involve evolution in any form are false, and that non-believers in creationism "must ultimately be consigned to the everlasting fire prepared for the Devil and his angels."

Among the intellectual luminaries that head the departments in the graduate school are Gary E. Parker, Chairman of Biology, who is the author of Dry Bones. He has prepared an exhibit showing a man walking behind a dinosaur, and imprinting his feet in the dinosaur tracks. Field research on the measurements and analysis of human and dinosaur footprints formed contemporaneously is included in the graduate program, as is also a search for Noah's ark and other archaeological sites and artefacts. Duane Gish, the hero of the Berkeley campus, heads the Division of Extension Services, which include a weekly radio program broadcast over 90 stations. As you might have guessed, Henry Morris is Editor, Division of Publications, thus guaranteeing a continued challenge, in print, to the forces of Satan.

SACRAMENTO, 1972

Starting in 1971, a controversy centered on the California State Board of Education, involving the state adoption of textbooks. Creationist groups demanded implementation of a document called Science Framework for California Public Schools. This booklet was developed by the State Advisory Committee on Science Education, by request of the State Board of Education. The final draft, 148 pages in length, received approval of the California State Curriculum Commission, and was presented to the State Board of Education on October 9, 1969. The Board had several members who were creationists, one of whom was Dr. John Ford, who later became its president. He stated: "I think we would be amiss if we did not include the theory of creationism in teaching the origin of the species."

The State Board met again on November 13, 1969, and an engineer, Vernon Grose, read a 13-page personal viewpoint on the framework at this meeting. The Board thereupon inserted two paragraphs as prepared by Grose, replacing part of the text of the original Science Framework draft. The Grose insertion stated:

> "All scientific evidence to date concerning the origin of life implies at least a dualism or the necessity to use several theories to fully explain relationships between established data points. This dualism is not unique to this study but is also appropriate in other scientific disciplines, such as the physics of light.
>
> 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 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."

This incident was followed by public hearings in Sacramento on November 9, 1972, at which statements were made by opposing sides. I well remember a challenge to Dr. Ford made by a Sacramento physician, who told Ford that the medical science on which his profession was based, was founded on acceptance of evolution by the biologists who had built the preclinical sciences. Dr. Ford, sitting in his presidential chair, stonily ignored his fellow physician.

In March 1974, the objectionable statement by Grose was removed from the Framework, and Grose vanished into the shadows of his phantom "Tustin Institute of Technology" in Santa Barbara, only to reappear in March 1981 at the court trial in Sacramento.

In the meantime, a committee was appointed to rewrite the Framework and issue a new edition. The task of the committee was made additionally laborious because creationists, acting through the State Board of Education, repeatedly rejected the statements in the various drafts. Finally, the State Board of Education adopted the manuscript on July 15, 1977, and the Framework was published in 1978. Shortly thereafter, creationists, notwithstanding the earlier agreement, started legal proceedings to recall and destroy the new Science Framework for California Public Schools. This time, the board had changed its make-up, and decided to accept the challenge.

THE SACRAMENTO CREATIONIST TRIAL, 1981

Legal action was brought against the State of California by Segraves et al., starting in 1979, and coming to trial in March, 1981. On January 6, 1981, Mr. Robert Tyler, Deputy Attorney General, State of California, asked me to serve as his consultant in the trial, because I was the co-author, with Dr. Richard Lemmon, of Appendix A in the Science Framework for Public Schools. This document, published in 1978 by the California State Board of Education, is intended for kindergarten and grades one through twelve. The introduction, by Dr. Wilson Riles, Superintendent of Public Instruction, says the Framework is intended to "give form and shape, strength and unity to all aspects of . . . public education." Dr. Riles also says that he hopes that the Framework will help teachers "in their most important work of enriching lives and showing each child his or her place as caretaker in the world of living things."

Appendix A gives examples of "major conceptual organizations of scientific knowledge," including evolution, and it was to sections of this that the plaintiffs had directed their complaint. Dr. Lemmon and I were appointed to the Science Framework committee for writing the publication by Dr. Junji Kumamoto, who was Chairperson of the appropriate governing committee. He had invited us to join following our participation in public hearings on the teaching of evolution held in Sacramento in December, 1972.

Mr. Tyler asked me for help in getting scientific witnesses. My first call was to Dr. Carl Sagan, who readily consented. I then called Dr. Arthur Kornberg, who also agreed to serve. I made similar requests to Drs. Richard Dickerson, Norman Horowitz, David Wake, Watson Laetsch, Russell Doolittle, Everett Olson, C. Rainer Berger and the Reverend Julian Bartlett, all of whom consented.

Mr. Tyler called Drs. Richard Lemmon, William Mayer, and Brent Dalrymple, obtaining their consent. He also "recruited" several eminent clergymen of various faiths, in addition to Dr. Bartlett, and other people, in the teaching profession, to serve as witnesses.

The trial started on Monday, March 2, in the Superior Court of the State of California, Sacramento, Judge Irving Perluss.

The plaintiffs, Segraves et al., were represented in Court by Richard K. Turner. The complaint contained 41 numbered paragraphs. Two of these were as follows:

> "20. The evolutionary theory of the origin of man and of all plant and animal life is at odds with, is hostile to and contributes a repugnant coercion against the religious beliefs of plaintiffs.
>
> "21. Scientific creationism is compatible and coincides with the religious beliefs of plaintiffs, said belief, based upon scientific principles, being that there was a time in the past when all matter, energy and man and all plant and animal life, and their processes and relationships were created ex nihilo and fixed by creative and intelligent design."

The complaint also stated that the action of the State of California forced taxpayers to support "an unconstitutional establishment of the Religion of Secular Humanism, which said establishment of religion is an extreme contravention of said plaintiff's freedom of religion."

The complain demanded that all copies of the 1978 Science Framework be recalled and that the Science Framework be revised "to reflect the constitutionally mandated approach of neutrality concerning the teaching of the origins of life."

The Trial

In his opening statement, Turner alleged that the trial was not a showdown between creationism and evolution, that it was not "religion versus science," that his client was not seeking a ban on the teaching of evolution, and was not seeking equal time. He alleged that the State of California was "essentially hostile to religion," and "deprived the plaintiff of his right to believe in the religion of his choice."

These injurious acts were exerted through the Science Framework for California Public Schools, together with its effect on the publishers of textbooks.

Mr. Turner did not state that creationists, through obstructive tactics and coercive intimidation have, for many years, exerted pressures on school textbook publishers to omit mention of evolution.

Instead, he alleged that the State of California "creates a desperate conflict," contrary to mainstream Christian beliefs that God created man as man and placed man on earth. His clients demanded that the defendants stop posing the theory that man and all creatures have a common ancestor.

The next day, March 3, Turner announced that the plaintiff would strike from the complaint the portion that attacked the teaching of evolution, and that the complaint would be confined to an attack on the Science Framework, particularly with respect to certain sections of Appendix A.* The Court agreed to this change so that, from then on, the trial was confined to a discussion of the Science Framework and its effect on teaching in public schools. The judge repeatedly emphasized that the trial had no relation to the teaching of evolution, because this had been legalized by the Epperson vs. Arkansas decision of the U. S. Supreme Court. The judge also emphasized that the trial did not concern the teaching of creationism, because the plaintiffs were not making a request for this. The issue, said the judge, was solely whether the plaintiff's religious rights

*They may have been afraid of our witnesses.

had been violated or jeopardized.

The next witness was Mr. Vernon Grose, of the Assembly of God Church, whose activities in 1969 are described on p. 15. Grose was appointed in 1980 to the Curriculum Development and Supplemental Materials Commission of California. A long struggle started, in which Dr. Junji Kumamoto played a leading part on behalf of science.

Grose had not been in the public eye in recent years, until he appeared in the courtroom on March 3, 1981. During his self-qualification on the stand, Grose presented himself as an engineer and as a systems analyst. One of his accomplishments was a study of explosions in grain elevators. He testified as to his earlier involvement with the 1980 Framework

but without the rhetorical flourishes on behalf of creationism that had characterized his statements in earlier years.

The next witness was 13-year-old Kasey Segraves. In response to direct questioning, he said that his science teacher had told him that man descended from apes. He said that he read a book and saw pictures in it describing the descent of man from apes, and he said that he, Kasey, believed that man was placed on the earth by God.

The appearance of this child on the witness stand had the anticipated emotional effect on the media. Large pictures of his cherubic face were printed in many newspapers. He was followed on the stand by his father, Kelly Segraves, whose main point, made repeatedly, was that the following sentence from the Science Framework, P. 84, conflicted with his beliefs:

> "The process has been going on so long that it has produced all the groups and kinds of plants and animals now living as well as others that have become extinct."

This statement was "against his religion," and was, therefore, very offensive to him.

As the trial progressed, the charges by the plaintiffs narrowed down to this sentence, the sentence preceding it, and another sentence on page 85 of the Framework. These two sentences are as follows: "Evolutionary studies indicate that these organisms are naturally selected from generation to generation, producing descendants with different characteristics and producing variability among populations of living species." And, on page 85: "This indicates that all living organisms on earth have a common ancestor from which they have diverged by evolution during about three billion years."

Cross-examination of this witness was prolonged and seemingly fruitless. Finally, Mr. Tyler read a paragraph on page 87.

> "Scientists also have developed from experiments and observations, hypotheses concerning the development of life from the non-living matter of the prebiological earth. This research and these hypotheses usually are referred to as 'chemical evolution.' Philosophic and religious considerations pertaining to the origin, meaning, and value of life are not within the realm of science because they cannot be analyzed or measured by present methods of science."

The judge immediately pounced on the last sentence of this quotation and pointed out that this greatly accommodated the plaintiff's complaint.

This was the first of several turning points in the trial.

On March 4, the Defense started to present its case, and Mr. Tyler, without making the customary opening statement, immediately placed me on the witness stand. By orders of the judge, defense witnesses were not permitted to discuss evolution. Instead, I was questioned about the disputed materials in the Framework, particularly with respect to dogmatism. I pointed out that the two quoted sentences on page 84 were actually a continuous statement and that the original sentence had been divided into two portions for reasons of literary style. I was also able to insert the argument that science was "open-ended" and continually subject to revision, while creationism, based as it is upon word-for-word belief in the Book of Genesis, is completely inflexible and not subject to change. Creationism, therefore, comes within the realm of religious belief. In spite of numerous objections by Mr. Turner, the judge allowed me to make a few points concerning evolution. At one point, I asked him if a witness was permitted to indulge in "Socratic discussion" (a term previously used by the judge), to which he consented.

The withdrawal of the main charges, and the strict delimitation of the case by the judge, made it necessary to revise drastically the plan for the defense and to cancel the appearance of most of our scientific witnesses. On Wednesday afternoon, I telephoned Dr. Norman Horowitz and asked him to cancel his trip to Sacramento, but I was unable to intercept Dr. Richard Dickerson, who had left Los Angeles on the 3 p.m. plane. This had a fortunate outcome.

On Thursday morning, March 5, Dr. Dickerson took the stand to define and describe the scientific process. The usual litany of querulous objections arose from Mr. Turner, but the judge allowed Dr. Dickerson to present some highly-effective testimony. This was followed by cross-examination in which Mr. Turner made very little headway. Dr. Dickerson's testimony was a second turning point in the trial.

He was followed to the stand by Dr. William Mayer, an old, experienced battler against creationism. He is head of the Biological Sciences Curriculum Studies in Boulder, Colorado. His testimony was forceful, versatile, and imaginative, and the judge included a considerable segment of Dr. Mayer's testimony in the Judgment and Decision. This testimony, emphasizing the distinction between science and religion, marked a third turning point in the trial.

The remaining defense witnesses dealt effectively, and at length, with the teaching process, the background of the Framework, the training of teachers, and the actions of the State Board of Education. Mrs. Marion Drinker, a former President of the California State Board of Education, stated that a memorandum by the Board was still in effect. It reads as follows:

> "On the subject of discussing origins in the science textbooks, the following editing be done prior to the execution of the contract with the publisher:

1. That dogmatism be changed to conditional statements where speculation is offered for explanation for origins.

2. That science emphasize how, and not ultimate cause, for origins.

Mr. Turner was notably ineffective in his attempt to cross-examine her. Ms. Frances Alexander and Mr. John Horn gave excellent and perceptive testimony on the care with which teachers treat children of various religious beliefs.

Throughout the trial, both the judge and the counsel for the plaintiffs kept asserting that this was a "First Amendment Case," involving freedom of religion. This assertion carried the implication of importance, and even of nobility, to the case. (The Constitution does not provide for freedom of scientific inquiry.)

With this background, Mr. Turner launched an oration, including a statement that he had stayed up last night reading the Magna Carta. He gave us several heart-rending illustrations of the rescue of religious freedoms by the courts, including California Chief Justice Rose Bird's noble action in removing Christmas decorations from the Los Angeles City Hall. The relevance of these anecdotes to the matter at hand was not immediately obvious.

Mr. Tyler then spoke at length, and attempted to bring the arguments into a factual atmosphere.

It was now Judge Irving Perluss' turn, and he announced that he was going to give his decision immediately, without leaving the bench.

He said that the issue is whether or not the free exercise of religion by Mr. Segraves and his children was thwarted by the instruction in science his children received in school "and, if so, has there been sufficient accommodation?"

He found that the Science Framework "does provide sufficient accommodation for the views of the plaintiff."

This essentially disposed of the charges made by the plaintiff.

The judge then continued: "Nevertheless, all of us, including - and I include myself - sometimes need to be reminded of our responsibilities."

"It will be the Order of the Court that there shall be disseminated to all publishers, institutions, school districts, schools and persons regularly receiving a Science Framework a copy of the memorandum discussed by Mrs. Drinker."

The judge said: "It would be presumptuous for this Court to revise the content of the Framework or any of these other publications written that have been presented to the Court."

The ruling of the judge was, therefore, merely that, in teaching, dogmatism be avoided. Obviously, this ruling does not conflict with teaching of science. Dogmatism in science is self-defeating.

The judge then quoted from the testimony of Dr. William Mayer: "There should be a clear explanation reinforcing, within the student's mind, that he's dealing with science and we are not making a pretense of teaching music, art, poetry, theology or any other discipline. Science says these things (in the textbook), and outside of that realm, science is not only moot but might even be inappropriate. Moreover, science is not dogmatic in that it is open-ended and that it has an absence of pre-set conclusions."

With this ruling, and these statements, Judge Irving Perluss concluded the case. He ordered both sides to pay their own costs.

The plaintiffs were exultant. Mr. Tyler was disppointed because he believed that the action of the plaintiffs in bringing suit had been frivolous.

Personally, I was delighted. We had backed the plaintiffs into a corner. They divested themselves of most of their charges, and we whittled the final charge down until it consisted of objections to the wording of three sentences in Appendix A of the Science Framework.

The judge rejected their objections to these three sentences, and the only

concession received by the plaintiffs was that a statement by the California Board of Education, made previously, be reiterated.

The creationists demanded tolerance and accommodation, yet in their literature, they harshly condemn what they call "theistic evolution," and those who adhere to it, which means religious people of all denominations who accept evolution.

The creationists reject the overwhelming mass of scientific findings supporting the conclusions that the age of the earth and the universe is measured in billions of years. To argue with these conclusions, the creationists invade the territory of science. Scientists do not customarily examine the beliefs of any religious sect by using scientific challenges.

The creationists' maneuvering to exclude testimony on evolution and on teaching creationism in the Sacramento trial was, in the words of one of their leaders, Nell Segraves, like a chess game. "We're making a move." Broad has quoted Turner as saying that creationists will choose their own time and place for a full-scale confrontation with science. During my testimony, Turner repeatedly raised objections by saying that he could, if necessary, place several equally qualified witnesses on the stand to contradict anything I said about evolution. This familiar technique of confusing courts and the public by "my scientist is as good as your scientist" is regularly successful in attacks on "establishment science."

The leader of the plaintiffs, Kelly Segraves, has been in the publishing business for years. His CSRC publications are designed to teach religious beliefs to children in public schools under the designation of "science." His mother, Mrs. Nell Segraves, candidly admitted this in an interview with the reporter, Mr. Wood, for the San Francisco Examiner.

CSRC publishes so-called textbooks that have been submitted for approval to the California State Textbook Evaluation Committee, of which I was an appointed member. I found that these textbooks did not meet the statutory requirements for absence of sexism. For example, the book Man and His World was written throughout from the standpoint of males, and all people who were illustrated in its pictures were males. Even a baby in a picture who was being regarded fondly by his young brother was a boy baby. This is what one might expect from a religious group that proclaims its verbatim belief in the Book of Genesis, which states that Eve was made from Adam's body and that it was Eve who cajoled Adam into committing the "original sin." Nevertheless, Mrs. Nell Segraves is the obvious leader of CSRC.

A conspicuous defect in the trial was the absence of definite evidence to support the main charge made by the plaintiffs, which was that the 13-year-old boy, Kasey Segraves, had been taught that man had descended from apes. He stated on the witness stand that this had been taught him by his science teacher, and he named the teacher. The cross-examination of Kasey Segraves was short and perfunctory, for obvious reasons: One does not subject a child to rigorous cross-examination. The father, Kelly Segraves, reiterated the charges made by his son, but this was hearsay.

Upon learning the name of the teacher, counsel for the defense reached her by telephone on Thursday evening, March 5. The teacher was not a science teacher; she taught social science or social studies. She said she had not told Kasey Segraves that man had descended from apes. She was asked if she would testify, and she said that she would need the weekend of March 7 to prepare herself.

Acting in open court, the judge declined this offer of proof made by counsel for the defense.

During the closing hours of the trial, Mr. Turner stated that Kasey Segraves had been ordered by his teacher to play the part of a monkey in a dramatic performance put on by the class, involving allegedly a cave-man. This, said Mr. Turner, was a harmful degradation to impose on a child. However, in a telephone conversation, the teacher said that a skit was put on by the class that included the impersonation of a monkey, and Kasey Segraves actually asked to play this part.

The counsel for the plaintiffs repeatedly accused evolutionists in general and the Science Framework in particular of dogmatism. This accusation shows a lack of understanding of the scientific process. Any scientist who tends to be dogmatic faces unusually rigorous challenges by his peers.

In pronouncing his decision, the judge said that those who seek tolerance and understanding should be prepared to exercise it.

THE ARKANSAS TRIAL DECISION 5 JANUARY 1982

> "The application and content of First Amendment principles are not determined by public opinion polls or by a majority vote. Whether the proponents of Act 590 constitute the majority or the minority is quite irrelevant under a constitutional system of government. No group, no matter how large or small, may use the organs of government, of which the public schools are the most conspicuous and influential, to foist its religious beliefs on others."

With these ringing words, Judge William R. OVerton concluded his judgment, 5 January 1982, in the action brought against the State of Arkansas by the American Civil Liberties Union. The issue was Act 590 of Arkansas, which stated that "Public schools within this state shall give balanced tratment to creation-science and to evolution-science."

The quotation from the judge's decision obviously went beyond the teaching of creationism; it was a peremptory challenge, in its implications, to the erosion of science by the "equal time for nonsense" principle that confronts us in the media and in public opinion polls.

Judge Overton's 38-page decision combined scientific and legal discourse, in a manner that scientists could not do unassisted. The judge was sparse in his prose, and devastating in his conclusions. Statements by Paul Ellwanger, who was termed by the Court "a respiratory therapist trained in neither law nor science," were used by Judge Overton to reveal the duplicity of creationists in attempting to foist their religious dogma on the public by disguising it as a form of science.

The judge says:

> " . . . Mr. Ellwanger is of the opinion that evolution is the forerunner of many social ills, including Nazism, racism and abortion. (Ellwanger Depo, at 32-34). About 1977, Ellwanger collected several proposed

> legislative acts with the idea of preparing a model state act requiring the teaching of creationism as science in opposition to evolution. One of the proposals he collected was prepared by Wendell Bird, who is now a staff attorney for ICR. From these various proposals, Ellwanger prepared a "model act" which calls for "balanced treatment" of "scientific creationism" and "evolution" in public schools. He circulated the proposed act to various people and organizations around the country."

Mr. Ellwanger was exposed by securing evidentiary deposition from him in response to a subpoena. Judge Overton said:

> "Mr. Ellwanger does not believe creation science is a science. In a letter to Pastor Robert E. Hays, he states, 'While neither evolution nor creation can qualify as a scientific theory, and since it is virtually impossible at this point to educate the whole world that evolution is not a true scientific theory, we have freely used these terms--the evolution theory and the theory of scientific creationism--in the bill's text.'"

Another letter by Ellwanger said:

> " . . . we'd like to suggest that you and your co-workers be very cautious about mixing creation-science with creation-religion. . . Please urge your co-workers not to allow themselves to get sucked into the 'religion' trap of mixing the two together, for such mixing does incalculable harm to the legislative thrust. It could even bring public opinion to bear adversely upon the higher courts that will eventually have to pass judgment on the constitutionality of this new law," (Ex. 1 to Miller Depo.)"

Ellwanger drafted the model act which became Act 590 of Arkansas, "without amendment or modification other than minor typographical changes."

The judge quoted section IV of 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."

The judge stated "Both concepts and wording of Section IVa convey an inescapable religiosity," and that "every theologian who testified, including defense witnesses, expressed the opinion that the statement referred to a supernatural creation which was performed by God."

The judgment discussed "dualism." This refers to the concept that there are only two explanations of natural phenomena. The first is based on literal acceptance of the Book of Genesis, and the second is the consensus that has been reached by the scientific community, resulting from experimental observations and conclusions. The choice is solely between these two possibilities, and all other theories emanating from different cultures or religions, current or historical, are brushed aside. As the judge pointed out, "according to creationists, all scientific evidence which fails to support the theory of evolution is necessarily scientific evidence in support of creationism." Later in his judgment, as discussed below, he used this point with telling effect.

To a greater extent than is shown in the brief for the plaintiffs, the judge had "done his homework" by reading the creationist literature, particularly the output of Morris, Gish and Bliss. The tendency of these authors to use "double-talk"

did not escape the judge. Gish has stated firmly that scientific creationism is indeed science, but, the judge quoted him as saying (when he found it convenient):

> "Creationists have repeatedly stated that neither creation nor evolution is a scientific theory (and each is equally religious)."

In the trial, the leading theologian for the creationists, and their first witness, was Dr. Norman Geisler. Judge Overton quoted him with every consideration and courtesy. On p. 5, the judge cited Geisler's definition of Fundamentalism. He also noted that Dr. Geisler "stated his belief that the earth is several billion years old." Tactfully and generously, the judge did not also note that Dr. Geisler believes in unidentified flying objects, and considers them to be manufactured by Satan, as recorded in cross-examination on 11 December 1981.

Judge Overton accorded consideration to the eccentric outpourings of Dr. Wickramasinghe, who claims that the earth "remains under the continuing influence of genetic material from space which continues to affect life." He said that Wickramasinghe has "at least used scientific methodology to produce a theory of origins which meets the essential characteristics of science." The judge was generous!

The judge then archly noted, "The Court is at a loss to understand why Dr. Wickramasinghe was called in behalf of the defendants," because, unfortunately, for the defense,he demonstrated that the simplistic approach of the two-model analysis of the origins of life is false. Furthermore, "he corroborated the plaintiff's witnesses by concluding that no rational scientist would believe the earth's geology could be explained by reference to a worldwide flood or that the earth was less than 1 million years old."

The judge commented, "The proof in support of creation science consisted almost entirely of efforts to discredit the theory of evolution through a rehash of data and theory which have been before the scientific community for decades."

The Court then turned its attention to the harassment of teachers in Arkansas following passage of Act 590. Ms. Wilson was ordered by the school superintendent to produce a creation-science curriculum guide. "She had not heard of creation science until about a year ago, and did not know its meaning before she began her research," Ms. Wilson and her committee reached the unanimous conclusion that creationism is not science; it is religion. They so reported to the Board. The Board ignored the recommendation, and insisted that a curriculum guide be prepared.

In a footnote, the judge stated:

> "Ms. Wilson stated that some professors she spoke with sympathized with her plight and tried to help her find scientific materials to support section 4(a). Others simply asked her to leave."

Ms. Wilson found all available creationist materials unacceptable because they were permeated with religious references and reliance upon religious beliefs.

The Court adumbrated this conclusion by readings from the creationist literature. Judge Overton noted a creationist chart, illustrating the evolutionist belief that man evolved from bacteria, to fish, to reptile, to mammals, and therefore, to man. "The illustration indicates, however, that the mammal from which man evolved was a rat."

In an amusing footnote on p. 32, Judge Overton again quoted Ellwanger as saying: "If you know of any textbooks at any level, and for any subjects that you think are acceptable to you and also constitutionally admissible, these are things that will be of enormous value to those bewildered folks who may be caught, as Arkansas now has been, by the sudden need to implement a whole new ball game with which they are quite unfamiliar."

Apparently, the players in this "new ball game" were unprepared for the presence of an umpire. The ineffable Mr. Gish attacked the umpire, 6 January 1982, with the

statement that Judge Overton's decision was biased because "he has come up through the same public education system that everyone else has."

In his conclusion, the judge presented a discussion of academic freedom, as impacted by Act 590. He made the remark that "evolution is the cornerstone of modern biology." We introduced this phrase into the California "Science Framework for Public Schools" manuscript, only to have it expunged by creationists who then held sway on the California State Board of Education.

The Arkansas decision had a salutary, or chilling, effect on the aspirations of creationists who were seeking legislation in several states. Unfortunately, Arkansas did not appeal Judge Overton's decision, so the opportunity for its probable upholding by the U.S. Circuit Court of Appeals and possibly the U.S. Supreme Court has been lost.

MR. GISH COMES TO BERKELEY

Duane Gish learned the difference on April 9, 1982, between University of California, Berkeley, and Liberty Baptist College.

His large audience, in the Life Sciences Building on the Berkeley campus, bristled with opponents and challengers. Apparently sensing this, Gish filibustered, and prolonged his talk for 2 hours of repetition, hoping that questioners would get tired and leave the room.

It didn't happen. Gish was challenged from many angles. One questioner asked Gish if he learned paleontology from Dr. Seuss.

An anthropologist, Tim White, proffered Gish a skull of Homo erectus, and told Gish that this was a transitional form. Gish, and other creationists, allege that transitional forms are non-existent. Gish's response was to declare that the skull was that of a monkey, but White was ready for him, and signalled to a colleague who marched up with a gorilla skull, to show Gish the difference. It was several minutes before the audience stopped laughing.

Among the many questions, the following one was asked by Steve Obrebsky:

> Henry Morris, director of your Institute of Creation Research, has written that physical stars (i.e., astrology) can have no effect on the earth, but that evil spirits connected with them are not so limited; that UFO sightings are associated with occultic influences and tendencies, suggesting that the rulers of darkness of this world are increasingly imaginative in their battles for the minds of men; that good and bad angels have power over natural processes and can prevent or cause physical catastrophes on earth and in the heavens; and that the scars on the Moon and Mars were caused by a war between the good and bad angels. He has further asserted that our spiritual bodies can move faster than light, and that intergalactic travel will be feasible for redeemed men in the future as it is for angels in the

present age. You, Dr. Gish, have written that Adam and Eve were genetically perfect. Can you tell us what data and scientific evidence you have for these assertions, and how other scientists might hope to test and verify your propositions?

Gish's response was to ask the question, "Are you Tom Jukes?" which was the best thing I had heard all week.

Gish's appearance was publicized by handbills, of which 7,000 copies were printed, stating that Gish had been a faculty member of Cornell University Medical College in New York for 18 years. Gish's biography in American Men and Women of Science, which was necessarily written and approved by him, notes that Gish was 3 years at Cornell Medical College, the first two of which were as a postdoctoral fellow. After these 3 years, he returned to Berkeley, in 1956.

He returned to Berkeley again on 9 April 1982, but some of his listeners predicted that it will be a long time before he makes his next visit.

Several mimeographed sheets were distributed by non-Creationists to the overflow audience before the meeting started, one of them unkindly showed Gish sprouting a pair of diabolical horns, and asked, "Whose work is he doing?" To drive the point home, the author stated, "It is Duane Gish, and the creationists, not scientists, who are using the methods they ascribe to diabolical influences. Can any person, religious or non-religious, condone such methods? Religious scientists and non-scientists say NO!"

Criticism of Gish's appearance started to appear on 3 April, when Hayward Zwerling, assistant development engineer, Dept. of Physiology/Anatomy at UC Berkeley, wrote a letter to department chairpersons on the Berkeley campus. Zwerling's letter concluded, "The attempt to introduce religion into the scientific curricula presents a fundamental threat to the very foundation of our society. If these fundamental

religious groups are left unchallenged by the scientific community, the lay public will be led to believe that the creationists have a valid scientific hypothesis. I urge you, and the members of your department, to attend Dr. Gish's lecture."

On March 30, 1982, Fred Edwords, editor of Creation/Evolution, offered to fly to Berkeley from Buffalo to debate Gish on April 9. This offer was declined by Gish's sponsors, who were quoted by the Daily Californian (the UC Berkeley campus newspaper) as saying, "Dr. Edwords was a professor of humanist studies and with no scientific training. The debate would have been very disjointed." The person who made the response, Freeman Ng, did not mention that Edwords had successfully debated Gish at the University of Guelph in Canada, in February. Perhaps Gish did not want a rerun. In any case, a good time was had by all evolutionists at the meeting on April 9. For hints on how to deal with Gish at future meetings, write to Dr. Kevin Padian, Assistant Professor, Dept. of Paleontology, University of California, Berkeley, California 94720, and to Dr. David H. Milne, Dept. of Biology, Evergreen State College, Olympia, WA 98505.

There was poetic justice in Gish's discomfiture, for the Life Sciences Building at Berkeley, where he spoke, has a great tradition for supporters of evolution. Dr. Charles Kofoid, professor and chairman of zoology, 1910 to 1932, emeritus, 1932 to 1947, was an occupant.

The scientific journals contain numerous articles each month describing new findings in evolution. These discoveries make it necessary to revise and expand our ideas. Many of the results are concerned with DNA, which is, of course, the molecule that is the driving force of evolution. Recently it was shown that the cells in the skin of a chicken, combined with mouse molar mesenchyme, can produce teeth, complete with enamel. Evidently, the genes for this function have been "turned off" and are lying dormant in the chromosomes, so that while birds do not produce tooth enamel, they have inherited from their ancestors, such as the reptiles, the means of doing so. This finding is of interest in examining the creationist claim that there are no "transitional forms" in the fossil record of vertebrates. All vertebrates are transitional forms. Their chromosomes contain the record of their evolutionary history. Only about 2% of our DNA consists of functional genes that produce proteins. Buried in the remaining 98% is the history of the past--non-functional genes, duplicate genes that are no longer used, intervening sequences, the molecular fossils, some undecipherable, others recognizable, that are the accumulation of a billion years.

I am sure that at some time you have pulled up a clover plant and looked at the small bumps on its roots. These bumps, or nodules, are the home of bacteria that fix nitrogen from the air, and the clover plant, which is a legume, can use the product as food. If you squash one of the nodules, you will probably see a reddish liquid oozing out. The red color is that of leghemoglobin--legume hemoglobin--a protein that is the first cousin of the hemoglobin in our blood. Its amino acid sequence shows that it came from the same ancestral gene as the hemoglobins of the blood of vertebrates. Leghemoglobin is produced in the clover plant by stimulation caused by the bacteria in the nodule. How do we explain that green plants can make a relative of the essential pigment of blood? Blood transfers oxygen from the lungs of land animals and the gills of fish to their muscles. Was there an ancestor of animals and plants that used hemoglobin for oxygen transfer, and did the green plants decide that they did not need it, and so put the gene into "storage"?

HARASSMENT OF SCHOOLTEACHERS

The Institute for Creation Research published the following paragraph in "Acts and Facts," October 1981:

> "Information on Classroom Humanism Requested
>
> If any readers know firsthand of specific recent instances in which atheism and evolutionary humanism have been taught dogmatically in a classroom in their community, or where creationism or Christianity have been dogmatically denied or ridiculed, ICR would appreciate your sending us the particulars. We are compiling a descriptive list of such offenses but will, of course, not publish specific names of schools or individuals."

Not to be outdone, Kelly Segraves, on November 24, 1981, announced the program of the Creation Creed Committee. The Committee was organized by Reverend Robert Grant and Kelly Segraves. It announced that it would "review science textbooks and send hundreds of monitors into classrooms in many of California's 1100 school districts to determine whether science teachers are violating the rights of Christian pupils in public schools. Presumably, the rights would be violated if the pupils were taught evolution in science classes. The committee said it would run advertisements over Christian television stations and many radio stations throughout California, inviting concerned parents and others to alert the group to teachers and books they suspect may be violating the state policy. The committee advises supporters to remind school boards that failure to comply with their demands would lead to pressure for the withholding of county and state funds, and "the loss of teaching credentials for individual offenders." The committee is preparing education kits and a film for those who will be monitoring schools "so that parents of children can more intelligently evaluate what children are being taught." Reverend Grant said that parents may choose to file suit against any board that fails to bring its texts and

teachers into compliance. Segraves said that the committee will utilize resources of the 40,000 ministers and the 328,000 members of Christian Voice to conduct a nationwide campaign against exclusion of creationism from the classroom.

Although we have been made aware of events in Livermore, and the resistance there of scientifically trained parents to the teaching of creationism in school science classes, there are many communities throughout the USA where such activities have gone unperceived.

The next major event will be the court trial in Louisiana, July 1982, at which the Louisiana creationist law will be challenged. The judge in this trial was quoted as saying that the probability of his awarding court costs would be about the same as pulling a tooth out of a hippopotamus without anesthetic. From this, it may be assumed that he is not intellectually the peer of Judge Overton, or, at least, that his mode of self-expression is somewhat different. In recent years, I have become increasingly aware of how much in court decisions depends on the personal characteristics of the judiciary.

Finally, we must consider the future effects of militant creationism on our social structure. At present, the creationists are in the main treated with amused tolerance, or they are simply ignored. We believe in freedom of religion. But when creationists try to force their beliefs down the throats of children in the name of science, the brighter students can be expected to raise questions about its credibility. There will be parents of some of these children who will be raised to indignation. We have seen this in Livermore. Some of these parents may regard religion as blind superstition or worse. They will turn to the sayings of Henry Morris in the creationist textbooks, who says that geology and evolution are both the work of the Devil, and that the asteroid belt was formed by a struggle between the good and bad angels. These parents will become reminded of the religious fervor that saw Giordano Bruno burned at the stake. They will be reminded of a more recent religious fervor that saw the culture of native peoples destroyed throughout the world. They will become the militant antagonists of creationism, and religious intolerance will be revived.

Another widespread effect of creationism is still in progress and will expand. This is a negative effect on the teaching of science to our children. For many years, creationists have succeeded in keeping descriptions of evolution out of the textbooks and the science classrooms, or seeing that it was de-emphasized. The publishers of school science textbooks have helped greatly. The trend continues. For example, a new textbook says:

"Darwin asked some interesting questions and set forth a thought-provoking

hypothesis about which people are seeking new clues in the light of modern science."

Creationism would also destroy the teaching of geology and astronomy. Knowledge of science will become increasingly confined to the elite, while those who emerge from our schools will be functionally illiterate in their understanding of science.

This is a prospect that I see as creationism continues to spread.