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CREATIONISM VS. EVOLUTION: A STUDY OF THE OPINIONS OF  
GEORGIA SCIENCE TEACHERS

*Georgia State University - College of Education*

PH.D. 1983

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CREATIONISM VS. EVOLUTION: A STUDY  
OF THE OPINIONS OF GEORGIA  
SCIENCE TEACHERS

by

PAULA G. EGLIN

A DISSERTATION

Presented in Partial Fulfillment of Requirements for the  
Degree of Doctor of Philosophy in Educational  
Leadership in the Department of Educational  
Administration in the College of Education  
Georgia State University

Atlanta, Georgia

1983

## ACCEPTANCE

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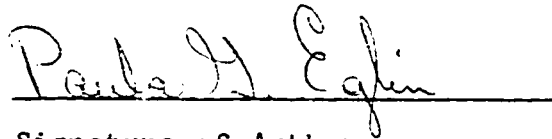
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## ABSTRACT

### CREATIONISM VS. EVOLUTION: A STUDY OF THE OPINIONS OF GEORGIA SCIENCE TEACHERS

by

PAULA G. EGLIN

The purpose of this study was to survey Georgia science teachers for opinions about teaching creationism and to analyze these opinions in terms of other attitudinal and biographic variables. The attitudes of teachers toward creationism might be expected to be related to religious convictions, activity of creationists in the community, science background, teaching experience, familiarity with creationist literature, and demographic variables. The study was also intended to document and seek reasons for teaching creationism in Georgia public schools.

#### Methods and Procedures

The study used a stratified sample from four types of community. Science teachers in 62 randomly-selected public high schools were mailed a questionnaire requesting opinions about creationism and evolution, practices in teaching creationism, and biographical data. Chi-square analyses were used to compare teachers' attitudes toward creationism with their opinions in the other areas studied.

### Results

Of the 128 teachers responding, 97 percent claimed to be familiar with creationism, 30 percent approved of teaching it, and 28 percent were actually teaching it. Although school system requirements influenced some teachers, personal conviction was the primary reason given for including it. Liberality in religious philosophy, familiarity with creationist literature, and academic degree were related to teachers' attitudes toward creationism. Approval of creationism was not related to religiosity, approval of evolution, impact of the creationism controversy on the community, or to the teacher's age, experience, or area of science expertise. Although approval of creationism was not significantly related to community size, the creationists were more active in suburban school systems.

### Conclusions

Teachers who subscribe to a liberal religious viewpoint and who are familiar with creationist literature and philosophy are more likely to disapprove of creationism, as are teachers with advanced degrees. This survey reveals little enthusiasm for creationism, even among those teachers reporting a fundamentalist background. Nevertheless, science teachers have not raised serious objections to the inclusion of creationism in science courses, and many are reluctant to enter the controversy or refuse to teach it if required. Many teachers do not believe that evolution is important to the science curriculum and misunderstand the creationists' position that the Bible and evolution are irreconcilable.

## LIST OF ABBREVIATIONS

AAAS	.	.	.	American Association for the Advancement of Science
ACLU	.	.	.	American Civil Liberties Union
ADA	.	.	.	Average Daily Attendance
ASA	.	.	.	American Scientific Affiliation
BSCS	.	.	.	Biological Sciences Curriculum Study
CAVE	.	.	.	Citizens for Another Voice in Education
CRS	.	.	.	Creation Research Society
ICR	.	.	.	Institute for Creation Research
NABT	.	.	.	National Association of Biology Teachers
NDEA	.	.	.	National Defense Education Act
NSTA	.	.	.	National Science Teachers Association
PSSC	.	.	.	Physical Science Study Committee
SPSS	.	.	.	Statistical Package for the Social Sciences

## ACKNOWLEDGEMENT

The author wishes to express appreciation to the many science teachers, professors, ministers, and citizens who were supportive during the creation-science controversy in Georgia, especially Dr. Mildred Graham, Dr. Jack Hassard, Dr. Robert Almeder, Dr. Everett DeVaughn, Jo Jaquith, Roberta Owen, the Reverend Craig Taylor, the Reverend Scott May, the Reverend Cecil Myers, and Charles Brooks. Without their continued approval and encouragement this study would not have been made.

Also, my gratitude is expressed to Dr. Richard Barbe, who was the first to agree that a study of the creation-science experience was possible, and to Dr. Charles Fallis, who guided it through many obstacles to its conclusion.

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## CHAPTER I

### INTRODUCTION

Creationism, scientific creationism, and creation-science are all designations for a movement, sponsored by conservative religious groups, to include in public school science courses instruction about a sudden creation of life and the physical universe within a short period of time relatively recently. The sponsors of this movement brook no compromise between Genesis and science, but insist on a literal interpretation of the scriptural account of creation. The creationists also believe that findings in the life and physical sciences can be interpreted so as to support this literalistic viewpoint. It is for this reason that this creationist doctrine has been called "scientific creationism" and "creation-science."

Teaching creationism in science courses has been proposed in public school systems in Georgia as well as school systems in other states.<sup>1</sup> The state legislatures of

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<sup>1</sup>Susan Milstein, "Tension Builds over Origin Issue," Atlanta Journal-Constitution Cobb Extra, 6 September 1979, p. 12; Lisa Golem, "Creationism Filmstrip Miffs DeKalb Parents," Atlanta Journal-Constitution DeKalb Extra, 27 March 1980, p. A9; Linda Haas, "Experts Debate Validity of Creationism as Science," Tampa Times, 18 June 1980; Deborah Blum, "Board Declines to Offer Teaching of Biblical Creation," St. Petersburg Times, 25 September 1980, p. B1, 10; Betty Kohlman, "Some Bay Area Schools Teach 'Creationism,'" St. Petersburg Times, 29 September 1980, p. B1,6.

Georgia, Florida, North Carolina, Alabama and Mississippi have considered bills that would require that creationism be added to the science curriculum. On March 17, 1981, the Arkansas State Legislature became the first to pass a law requiring the teaching of "creation-science" in public schools.<sup>2</sup> The Louisiana Legislature soon passed a nearly identical law.<sup>3</sup> A similar bill rested in the Georgia House Committee on Education for a year but never came to a vote of the General Assembly. The lawmakers, while pressed by constituents to pass the bill, were reluctant to do so after the rejection of the Arkansas law in a suit in Federal District Court sponsored by the American Civil Liberties Union (ACLU).<sup>4</sup>

Since the constitutionality of laws requiring creationist materials in the public schools is in question, the creationists may be expected to concentrate on introducing their material by influencing local school board actions, administrative decisions, and practices of teachers. They have already attempted to do this in Georgia. Their success ultimately depends on the classroom presentation of science teachers. This presentation may be influenced by the teacher's perception of creationism,

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<sup>2</sup>"Arkansas First State to Require Creationism," Atlanta Journal, 18 March 1981, p. A1.

<sup>3</sup>William J. Broad, "Louisiana Puts God into Biology Lessons," Science 213 (August 1981): 628-29.

<sup>4</sup>Roger Lewin, "Judge's Ruling Hits Hard at Creationism," Science 215 (22 January 1982): 381-82, 384.

philosophy of teaching, and religious convictions as well as by community and administrative pressures.

### The Purpose

The purpose of this study is both historical and exploratory. The historical portion is intended to document instances of the inclusion of creationism in science courses by administrative direction and by the personal choice of the teacher. The exploratory research will consist of a survey of science teachers in a sample of Georgia high schools about creationist activity in their communities, their opinions of creationism as a part of the curriculum, and, where applicable, their practices in teaching creationism. The study will investigate relationships between the teachers' approval of creationism and their religious philosophy, familiarity with the tenets of creationism, and understanding of the role of evolution in biology. The influence of biographical factors such as academic degree, age, locale, and teaching experience will also be investigated. The results of the study may suggest reasons for the acquiescence of some teachers and the antagonism of others to pleas of creationists for equal time in science classes.

Textbook publishers, college science education departments and researchers studying the philosophy of science teaching all have an interest in teachers' opinions about creationism. Whether the results support or refute

claims of grass-roots agreement by educators with the creationist position, administrators who are concerned with instruction and curriculum selection in the science disciplines should find this study of value. The contest between biblical literalists and biologists has not been so vehement since the 1920s. The 1980s will see an intensification of this struggle for the minds of American students.

### The Problem

There exists as yet no evaluation of the extent or success of the creationist movement in Georgia. Newspapers and television followed the progress of House Bill 690, which required teaching creationism in public school science classes whenever the topic of evolution was taught. Actions in metropolitan area school districts were recorded, but actions taken beyond the Atlanta area have not attracted the attention of the media and have not been documented.

The questions to be answered by this study are:

1. How many teachers are familiar with the creationist movement?
2. How many teachers approve of including creationism in science courses, and how many would refuse to teach it if required? Is any biographical factor related to their positions?
3. With what materials and to what extent do teachers believe creationism should be taught, if at all?

4. How many teachers are actually teaching creationism and what size communities do they represent?
5. How many teachers have been faced with a local proposal that creationism be taught?
6. What reasons do teachers give for teaching or rejecting creationism? Are school board requirements or administrative decisions frequently reported, and if so, is this typical of any certain size community?
7. Is a teacher's approval of creationism related to any of the following factors: familiarity with creationism, self-rated religiosity, liberal or conservative religious beliefs, perception of the place of evolution in the science curriculum, local activity by creationist supporters, age, length of professional experience, degree level attained, specialization (biological or physical science), community size?
8. How many teachers have personal doubts about the validity of evolution, and is the area of the teacher's scientific training related to these doubts?
9. To what extent have students expressed doubts about evolution because it conflicts with their religious beliefs?
10. Is creationist activity as reported by the teachers stronger in any particular size community?

The answers to these questions are essential to school administrators in assessing the impact and the future of the creationist movement. Whether the results support the creationists' view that teachers prefer to give creationism equal emphasis with evolution or the position of their opponents that creationism deserves no status in the science curriculum, this study will have provided needed information to the educational community.

#### Historical Background

In July, 1925, a trial was held in Dayton, Tennessee, that signaled the culmination of the anti-evolution movement in early twentieth-century America. John Scopes, a biology teacher, was found guilty of violating a Tennessee statute forbidding teaching in a public school classroom the theory that man was descended from a lower form of animal. Since that day the adherence of the courts to the constitutional principle of separation of church and state has steadily forced a clear division between science and religion in the public schools.

In the 1920s, however, American culture was synonymous with American Protestantism. This was the "focal decade in the Kulturkampf of American Protestantism."<sup>5</sup> The advocates of orthodox religion were pressed on every side by the

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<sup>5</sup>Richard Hofstadter, Anti-Intellectualism in American Life (New York: Alfred A. Knopf, 1963), p. 123.



rising influence of advertising, radio, the opponents of Prohibition, and the increasingly sophisticated urban population personified by Al Smith. Their only success (Scopes could hardly be called a success) was the defeat of Smith for president in 1928.

One can hear in the anguished cries of the 1920s a clear awareness that the older American type was 'passe', and the accusation that it was the intelligentsia who were trying to kill it.<sup>6</sup>

Their spokesmen railed against the new ethnic groups, extolling Nordic and pioneer stock.<sup>7</sup> Right wing opposition to the New Deal developed, a militant nationalism arose, and moralists became adept at linking biblical criticism with irrelevant issues, reading into scriptural interpretation whatever fit their political ideology. Consequently, "The fundamentalism of the cross was now supplemented by a fundamentalism of the flag."<sup>8</sup>

This decade, then, was the setting for a battle between fundamentalism and "Modernism" as Americans rallied to turn out the enemies of Americanism and the agrarian tradition, identified as materialism, science, and, targeted by William Jennings Bryan, evolution: "All the ills from which America suffers can be traced back to the teaching of Evolution."<sup>9</sup>

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<sup>6</sup>Ibid., pp. 123-24.

<sup>7</sup>Especially the Ku Klux Klan. See Hofstadter's description of the philosophy of Hiram W. Evans, Imperial Wizard in 1926, *ibid.*, pp. 124-25.

<sup>8</sup>Ibid., p. 131.

<sup>9</sup>Maynard Shipley, The War on Modern Science (New York: Alfred A. Knopf, 1927), pp. 254-55.

Until the 1920s the furor over evolution had been carried on at the elite level of the colleges and universities, which few fundamentalists attended. By 1920 it had reached the high school, and a more general spectrum of the population encountered it.<sup>10</sup> When Bryan entered the fray in 1920 the crusade became a Holy War. Twenty state legislatures considered antievolution bills. The law finally passed by Tennessee was introduced by John Washington Butler, of whom Arthur Garfield Hays speculated that

He thought, if indeed he thought at all, that the King James' version of the Bible was handed down by God in person to Moses, in printed form and in the English language.<sup>11</sup>

In a maelstrom of modernist ridicule Scopes was found guilty and fined one hundred dollars; however, the case was reversed by the Tennessee Supreme Court, which, wishing to prevent an appeal to the U. S. Supreme Court, held that the jury, not the judge, should have levied the fine.<sup>12</sup>

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<sup>10</sup>Hofstadter, *Anti-Intellectualism*, p. 126.

<sup>11</sup>Gail Kennedy, ed., Evolution and Religion: The Conflict Between Science and Theology in Modern America (Boston: D. C. Heath, 1957), p. 37.

<sup>12</sup>John Thomas Scopes v. The State of Tennessee, 53 A.L.R. 821, 154 Tenn. 1055, 289 S.W. 363 (1927). For a first-hand account of the trial see Arthur Garfield Hays, "The Scopes Trial" from Let Freedom Ring, reprinted in Kennedy, pp. 35-52. For a description of the events leading to Scopes's arrest, see Stephen Jay Gould, "A Visit to Dayton," Natural History 90 (October 1981): 8.

In the intervening years Modernism waxed and waned. The liberalism of the New Deal years was supplanted by the patriotic fervor of World War II. As always, the philosophy of the schools concurred with the prevailing philosophy of the nation.<sup>13</sup> The development of Soviet missile capability in the 1950s led to the passage in 1958 of the National Defense Education Act (NDEA) which expanded science education in the secondary school.<sup>14</sup> In 1957 the science textbook reform movement began with the development by the Physical Science Study Committee (PSSC) of a high school physics course centered around a search for order through laboratory participation, films, and problem-solving that utilized the investigatory techniques implicit in the scientific method. When the new curriculum studies were extended to biology by the Biological Sciences Curriculum Study (BSCS), the taxonomic approach taken by conventional high school biology texts was abandoned in favor of an organization that related the systems of all living organisms, using evolution to connect them.<sup>15</sup>

Protests against the BSCS curriculum were lodged in several southern states, notably Texas, where a

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<sup>13</sup>R. Freeman Butts and Lawrence A. Cremin, A History of Education in American Culture (New York: Holt, Rinehart and Winston, 1953).

<sup>14</sup>Henry J. Perkinson, The Imperfect Panacea: American Faith in Education, 1865--1965 (New York: Random House, 1968), pp. 214-15.

<sup>15</sup>Paul DeHart Hurd, New Directions in Teaching Secondary School Science (Chicago: Rand McNally, 1969).

fundamentalist church group demanded that the books be banned.<sup>16</sup> The materials were later accepted, but only after modifications were made in the "dogmatic" way evolution was presented. With the encouragement provided by the National Science Foundation seminars and institutes for high school science teachers the BSCS textbooks received wide acceptance during the liberal era of the 1960s. Nearly half the American high schools eventually adopted the program,<sup>17</sup> and by 1964 three-fourths of the officially adopted high school textbooks were based on the BSCS model.<sup>18</sup> In her analysis of community and religious influence on the public school curriculum, Dorothy Nelkin wrote:

During most of the 1960s, the major problem facing BSCS was less a matter of social protest than the inertia of high school teachers, who often failed to understand the materials and the methods of science sufficiently to convey the character and use of evolution theory in biology.<sup>19</sup>

Nevertheless, reaction to the BSCS books grew slowly but steadily among fundamentalists. The recognition of

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<sup>16</sup>Dorothy Nelkin, Science Textbook Controversies and the Politics of Equal Time (Cambridge, Mass.: MIT Press, 1977), p. 29.

<sup>17</sup>Ibid., p. 30.

<sup>18</sup>Vernon Lee Bates, "Christian Fundamentalism and the Theory of Evolution in Public School Education: A Study of the Creation Science Movement" (Ph.D. dissertation, University of California in Davis, 1976), Dissertation Abstracts International, 1976, 37, 1823A (University Microfilms No. 76-20, 980).

<sup>19</sup>Nelkin, p. 30.

evolution as the underlying principle of biology inspired the opposition of conservative groups located in the Southern California and Texas centers of the aerospace industry. Nelkin described the increased influence of the conservative religions among the middle-class:

Anxious about the uncertainty caused by rapid social and technological change, they sought new patterns of personal meaning and definitive answers to complex social problems through traditional fundamentalist values.<sup>20</sup>

Throughout the 1970s the influence of the conservative Christian churches continued to rise until the "Religious Right" became a formidable political force as well as an agent for moral reform. The decline of morality, the breakdown of the family, the casualness of sexual and marriage relationships, the rising crime rate, the drug culture, and the changing values of society were all concerns of Americans as the twentieth century wore on. The search for causes led to the finding of scapegoats. The claim was made that teaching origins led to evolving ethics and that children taught that their ancestors were monkeys would learn to behave like animals.<sup>21</sup> Evolution once more became the scapegoat: the doctrine behind communism, fascism, socialism, Satanism. Every evil in the world could

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<sup>20</sup>Ibid., p. 46.

<sup>21</sup>Susan Milstein, "Judge Says Crime Stems From Evolution Teaching," Atlanta Journal-Constitution Cobb Extra, 15 November 1979.

somehow be blamed on evolution.<sup>22</sup> Troubled people seeking simple answers to complex questions recognized in creationism a means of regaining control of their children's faith.<sup>23</sup> Their reasoning reveals some of the widely-held misconceptions about science and education and illuminates the problems faced by public school teachers, some with their own misgivings about the place of evolution and creationism in the curriculum.

### Social Context

Throughout history social scientists have misapplied scientific principles. This happened when Herbert Spencer, who was a civil engineer, not a biologist, applied the biological scheme of evolution to society in general (as "Social Darwinism"). It was Spencer, not Darwin, who first used the expression "survival of the fittest," although Darwin later adopted it in place of his term natural selection.<sup>24</sup> The entanglement of biology and sociology is widely disapproved of today. Unfortunately, the confusion caused many people to become wary not only of improper uses of scientific principles but of the substance of those principles as well.

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<sup>22</sup>Henry M. Morris, The Twilight of Evolution (Grand Rapids: Baker Book House, 1963), p. 83.

<sup>23</sup>Bates, p. 72.

<sup>24</sup>Richard Hofstadter, Social Darwinism in American Thought (Boston: Beacon Press, 1955), pp. 38-39 (first published 1944).

The creationist movement arose as a means of solving the dilemma of fundamentalists pressured to conform in a technologically sophisticated nation and faced with the seduction of their children from a rigorous religious tradition by the public schools. In his 1976 dissertation, Vernon Bates traced the development of creationism and its various supportive organizations beginning with the American Scientific Affiliation (ASA). The ASA gradually became dominated by "theistic evolutionists" who reconciled creation and science by recognizing the validity of biblical scholarship and criticism and relinquishing insistence on a literal six-day creation. Dissatisfied members of the ASA formed the Creation Research Society, and around this nucleus coalesced the movement that was to become prominent in efforts to change the textbooks used by the public schools in California and eventually across the nation.<sup>25</sup>

#### Educational Significance

The goal of education is to develop concepts: mental images or ideas that may or may not be capable of being verbalized but that nevertheless constitute an understanding that is the goal of education. These concepts are transferred from the mind of the teacher to that of the student by means of examples, models, books, lectures, and experience; in short, all the materials used to create these mental pictures, which we call the curriculum. The mental

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<sup>25</sup>Bates, p. 72.

image of a creation necessitates a creator: a designer, a "first cause," all of which are synonymous with the concept of a deity, whether or not they go by the name "God." Such an idea constitutes a religious concept. Teachers are therefore forbidden by the First Amendment to promulgate this idea in the public schools.<sup>26</sup> This is the position of those who would forbid teaching creationism on constitutional grounds.

The concept of evolution, on the other hand, is not synonymous with a deity. It is a process that can be tested, albeit on a small time scale, and disproved. It has predictive capability, although its detractors claim that observation of the outcomes of predictions are impossible because of the time required. The mechanism of evolution is debated, but the theory itself has never been disproved.<sup>27</sup> The opponents of creationism claim that to leave evolution out of the curriculum would deprive biology of its foundations and send it back to the pre-BSCS rote memorization approach. Creationists claim that fairness demands the presentation of both models, creation and evolution.<sup>28</sup> Gary Crawford, an ACLU attorney, remarked of

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<sup>26</sup>Leo Pfeffer, God, Caesar and the Constitution (Boston: Beacon Press, 1975), p. 203 (describing the Supreme Court decision in DeKalb School District v. DeSpain wherein the "cookie prayer" was outlawed as implying a deity, even though the word "God" was not used).

<sup>27</sup>R. C. Lewontin, "Evolution/Creation Debate: A Time for Truth," BioScience 31(September 1981), 559.

<sup>28</sup>Henry M. Morris, "Resolution for Equitable Treatment of Both Creation and Evolution," Impact Series No. 26 (San Diego, Calif.: Institute for Creation Research, no date).



this position that "Science doesn't work on the fairness doctrine. It works on the merit system."<sup>29</sup> Niles Eldredge wrote that the public's willingness to swallow the "fairness" argument is the "real tragedy of American science education"--science is viewed as dogma, not as ideas; as authoritarian and unchanging, just like creationism.<sup>30</sup>

The proponents of creationism have fostered an atmosphere that encourages friction between religionists and nonreligionists.<sup>31</sup> Creationism does not allow a middle view between nontheistic evolution and fundamentalist concepts of creation. The student is required to choose between the two opposing views. The books intended for public school use ask for a choice and then proceed to push the student in the direction of what is defined as "creationism."<sup>32</sup> Richard

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<sup>29</sup> John Pope, "Gaggle of Legal Beagles Produce a Roomful of Giggles," New Orleans Times-Picayune/States-Item, 20 December 1981, p. 116.

<sup>30</sup> Niles Eldredge, "Creationism Isn't Science," New Republic, 4 April 1981, pp. 15-17, 20.

<sup>31</sup> See Henry M. Morris, Studies in the Bible and Science (Philadelphia: Presbyterian and Reformed Publishing Co., 1966), pp. 102-103, in which he rejects theistic evolution, and Twilight of Evolution, p. 21, where he deplors the accommodation made with Darwin by Catholics and liberal Protestants.

<sup>32</sup> See Richard Bliss, Origins, Two Models: Evolution--Creation (San Diego: Creation-Life Publishers, 1979), pp. 54-55, cautioning that the writings of some scientists are biased; and Duane Gish, Evolution The Fossils Say No! (San Diego: Creation-Life Publishers, 1978), p. 174, "the facts of science declare special creation to be the only logical explanation of origins."

Bliss, author of one of the high school creationist texts, is convinced that, presented with his material, students will choose "creation over evolution."<sup>33</sup>

### Summary

In the public schools teacher presentation is usually the deciding factor in determining student acceptance or rejection of ideas. The fate of creationism may ultimately depend on its acceptance by the classroom teacher. This study, then, will probe the teacher's understanding of both "models," evolution and creationism, solicit opinions on the scientific validity of creationism and the infallibility of scriptural descriptions of the creation, and gather information on current practices in the presentation of evolution and creationism in the science classroom.

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<sup>33</sup>Richard Bliss, Conference on "Origins: Two Models," Atlanta Georgia, 25 August 1979. Bliss's presentation was videotaped by Paul Crawley, WXIA Atlanta, for the series "Creation or Evolution?" presented December 1980--January 1981. See also Richard B. Bliss, "A Comparison of Two Approaches to the Teaching of Origins of Living Things to High School Biology Students in Racine, Wisconsin" (Ed.D. dissertation, University of Sarasota, 1978), EDRS ED 152 568 SE 024 113, p. 91.

## CHAPTER II

### REVIEW OF THE LITERATURE

#### Introduction

The advent of Darwin's Theory of Evolution and Natural Selection in 1859 precipitated a theological controversy that continues today. The debate on the merits of the theory was followed by attempts to prevent its being taught in the high schools. When the courts approved the teaching of evolution and forbade the parallel presentation of the Genesis creation story, the advocates of creationism claimed that there was scientific support for their view. They requested that public schools either teach both, since both were equally scientific, or teach neither, since evolution was a religion requiring belief rather than a science supported by proof. This chapter reviews the literature of both sides of the controversy and relates the legal attempts to exclude evolution or include creationism in the public school curriculum. Writings which support the claim of scientific credibility for creationism are summarized and various descriptions of evolution examined. Finally, the experience of a Georgia school system where a resolution supporting creationism was passed is described.

Darwinism vs. Theology

The literature of "creation vs. evolution" goes back at least to the time of Saint Augustine, who drew the distinction between the society of the spirit and that of the flesh by equating the supernatural with God and the natural with the devil. The conflict between reality and revelation described by Augustine continues to plague the scientists and theologians of the twentieth century.

Saint Augustine did not seem to be troubled by the Genesis creation story. He admitted that the "days" of creation were open to interpretation and that God may have created man at any time during a long history of the cosmos. He was chiefly concerned that God must exist distinct from his creation.<sup>1</sup> To Augustine, the creation required no testimony other than that of its existence. One supposes that the attempts of "creation scientists" to verify the events recounted in Genesis would not have impressed him. Harold Clark, president of the Life Origins Foundation, agreed that Augustine was trying to reconcile biblical description with reason and might just as easily be interpreted as supporting evolution. Clark suggested that Augustine advocated what today's creationists call "theistic evolution."<sup>2</sup>

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<sup>1</sup>St. Augustine, The City of God, trans. M. Dods (New York: Modern Library, Random House, 1950), Book XII.

<sup>2</sup>Harold W. Clark, "Was Augustine an Evolutionist?" Creation Research Society Quarterly 7 (March 1971): 242-3.

The historian Andrew D. White reviewed the attitudes of theologians toward origins both before and after Darwin.<sup>3</sup> Many of the modern creationists' ideas were not original; such recent speculations as the capacity of Noah's Ark<sup>4</sup> have been carried on since the Christian church began. The difference is that the church fathers did not have scientific discoveries to contradict them--not, that is, until they had the misjudgement to predicate their theology on a geocentric solar system. White attributed the persistence of biblical literalism to Augustine, who insisted that scriptural authority was absolute. Even though Augustine interpreted scripture to fit known facts, the views of Luther, Calvin, the Roman Catholic hierarchy, and American Protestantism all demanded the authority of the Bible over science.<sup>5</sup>

Long before Darwin, great thinkers of civilization ran afoul of theology that required immutability of species. The opposition of the Roman Catholic Church prevented Descartes and Leibnitz from promoting theories on the formation of the solar system and the transformation of

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<sup>3</sup>Andrew D. White, A History of the Warfare of Science with Theology in Christendom (New York: George Braziller, 1955).

<sup>4</sup>John C. Whitcomb and Henry M. Morris, The Genesis Flood: The Biblical Record and Its Scientific Implications (Nutley, N. J.: Presbyterian and Reformed Publishing Co., 1969), pp. 10-11.

<sup>5</sup>White, pp. 25-27. White quotes St. Augustine's statement "Major est Scripturae auctoritas quam omnis humani ingenii capacitas."

species. Worse than this, the limits of orthodox theology, both Catholic and Protestant, led scholars such as Linnaeus to make concessions to religion and declare that all presently existing species were part of the original creation in spite of evidence that strongly favored the contrary view.

White reviewed the development of geology, astronomy, anthropology, chemistry, physics, medicine and psychology as well as biology and described the attacks launched every step of the way by religionists.<sup>6</sup> Comparison of the efforts of present-day creationists to the warfare described by White leaves the impression that there is nothing new in the battle between religion and science.

Concern with the geologic age of the earth and the existence of fossils preceded the evolution controversy. In 1844 Robert Chambers published Vestiges of the Natural History of Creation in which he related the development of species to the geological formations.<sup>7</sup> In 1857 Philip Henry Gosse published Omphalos, an attempt to reconcile current discoveries in geology with Genesis. His proposition was that rather than a slow change in the earth's surface over eons of time, the creation produced an earth instantaneously old. Gosse's son described the press reaction to his father's theory as suggesting "that God hid the fossils in

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<sup>6</sup>Ibid., pp. 57-61.

<sup>7</sup>Robert Chambers, Vestiges of the Natural History of Creation (New York: Humanities Press, 1969), first published 1844.

the rocks in order to tempt geologists into infidelity."<sup>8</sup> Gosse's volume met ridicule and indifference from scientists and theologians alike. However, this same theory voiced in 1963 by Henry Morris, director of the Institute for Creation Research (ICR), commanded respect from many scientists and even more churchmen. Morris wrote that "true creation necessarily involves the creation of an 'appearance of age'" and compared the universe to a clock wound and set by God at an "apparent age" of his choosing. He saw nothing deceptive in this action.<sup>9</sup> Nineteenth century critics were not so tolerant. According to Charles Kingsley, it was as if "God had written on the rocks one enormous and superfluous lie."<sup>10</sup>

Darwin's theory has been compared to that of Copernicus in the widespread consternation it created. The idea itself was not new: Geologists and paleontologists had observed fossil changes in flora and fauna over geologic time, and Lamarckian genetics had attempted to explain animal characteristics in terms of adaptation to environmental factors. Darwin himself credited the idea to Lamarck, Huxley, Lyell, Haeckel and others.<sup>11</sup> What was new, at least

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<sup>8</sup>Sir Edmund Gosse, "The Dilemma of the Fundamentalists and the Scientist," from Chapter V, Father and Son, 1907, reprinted in The Norton Anthology of English Literature, 4th ed., M. H. Abrams, gen. ed., 2 vols. (New York: W. W. Norton & Co., 1979), vol. 2, pp. 1628-30.

<sup>9</sup>Morris, Twilight, pp. 56-57.

<sup>10</sup>Gosse, p. 1630.

<sup>11</sup>Charles Darwin, The Origin of Species (1859) and The Descent of Man (1871) (New York: The Modern Library, Random House, n.d.).

in the minds of nineteenth century theologians, was the idea that man, having been long displaced from the center of the universe by the acceptance of a heliocentric celestial arrangement, was now removed from his exalted place in nature. His humanity arose not from his status as a specially created being but through generations of evolution from the primates and ultimately from the one-celled animals.<sup>12</sup> This confusion was not alleviated by the adoption of Darwinism by social scientists such as Herbert Spencer and William Graham Sumner and by the psychologist G. Stanley Hall. Spencer's doctrine was "Social Darwinism", which viewed history as the adaptation of human abilities to the circumstances of the times and predicted that the survivors would be those having the greatest innate capability.<sup>13</sup> Modern creationist writers have seized on Spencer's application of natural selection to sociological development to claim that the teaching of evolution has led children to believe they are animals subject to no laws except those of the "jungle."<sup>14</sup>

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<sup>12</sup>V. T. Thayer, Formative Ideas in American Education (from the Colonial Period to the Present) (New York: Dodd, Mead & Co., 1970).

<sup>13</sup>Hofstadter, Social Darwinism, pp. 201-204. The conflicts over the relation of Social Darwinism to genetic evolution and the wisdom of interchanging social forces and natural forces is discussed by Lawrence Cremin in "Science, Darwinism and Education," Transformation of the School (New York: Alfred A. Knopf, 1961), Chapter 4.

<sup>14</sup>Henry M. Morris, The Troubled Waters of Evolution (San Diego: Creation-Life Publishers, 1974), pp. 12, 166, 168.



Darwin's most prominent and effective defender was Thomas Henry Huxley. Huxley's essays on the evolutionary origin of man state Darwin's case in the plainest of language and with style and humor.<sup>15</sup> Huxley debated the issue not only on his home ground of science but also on theological territory. His famous exchange with Bishop Wilberforce at the 1860 meeting of the British Association for the Advancement of Science is described by Irvine in his parallel biography of Darwin and Huxley.<sup>16</sup> Huxley's collection of lectures, Man's Place in Nature, was the result of his defense of Darwin against detractors such as Wilberforce and the biologist Richard Owen. As anthropologist, anatomist, paleontologist and educator, Huxley's qualifications were unique, yet his greatest impact lay in the organization and style of his writing.<sup>17</sup>

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<sup>15</sup>Thomas Henry Huxley, Man's Place in Nature and Other Anthropological Essays (New York: D. Appleton, 1898), contains illustrated essays on various primates which Huxley called "man-like apes." Evolution and Ethics (London: Macmillan, 1903) considers civilized man now attempting to shed his animal instincts and finding that justice is illusive: The deserving are not necessarily rewarded, nor are the wicked punished. Science and Christian Tradition: Essays (New York: D. Appleton, 1913) discusses New Testament myths and shows why the Gospels, as well as the Old Testament myths, do not require a belief in the supernatural. Huxley gives twelve established scientific truths to which theological speculation will have to adjust.

<sup>16</sup>William Irvine, Apes, Angels and Victorians (New York: McGraw-Hill, 1955).

<sup>17</sup>Edward Clodd, Thomas Henry Huxley (New York: Dodd Mead, 1902, Reprint by AMS Press, New York, 1977).

Thirty years after Huxley published his essays, his grandson, Sir Julian Huxley, defended evolution as well as other scientific aspects of man's nature in Man in the Modern World. Julian Huxley took up the question of whether a scientific approach could throw any light on religion. He concluded that it could not.<sup>18</sup>

A student of Thomas Huxley, Henry Fairfield Osborn, wrote in 1925 a defense of the teaching of evolution, which was appropriately dedicated to John Scopes.<sup>19</sup> The book was a collection of articles, letters, and speeches in response to the furor raised by William Jennings Bryan over the teaching of evolution in the schools. After a fiery and inspiring beginning Osborn diluted his stand for teaching evolution by advocating a "nature study" approach to Darwin and avoided the word "evolution."<sup>20</sup>

Walter Lippman wrote in 1928 about the relation of teaching evolution and academic freedom. It is impossible for the teacher to be neutral, he said, because he must make an impression on the student and thus lead him either toward or away from "Modernism."<sup>21</sup> This argument is one currently

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<sup>18</sup>Sir Julian Huxley, Man in the Modern World (New York: Harper & Row, 1927).

<sup>19</sup>Henry Fairfield Osborn, Evolution and Religion in Education (New York: Charles Scribner's Sons, 1926).

<sup>20</sup>In this Osborn was probably influenced by Liberty Hyde Bailey, America's champion of agriculture, country life and the joys of nature. For a discussion of this outlook see Cremin, Transformation of the School, pp. 75-78.

<sup>21</sup>Walter Lippman, American Inquisitors: A Commentary on Dayton and Chicago (New York: Macmillan, 1928).

used against the concept of "equal time": It is impossible for the teacher to be neutral in a conflict with such deep roots in religious faith and the freedom of scientific inquiry. Lippman analyzed the conflict as one between generations as well as between factions. The current protest that the schools should teach what the parents prescribe was predicted by Lippman:

The introduction of modern habits of thought into the schools means . . . that parents and children may come to think so differently that neither can sympathize with or even comprehend the other.<sup>22</sup>

He sympathized with the predicament of the teacher as a target of the fundamentalists and suggested that resistance to the majority, however temporarily ineffective, would in the end limit the power of the majority to impose its teaching on the minority.<sup>23</sup>

No review of the Darwin vs. religion literature would be complete without reference to William Jennings Bryan, who defined theistic evolution as "an anesthetic which deadens the patient's pain while atheism removes his religion."<sup>24</sup> Bryan objected to Darwin's theory as merely an unverified "guess," which furthermore had no foundation in the Bible. Surely, Bryan contended, if there were a word of truth in evolution we would find scriptural support, not contradiction.<sup>25</sup>

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<sup>22</sup>Ibid., p. 89.    <sup>23</sup>Ibid., p. 111.    <sup>24</sup>Kennedy, p. xiv.

<sup>25</sup>William Jennings Bryan, "God and Evolution," New York Times, 26 February 1922 (In Kennedy, pp. 23-29).

The American Scientific Affiliation is an organization of "theistic evolutionists" dedicated to the idea that science and Christianity are not incompatible. A collection of essays by members was published in 1959 and included articles on the theology of evolution, the fossil evidence and the origin of the cosmos from an evolutionary, yet theologically permissible, point of view.<sup>26</sup>

Another scientist--theologian who wrote of both the physical and metaphysical nature of man was Pierre Teilhard de Chardin, a French priest and paleontologist. His superiors in the Catholic Church refused to allow his works to be published during his lifetime.<sup>27</sup> In The Phenomenon of Man Teilhard took the position that man is a phenomenon and thus man, his history and his values are subject to scientific analysis. Nevertheless, when the various disciplines of science analyze man, the composite that results is not a true picture; thus man is a paradox. He defines evolution as "an ascent towards consciousness."<sup>28</sup> Teilhard contended that evolution, as an upward progression in man's finer nature, supported rather than contradicted the concept of man's creation by a divinity. Although his

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<sup>26</sup>Russell L. Mixter, ed., Evolution and Christian Thought Today (Grand Rapids: William B. Eerdmans Co., 1959).

<sup>27</sup>Robert Speaight, The Life of Teilhard de Chardin (New York: Harper & Row, 1967), p. 285.

<sup>28</sup>Pierre Teilhard de Chardin, The Phenomenon of Man, trans. Bernard Wall (New York: Harper & Row, 1959, first published 1955).

work was criticized as being more metaphysical than scientific,<sup>29</sup> Teilhard, a dedicated Jesuit and devout Catholic, purposely did not divorce his consideration of the spiritual nature of man from his scientific premises of man's origins. In an age where evolution was unacceptable to most scriptural purists, he attempted to reconcile science with scripture and ease the consciences of those who had until then been unable to accept evolution for religious reasons.<sup>30</sup>

Gail Kennedy edited a collection of commentaries on evolution and religion that contained excerpts from the writings of Bryan, Harry Emerson Fosdick, Henry Ward Beecher, John Dewey, Walter Lippman, and Arthur Garfield Hays. An extensive bibliography serves as a starting point for exploration of the literature of science vs. religion in general and Darwinism vs. biblical literalism in particular.<sup>31</sup>

Mainstream Christianity has long been at peace with evolution, having abandoned a literal interpretation of scripture in favor of biblical scholarship and criticism. Gerhard von Rad pointed out that the idea of Jehovah as

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<sup>29</sup>P. D. Medawar, "Review of The Phenomenon of Man," Mind 70 (1961), in Philip Appleman, ed., Darwin, Norton Critical Edition (New York: W. W. Norton & Co., 1970), pp. 476-85; George Gaylord Simpson, "Evolutionary Theology: The New Mysticism," This View of Life (New York: Harcourt, Brace & World, 1964), In Appleman, ed., Darwin, pp. 470-76.

<sup>30</sup>Speaight, Chapter 7, pp. 133-51.

<sup>31</sup>Kennedy, ed., Evolution and Religion.

Creator came late to Israel's theology, which was primarily concerned with salvation rather than origins. Creation has theological rather than historical substance. Although the biblical writer intended to convey scientific knowledge also, this must be interpreted in terms of the scientific knowledge of today--it has no scientific importance for us.<sup>32</sup>

In recent years the creationist movement has evoked responses from theologians of all persuasions. John Swomley sees the movement as one of the most important issues in church--state relationships in the 1980s.<sup>33</sup> James Skehan, a Jesuit, insists that Genesis is a book of religious history, not a literal account of cosmic beginnings.<sup>34</sup> Edwin Olson, writing in the evangelical publication Christianity Today, objects to the rigidity of contemporary creationists that imposes an either/or view of biblical creation and suppresses the real meaning of the Bible, which is redemption.<sup>35</sup>

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<sup>32</sup>Gerhard von Rad, Old Testament Theology, Vol. I, trans. D. M. G. Stalker (New York: Harper & Row, 1957), pp. 138, 148.

<sup>33</sup>John M. Swomley, Jr., "The Decade Ahead in Church--State Issues," Christian Century 48 (25 February 1981): 201.

<sup>34</sup>James W. Skehan, S. J., "Geological and Theological Perspectives on the Age of the Earth, of Life and of Mankind," paper presented at the American Association for the Advancement of Science, Washington, D.C., February 1982.

<sup>35</sup>Edwin A. Olson, "Hidden Agenda Behind the Evolutionist/Creationist Debate," Christianity Today, 23 April 1982, pp. 26-30.

Unfortunately, most science teachers do not study theology, and biblical criticism and analysis are not accepted by fundamentalists. As a result, science and theology become confused in the minds of teachers, students, school board members, and legislators. Skehan warns that this confusion endangers the quality of education, and that:

A nation whose understanding of theology is so meager that it cannot draw a clear distinction between science and religion is educationally impoverished. Moreover, the confusion on the part of religious fundamentalists and politicians, as has been demonstrated in certain parts of the United States, bodes ill not only for the quality of science education but also for the good name of religion among thinking people.<sup>36</sup>

This new fundamentalist movement appears to take no heed of the lessons of the past. The modern religionists apparently intend to bypass court decisions with laws to limit the power of the Supreme Court over educational matters. Nevertheless, it is instructive to examine past judicial solutions for clues to the direction the creationist movement will take.

### Legal Challenges

Many years passed before Darwinism had its day in court. A fundamentalist revival in the 1920s led to the enactment of statutes forbidding the teaching of evolution in the public schools. Florida, Tennessee, Arkansas, Missississippi, and Oklahoma all passed legislation or adopted resolutions against teaching Darwin's theory of evolution,

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<sup>36</sup>Skehan, p. 12.

although Oklahoma's statute was repealed in 1926.<sup>37</sup> In one of the most famous cases in history, John Scopes, a biology teacher in Dayton, Tennessee, was convicted of teaching evolution and violating the Tennessee "monkey law" of 1925, which was found to be constitutional.<sup>38</sup> This appears to be the only such case in U.S. history so decided.

In 1968 the U.S. Supreme Court decided that Susan Epperson, a high school biology teacher, was unlawfully subjected to criminal prosecution and dismissal by the Arkansas statute prohibiting teaching the theory of evolution. The Supreme Court held that the protection of constitutional freedoms, including academic freedom, was vital. The fact that the statute was vague and uncertain was unimportant, nor was it relevant that there had been no prosecution under it. Clearly it was based on fundamentalist religious doctrine. Although the courts recognize the right of school boards to determine what shall be taught, where constitutional questions arise the courts are vigilant in the protection of rights, said Mr. Justice Fortas in delivering the majority opinion.<sup>39</sup> The First

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<sup>37</sup>S. J. Holmes, "Proposed Laws Against the Teaching of Evolution," Bulletin of the American Association of University Professors 13 (December 1927): No. 8, reprinted in A Compendium of Information on the Theory of Evolution and the Evolution--Creationism Controversy, Jerry P. Lightner, ed. (Reston, Va.: National Association of Biology Teachers, 1977), pp. 43-47.

<sup>38</sup>Scopes v. State of Tennessee, 53 A.L.R. 821, 154 Tenn. 105, 289 S.W. 363 (1927).

<sup>39</sup>Epperson v. Arkansas, 393 U.S. 97, 89 Sup. Ct. 266 (1968), 21 L. Ed. 2d 228, cited at 235.



Amendment "does not tolerate laws that cast a pall of orthodoxy over the classroom," said the court in Keyishian v. Board of Regents,<sup>40</sup> and government "may not aid or promote one religion or religious theory against another or even against the militant opposite."<sup>41</sup>

Richard Morgan said that Fortas's reasoning stemmed from the ACLU's brief which was written by Leo Pfeffer. This placed the blame for the objection to evolution squarely on its contradiction of certain religious views, thus making the statute

an impermissible establishment of religion. This was a very neat twist. Fortas was able to underscore the teaching of the school prayer cases that the state may not favor religious doctrine; he got rid of an obnoxious, if archaic, statute; and he avoided diminishing the general power of states to prescribe public school curricula which would have resulted from launching a constitutional theory of academic freedom.<sup>42</sup>

Pfeffer speculated that the Supreme Court, which could reasonably have refused to hear the Epperson case, chose instead to affirm once and for all that "public education must be secular in determining both what is included and what is excluded from its programs and curricula."<sup>43</sup> L. Sprague DeCamp described the Scopes trial and the

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<sup>40</sup>Keyishian v. Board of Regents, 385 U.S. 589 at 603, 87 Sup. Ct. 675 at 683, 17 L. Ed. 2d 629 (1967).

<sup>41</sup>Epperson, 21 L. Ed. at 234.

<sup>42</sup>Richard Morgan, The Supreme Court and Religion (New York: The Free Press, 1972), p. 157.

<sup>43</sup>Pfeffer, p. 224.

legislation that led to it in 1969, three months after Epperson reached the Supreme Court. DeCamp also described Epperson, labelling it "The End of the Monkey War."<sup>44</sup>

Following the vindication of Ms. Epperson, the antievolution statute in Mississippi was struck down in 1970 when a parent brought suit on behalf of her daughter seeking to enjoin the enforcement of the statute, claiming that the daughter's constitutional rights under the First Amendment were violated by her being denied the opportunity to be taught this scientific theory. The court held the statute unconstitutional, seeing no difference between this statute and the Arkansas statute cited in Epperson.<sup>45</sup>

In 1973 a civil rights action was brought in the Fifth Circuit seeking to enjoin the Houston schools from teaching evolution, which, it was claimed, was a sectarian, atheistic religion. The court disposed of this question decisively, denying the analogy of evolution as a religion. They rejected also the doctrine of "equal time," saying that

Teachers of science in the public schools should not be expected to avoid the discussion of every scientific issue on which some religion claims expertise. . . . To require the teaching of every theory of human origin, as alternatively suggested by plaintiffs, would be an unwarranted intrusion into the authority of public school systems to control the academic curriculum.<sup>46</sup>

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<sup>44</sup>L. Sprague de Camp, "The End of the Monkey War," Scientific American 220 (February 1969): 15-21.

<sup>45</sup>Smith v. State, 242 So. 2d 692 (1970).

<sup>46</sup>Wright v. Houston Independent School District, 486 F. 2d 137 (5 Cir. 1973), Cert. den. 417 U.S. 969, cited at 366 F. Supp. 1211.

Two cases in 1975 dealt with evolution. Harold Steele, a biology teacher, challenged on constitutional grounds a Tennessee statute requiring that the Genesis version of creation be taught and that the Darwinian theory be presented as theory and not fact.<sup>47</sup> The trial court agreed as to the unconstitutionality of the statute, and while the case was on appeal the Sixth Circuit Appellate Court decided a similar case, Daniel v. Waters, in favor of Daniel, who was a college biology teacher. The decision was specific about the "equal time" provision and held that this statute violated the Establishment Clause of the First Amendment.<sup>48</sup> Subsequently the Supreme Court of Tennessee upheld the trial court finding in favor of Steele.

In 1977 a ninth grade student, Jon Hendren, and his parents sued the Indiana Textbook Committee over the selection of Biology, a Search for Order and Complexity, a textbook written and sponsored by creationists. The court held that the book was plainly sectarian and that a close church relationship was implied. Creation was defined in religious terms, the teachers' guide specified "correct" Christian answers, and the purpose was obviously to present the biblical version of creation, not the "balanced view" its promoters claimed. The judge reversed the decision of the Indiana State Textbook Commission, finding the textbook

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<sup>47</sup>Steele v. Waters, 527 S.W. 2d 72 (1975).

<sup>48</sup>Daniel v. Waters, 515 F. 2d 485 (6 Cir. 1975).

in violation of the Indiana Constitution and the First Amendment.<sup>49</sup>

Subjecting children to teaching that conflicts with the religious beliefs and practices of their parents was protested in the case of Wisconsin v. Yoder, wherein the court granted Amish parents the right to withdraw their children from school after the eighth grade in order to protect their developing value systems from a secular society. In this case, the court rejected the argument that the child had a right to an education that prepared him for the importunities of a materialistic world and affirmed the right of the parents to act in accordance with the beliefs of their religion.<sup>50</sup> This interpretation by the court might also be applied to any requirement that a child submit to teachings, such as evolution, that conflict with sincere religious beliefs. LeClerc suggested that such excusal is preferable to allowing political bodies to tamper with the curriculum.<sup>51</sup> The imprudence of depending on the legislative process to right educational wrongs is evident from the failure of various state legislatures to arbitrate the disagreement between Darwinist biologists and

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<sup>49</sup>Hendren v. Campbell, Case no. S577-0139 Marion Superior Court No. 5, April 14, 1977 (Indiana).

<sup>50</sup>Wisconsin v. Yoder, 406 U.S. 205, 92 Sup. Ct. 1526, 32 L. Ed. 2d 15 (1972).

<sup>51</sup>Frederic S. LeClerc, "The Constitution and Creationism," American Biology Teacher 36 (March, 1974): 139-45 (reprinted in Compendium, pp. 1-11).

fundamentalist Christians over what should be taught in public school science classes. Time and time again the courts have had to intervene between what Leo Pfeffer calls the forces of God and the forces of Caesar.<sup>52</sup> Reliance on lawmakers to arbitrate decisions involving specific kinds of theology is unwise. Frequently a vote for Caesar is viewed as a vote against God, and legislators nervous about reelection prefer to be recorded on the side of the Almighty.

Into the morass of church/state--evolution/creation debate waded Wendell Bird, a creationist attorney whose articles in the Yale and Harvard Law Journals delineated the legal basis of "scientific creationism."<sup>53</sup> Exclusive presentation of evolution contravenes the Free Exercise clause, denying students their right to practice their religion, which forbids "belief" in evolution, he wrote. The Establishment clause is also violated by the public schools' exclusive support of evolution, which creationists view as a contrary religion. Creationist pamphlets and monographs have referred to these articles many times.

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<sup>52</sup>Pfeffer, p. 298.

<sup>53</sup>Wendell R. Bird, "Freedom of Religion and Science Instruction in Public Schools," Yale Law Review 87 (January 1978): 515-70; "Freedom from Establishment and Unneutrality in Public School Instruction and Religious School Regulation," Harvard Journal of Law and Public Policy 2 (June 1979): 125-205. Bird elaborated on these positions in the ICR Impact series nos. 69 (March 1979) and 70 (April 1979) and in "A Response to Gerald Skoog: Creationism and Evolution," Educational Leadership, November 1980, p. 157.

Gerald Skoog reviewed recent legal maneuverings by creationists in California and elsewhere. "Scientific creationism is biblical creationism without the theological terminology," Skoog said, and related the opinion of California Attorney General Evelle Younger that "scientific creationism had an inherent religious basis" and also that "the inclusion of a scientific theory of evolution in a textbook did not violate the First Amendment."<sup>54</sup> Attempts to brand the theory of evolution as a religion of secular humanism have thus far been unsuccessful.

In 1981 Kelly Segraves, director of the Creation-Science Research Center, sued the California State Board of Education on behalf of his son, who was, he contended, unlawfully taught evolution as the only explanation of the development of life.<sup>55</sup> Segraves backed down from his original demand that evolution not be taught "dogmatically."<sup>56</sup> Over the defense's objections Judge Irving Perluss agreed, after refusing to consider the truth of either creation or evolution.<sup>57</sup>

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<sup>54</sup>Gerald Skoog, "Legal Issues Involved in Evolution vs. Creationism," Educational Leadership, November, 1980, p. 155.

<sup>55</sup>Segraves v. State of California.

<sup>56</sup>Peter Gwynne, "Scopes II in California," Newsweek, 16 March 1981, p. 67; Kenneth M. Pierce, "Putting Darwin Back in the Dock," Time, 16 March 1981, p. 80.

<sup>57</sup>William J. Broad, "Creationists Limit Scope of Evolution Case," Science 211 (20 March 1981): 1331-2.

According to Thomas Flygare's analysis of this case,<sup>58</sup> the Segraves' objected to the "Science Framework for California Public Schools" which Nell Segraves had attempted to have revised in 1969 to reflect biblical views of creation.<sup>59</sup> Failing to get their revised "Framework" adopted by the California State Board of Education, the Segraves went to court. Although they had to settle for much less than the "philosophical neutrality" they hoped for, they received enough publicity to make them clearly the winners.<sup>60</sup>

The most recent and celebrated case was brought by the ACLU in Arkansas in 1981 after that state legislature passed a law requiring the teaching of "creation-science" whenever any treatment was made of "origins."<sup>61</sup> This trial had the interesting spectacle of scientists extolling the miraculous acts and existence of a creator (who was not necessarily God) while prominent clergymen denounced the creationist doctrine as unconstitutional religious instruction, since a

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<sup>58</sup>Thomas J. Flygare, "The Case of Segraves v. the State of California," Phi Delta Kappan, October 1981, pp. 98-99.

<sup>59</sup>Nicholas Wade, "Creationists and Evolutionists: Confrontation in California," Science 178 (17 November 1972): 724-29. This article outlines in detail the background, personalities, strategies and results of the efforts of the Creation Research Society to rewrite the "Science Framework for California Public Schools."

<sup>60</sup>Flygare, p. 101.

<sup>61</sup>Act 590, Ark. Stat. Ann. no. 80-1663 (1981).

"creator" was essentially the same concept as a deity.<sup>62</sup> Early in 1982 Judge William Overton ruled the law unconstitutional, and the Arkansas attorney general decided not to appeal.<sup>63</sup>

In July, 1981, the Louisiana Legislature passed a bill nearly identical to that of Arkansas.<sup>64</sup> Governor David C. Treen signed the bill in the midst of both congratulations and objections from religious leaders and complaints from state education officials that implementation of the law would be expensive.<sup>65</sup> The ACLU filed a suit challenging the law. Louisiana Attorney General William J. Guste, Jr. countered by asking that the law be declared constitutional. After the decision on the Arkansas law U.S. District Judge

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<sup>62</sup>Roger Lewin, "Creationism on the Defensive in Arkansas," Science 215 (1 January 1982): 33-34; Lewin, "Where is the Science in Creation Science?," Science 215 (8 January 1982): 142-3, 144, 146; Jack Weatherly, "Creationists Lose in Arkansas," Christianity Today 26 (22 January 1982): 28-29; Jack Novik, "Judge Throws 'Creation-science' out of Arkansas Classrooms," Civil Liberties, February 1982, pp. 1, 4; Gene Lyons, "Repealing the Enlightenment," Harper's 264 (April 1982): 38-40, 73-78.

<sup>63</sup>McLean v. the Arkansas Board of Education, 529 F. Supp. 1255 (1982). The complete text of Judge Overton's opinion was published in Science 215 (19 February 1982): 934-43.

<sup>64</sup>Balanced Treatment for Creation-Science and Evolution-Science Act, Louisiana Revised Statutes of 1950, secs. 3701-3706 (1981).

<sup>65</sup>"Louisiana Creationism Bill Goes to Governor's Desk," Atlanta Journal, 9 July 1981, p. A21; "Creationists Awaiting the Word from Treen on 'The Beginning,'" New Orleans Times-Picayune/Stater-Item, 19 July 1981, sec. 1 pp. 1, 4.



Adrian G. Duplantier agreed to give Guste's suit priority.<sup>66</sup> U. S. District Judge Frank J. Polozola, who heard the case in Baton Rouge, declined to rule, stating that as a debate between the Louisiana Attorney General and the State Board of Education, the case should first be heard by a state court. The way was thus cleared for the ACLU suit to be heard in New Orleans, with Wendell Bird, Thomas Anderson and A. Morgan Brian assisting the defense.<sup>67</sup> Meanwhile, two legislators had filed repeal bills, which were unsuccessful, and Senator Keith, the law's sponsor, asked for its suspension until the legal challenges were resolved.<sup>68</sup>

Jack Wardlaw commented of this legal muddle that "Louisiana again finds itself a lonely outpost, holding out against the world." He described it, like Winston Churchill did another situation forty years ago, as "perhaps, the end of the beginning."<sup>69</sup>

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<sup>66</sup> Jack Wardlaw, "Creationism's 'Big Bangs,'" New Orleans Times-Picayune/States-Item, 6 December 1981, sec. 1, p. 26. This legal maneuvering was not affected by the January decision of Judge Overton in the Arkansas case; see "Louisiana Won't Quit on Creation Law, Guste Says," Times-Picayune/States-Item, 5 February 1982, sec. 1, p. 21.

<sup>67</sup> Ed Anderson, "Court Turns Aside ACLU Claim in Creationism Suit," New Orleans Times-Picayune/States-Item, 19 March 1982, sec. 1, p. 13.

<sup>68</sup> "Creationism Issue Still Touchy for Lawmakers," New Orleans Times-Picayune/States-Item, 15 April 1982, sec. 5, p. 2.

<sup>69</sup> Jack Wardlaw, "Creationism: End in Sight," New Orleans Times-Picayune/States-Item, 7 February 1982, sec. 1, p. 27.

### Creationism as Science

Although the modern crusade against evolution may have begun in response to the BSCS materials, opposition to Darwin's theory never really died out, even after the Scopes fiasco. A new approach to biblical literalism was suggested when Immanuel Velikovsky published Worlds in Collision in 1950.<sup>70</sup> This book attempted to explain the Old Testament miracles with the principles of astronomy--a science in which Velikovsky's competence was limited.<sup>71</sup> Velikovsky did not restrict his research to Judeo-Christian literature; he investigated legends from many primitive cultures. Although his works received serious notice from the general public for some years after publication, his catastrophic interpretation of celestial events recorded in scripture and his flawed understanding of physics and astronomy eventually brought his works into disrepute.<sup>72</sup>

Velikovsky was a physician, not a theologian. He made no assertions concerning the infallibility of scripture, treating it with the same detachment afforded the many other myths that he cited. In this respect he differed from the scientific creationists, who seek scientific documentation

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<sup>70</sup>Immanuel Velikovsky, Worlds in Collision (New York: Dell Publishing Co., 1950).

<sup>71</sup>Carl Sagan, Broca's Brain: Reflections on the Romance of Science (New York: Random House, 1979), Chapter II, part 7.

<sup>72</sup>Donald Goldsmith, ed., Scientists Confront Velikovsky (Ithaca, N. Y.: Cornell University Press, 1977).

for the events recounted in Genesis in order to justify their religious convictions.

One of the leading advocates of scientific creationism is Henry Morris, a graduate of Rice University who holds a doctorate in hydraulic engineering from the University of Minnesota. In 1951 Morris published The Bible and Modern Science, a treatise on the "scientific truths" that lie hidden in scripture awaiting man's interpretation. For example, Morris interprets Jeremiah 33:22: "The host of heaven cannot be numbered" as a scientific statement that the stars are innumerable. Similar pronouncements were made on meteorology in Ecclesiastes, hydrology in Job, bacteriology in Deuteronomy, and anatomy and physiology in Leviticus. According to Morris, Isaiah concluded that the earth was round when he said (in 40:22) "It is he who sitteth upon the circle of the earth." The first law of thermodynamics is stated in Hebrews (4:3) and the second law in Psalms 102.<sup>73</sup> In this way Morris claims that the Bible is really a science book, a view inconsistent with the theology of most major religious denominations today. Bruce Rahtjen, a Methodist theologian, writes that this method of biblical interpretation presumes that the biblical writer was a "crypto-scientist" who was really writing a message for the twentieth century in a code that his own people were not supposed to understand. Rahtjen sets out the position of many denominations today: The Bible is the word of God, not

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<sup>73</sup>Henry M. Morris, The Bible and Modern Science (Chicago: Moody Bible Institute, 1951), pp. 5-14.

God himself. It is a human document and should not be seen as inerrant. Genesis was never meant to be a scientific description of how the universe and man came to be.<sup>74</sup>

Biblical inerrancy, however, is the foundation of creationism. Morris documents the departure from scripture of the uniformitarianism of Lyell and the theory of evolution of Darwin.<sup>75</sup> That his objections are theological is never disguised. The theses set out in his early works are expanded in later treatises on evolution<sup>76</sup> and uniformitarianism.<sup>77</sup> Morris is vehement in his treatment of evolution, equating it to the curses of Satan and the basis for all the evils of the world, including "materialism, modernism, humanism, socialism, Fascism, communism and ultimately Satanism."<sup>78</sup>

Morris writes from a background of geology and hydrology to deny uniformitarianism because of its contradiction of the six days of creation and of the statement (in Hebrews 4:3) that creation was "finished," which he interprets to mean that these "processes used by God in creation are

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<sup>74</sup>Bruce D. Rahtjen, Biblical Truth and Modern Man (New York: Abingdon Press, 1968), pp. 66-67, 71.

<sup>75</sup>Morris, Bible and Science, pp. 17-18.

<sup>76</sup>Morris, Twilight.

<sup>77</sup>Henry M. Morris, ed., Scientific Creationism (San Diego: Creation-Life Publishers, 1974), Chapter 5.

<sup>78</sup>Morris, Twilight, p. 83.

not now in operation."<sup>79</sup> He advances the alternative theory that the geologic strata and fossil record were produced by the "Deluge" as described in Genesis and describes the effects such a universal flood would have, referring to biblical descriptions of the "canopy of waters," the "waters which were above the firmament," and the "waters which were under the firmament."<sup>80</sup> This explanation of planetary geology by catastrophism as a result of the "Noachian Deluge" persists in creationist texts although Morris' biblical references have been removed. The biblical foundations of creationist beliefs are established, and works of Morris and others dated through the 1960s and early 70s make no attempt to deny them.<sup>81</sup>

After the courts struck down the Tennessee law requiring the teaching of biblical creation in public schools, creationists intensified their attempts to make creation more scientific and less religious in order to promote their theories for secular instruction. At least two of their texts are published in dual editions: "public school" and "private school," the latter containing all the biblical and religious references omitted in the former.<sup>82</sup>

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<sup>79</sup>Morris, Studies in the Bible, p. 39.

<sup>80</sup>Whitcomb & Morris, Genesis Flood, pp. 71, 76.

<sup>81</sup>Paula G. Eglin, and Mildred W. Graham, "Creationism Challenges Geology: A Retreat to the Eighteenth Century," Journal of Geological Education 30 (January 1982): 15.

<sup>82</sup>Morris, ed., Scientific Creationism and Gish, Evolution The Fossils Say No! are two examples of textbooks with dual editions for public and private schools.

In denying a religious foundation, the creationists have created a dilemma for themselves by their insistence that science can prove the existence of a creator. If this proof is lacking, is the nonexistence of a creator implied? Writers of the conservative, literalist persuasion have objected to this reasoning. In Plain Truth, a publication that rejects the theory of evolution and is affiliated with a college that advertises this omission,<sup>83</sup> Sidney Hegvold writes that "scientific theory and creation belong in completely different disciplines." A scientific theory of creation must be subject to disproof, and this is not possible within the framework of fundamentalist interpretation of scripture. Hegvold deplores the establishment of evolution in the sciences and schools but objects to the recognition of certain views of creation as a "nonreligious" scientific theory.<sup>84</sup>

After the Arkansas law was passed, creationism attracted more attention from writers for religious publications. Sellers wrote in Christian Century that the creation story should be taught in schools as part of the general culture, but that the creationists should not be allowed to teach "creationism," and the biblical account is not science.<sup>85</sup>

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<sup>83</sup>Ambassador Bible College Correspondence Course (advertisement), Plain Truth 47 (April 1982): 13-14.

<sup>84</sup>Sidney M. Hegvold, "Now Some Want Creation Taught as 'Scientific Theory'!", Plain Truth 47 (March 1982): 7-9.

<sup>85</sup>James Sellers, "On Teaching Creation in the Schools," Christian Century 98 (23 December 1981): 1333-4.

Moore, writing from a creationist viewpoint, objected to the contention by the leaders of the movement that creationism stands by itself on scientific principles and does not require biblical documentation or faith to support it. The creationists are turning over to the state the responsibility for religious education when the Bible gives government no such permission. Finally, said Moore, creationism is denying the pluralism that offers an opportunity for all viewpoints to be considered. He evoked the Augustinian vision of the "city on a hill" wherein the inhabitants spread their Christianity by lifestyle and example, not by government decree.

The current debacle has cast aspersions on the intellectual integrity of the gospel, diverted enormous energy and resources with only minimal results, created an air of arrogance around many evangelical leaders, and compromised the consistency of the faith in the name of political expediency.<sup>86</sup>

Stevenson describes the struggle as political, not scientific or educational, and many other writers agree. Stevenson points out other elements in the Genesis creation story which are contradicted by science (flat earth, windows in the sky, ocean above the sky, etc.) yet are evaded by the creationists.<sup>87</sup> Harold Lindsell contrasts agnostic, naturalistic and theistic understandings of origins and

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<sup>86</sup>T. M. Moore, "Creationist's Complaint Against the Movement," Christian Century 99 (17 February 1982): 67.

<sup>87</sup>Dwight E. Stevenson, "The Beginning," The Disciple, 16 August 1981, pp. 8-10.

concludes that "special creationism" is the only answer that adequately explains man's soul: that imago dei that is not present in lower animals. The evolutionist cannot use the Bible as the source of his knowledge of origins, a proscription hardly unwelcome to the theistic evolutionist. Lindsell does not claim, however, that science should be used to enhance one's understanding of the Bible. He is content to accept the supernatural explanation, placing "the revelation of God above science."<sup>88</sup>

Jack Haas, president of the American Scientific Affiliation, takes the view that "the supporters of fiat creation really base their case on a narrow reading of Scripture and a flagrant ignoring of scientific evidence." The general tone of this discussion with two science professors at a "Christian" college is that although evolution should not be taught as "dogma," the Bible identifies the creator rather than providing an explanation of his method. Like Lindsell, Haas is willing to accept biblical miracles on faith and not seek scientific explanations.<sup>89</sup> The Jesuit magazine America editorialized that "All those who believe in God's intervention as a First Cause and as the Father of mankind cannot rejoice in the movement to teach creation as science."<sup>90</sup>

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<sup>88</sup>Harold Lindsell, "Where Did I Come From? A Question of Origins," Christianity Today, 17 June 1977, pp. 16-18.

<sup>89</sup>David Singer, "An Interview with Jack Haas and Richard Wright," Christianity Today, 17 June 1977, pp. 8-11.

<sup>90</sup>"God and Science," America, 26 April 1980, p. 351.



Gerald Skoog's account of the fundamentalist attack on the science curriculum<sup>91</sup> evoked responses from three creationists who insist that students should be allowed to consider both theories and make a choice. The letter writers made the arguments (1) that evolution must be accepted on faith and therefore is not science, (2) that evolution is only a theory, never verified, and cannot be classed with theories of Galileo, Newton, and Einstein, and (3) that evolution as a model of origins is simply another belief system and should be presented as such; an argument that, as Skoog points out, has been rejected by two different judges, who ruled that its exclusive presentation in biology classes does not violate the free exercise guarantee of the First Amendment.<sup>92</sup>

The writers of other letters agreed with Skoog's linking of the present activity of creationists with the rise of religious conservatism and the subsequent revival of the Modernist-fundamentalist controversy.<sup>93</sup> Tom Minnery concurs with Skoog that the biology curriculum is being subtly

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<sup>91</sup>Gerald Skoog, "The Textbook Battle over Creationism," Christian Century 97 (15 October 1980): 974-6.

<sup>92</sup>Allen A. Quain, (letter) Christian Century 97 (3 December 1980): 1203; Timothy Work, "In Theory," (letter) 97 (17 December 1980): 1251; William Tarbell, "Creation and God," (letter) 97 (10 December 1980): 1229.

<sup>93</sup>Temple F. Smith, "Evolution in Creation," (letter) Christian Century 97 (3 December 1980): 1203; Robert F. Crenshaw, (letter) 97 (10 December 1980): 1229.

changed by creationist influence.<sup>94</sup>

According to the ACLU, creationism is "biblical literalism in the guise of science."<sup>95</sup> An increasing number of theologians agree. In the face of desertion by the religious community, even some creationists appear to have discarded the pretense of creationism as science. In a letter to The Science Teacher Duane Gish wrote that "creation scientists readily acknowledge that creation is not a scientific theory".<sup>96</sup> However, Gish further states that evolution is not a scientific theory either, and this position is reflected in other responses to Stephen Brush's article pointing out the fallacies in the "scientific" support of creationist tenets such as the "young" earth, "incomplete" fossil record and "appearance of age."<sup>97</sup>

When faced with flaws in their scientific reasoning, creationists attack from their second line of defense: evolution isn't science either. Such a position may prove more difficult for teachers to handle than claims of scientific credibility for the Genesis creation story.

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<sup>94</sup>Tom Minnery, "Creationist Tenacity Secures Subtle Shifts in Science Texts," Christianity Today, 7 November 1980, p. 1364-65.

<sup>95</sup>Harry Cook, "Monkey Trial Redivivus," Christian Century 99 (6 January 1982): 6-7.

<sup>96</sup>Duane T. Gish, (letter) The Science Teacher 48 (October 1981): 20.

<sup>97</sup>Stephen G. Brush, "Creationism/Evolution: The Case Against Equal Time," The Science Teacher 48 (April 1981): 29-33. Letters opposing Brush are from William Landis, Charles C. Woolwine, Richard O. Pierce, and John W. Klotz in 48 (October 1981): 20.

### Evolution as Religion

The idea of evolution as a belief system pervades creationist thinking. Because nontheistic religions have accepted evolution, creationists have applied the label "atheistic" to any philosophy that recognizes evolution as a valid scientific theory.<sup>98</sup> Morris indicts all except strict biblical philosophies and mentions specifically those of Marx, Nietzsche, and John Dewey as "secular" religions.<sup>99</sup>

To creationists, evolution can only be explained as a belief system in opposition to a belief in scripture. Among Morris's many descriptions of evolution are these:

Evolution is a complete world-view, an explanation of origins and meanings without the necessity of a personal God who created and upholds all things.<sup>100</sup>

Evolution is a dogma incapable of refutation. . . Evolution is an authoritarian system to be believed.<sup>101</sup>

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.<sup>102</sup>

Morris agrees that the idea of evolution did not begin with Darwin; he credits a much older source even than

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<sup>98</sup>Henry M. Morris, "The Religion of Evolutionary Humanism and the Public School," Impact series no. 51, September, 1977, in Up With Creation, eds. Duane T. Gish and Donald H. Rohrer (San Diego: Creation-Life Publishers, 1978), p. 312.

<sup>99</sup>Morris, Troubled Waters, p. 33.      <sup>100</sup>*Ibid.*, p. 185.

<sup>101</sup>Morris, ed., Scientific Creationism, pp. 6, 7.

<sup>102</sup>Morris, Twilight, p. 83.

Anaximander and Empedocles: "how can we explain the . . . insistence that all things must have come about by evolution? . . . The answer is Satan!" Morris goes on to suggest that Satan developed the idea of evolution to justify his rebellion against God, used it to deceive Adam and Eve, and set in motion "a degenerate system of evolutionary pantheistic humanism."<sup>103</sup>

Duane Gish also portrays evolution as a religious philosophy,<sup>104</sup> implies a link between evolution and humanism, and quotes Julian Huxley and George Gaylord Simpson.<sup>105</sup> However, Gish is not as vehement as Morris in attributing Darwinism to Satanic machinations.

Creationists argue against evolution by on grounds that the theory is imperfect because of gaps in the fossil record,<sup>106</sup> that it is not demonstrable because of the time involved,<sup>107</sup> that it is statistically impossible,<sup>108</sup> and that it contradicts the second law of thermodynamics.<sup>109</sup>

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<sup>103</sup>Ibid., p. 75, 77, 81.

<sup>104</sup>Duane T. Gish, "Creation-Evolution," Impact series no. 4, in Creation: Acts--Facts--Impacts, eds. Henry M. Morris, Duane T. Gish, George M. Hillestad (San Diego: Creation-Life Publishers, 1974), p. 138.

<sup>105</sup>Gish, Evolution--The Fossils Say No!, pp. 25-26.

Morris, ed., Scientific Creationism, pp. 78-90.  
<sup>106</sup>

<sup>107</sup>Ibid., p. 9.

<sup>108</sup>Henry M. Morris, Duane T. Gish, George M. Hillestad, eds., "The Mathematical Impossibility of Evolution," in Creation, pp. 6-8.

<sup>109</sup>Ibid., pp. 37-46.

These criticisms of evolution have been countered in frequent articles by authors from the fields of science, education and the humanities.<sup>110</sup> For some years scientists refused to get involved with what they regarded as a strategy to draw them into a time-consuming defense of an established scientific principle against a metaphysical attack.<sup>111</sup> Recent inroads of creationists into secular colleges and teacher-training institutes and increasing equivocation in science textbooks have convinced scientists that such a defense is necessary if evolution is not to be banished forever from public school biology.<sup>112</sup> It is instructing to examine the emphasis placed on evolution by high school biology teachers and texts.

In 1942 the Union of American Biological Societies studied the position of the theory of evolution in the high school biology curriculum and found that of 3075 biology teachers, 1651, or 53.7 percent, presented evolution as a

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<sup>110</sup>Writers who have defended evolution against its creationist detractors are Catherine Callaghan, "Evolution and Creationist Arguments," American Biology Teacher 42 (October 1980): 422-27; Richard Alexander, "Evolution, Creation and Biology Teaching," American Biology Teacher 40 (February 1978): 91-104, 107; and Stephen Jay Gould, "Evolution is Both Fact and Theory," Today's Education 70 (September--October 1981): 70-72.

<sup>111</sup>John Skow, "The Genesis of Equal Time," Science 81 2 (December 1981): 54, 57-59.

<sup>112</sup>"Taking Time From Research," Scientific American 242 (June 1980): 74.

fundamental scientific principle.<sup>113</sup> A survey of high school biology teachers in New Jersey regarding their teaching of evolution revealed that their reasons for avoiding it were inadequate training, religious opposition, lack of time and personal conviction, in that order.<sup>114</sup>

Cornelius Troost reviewed the position of the theory of evolution in the high school biology curriculum and found it convenient to designate 1950 as a turning point in this curriculum development. The popularity of the Biological Sciences Curriculum Study (BSCS) in the period 1955--1960 contributed to a renewed emphasis on evolution as a guiding principle in high school biology.<sup>115</sup>

In the 1960s two eminent scientists, Julian Huxley<sup>116</sup> and George Gaylord Simpson<sup>117</sup> complained of the lack of emphasis on evolution by secondary educators. Simpson

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<sup>113</sup>Oscar Riddle, ed., The Teaching of Biology in Secondary Schools of the U.S.: A Report of Results from a Questionnaire (Union of American Biological Societies, 1942), pp. 69-76.

<sup>114</sup>Dean M. Laux, "An Inquiry Into the Teaching of Evolution in Biology Courses of 24 Public Secondary Schools of Bergen County, N. J., 1960-61," Research Abstracts Bulletin 55 (Montclair State College, 1963): 47-53.

<sup>115</sup>Cornelius J. Troost, "An Analysis of Factors Influencing the Teaching of Evolution in the Secondary Schools of Indiana" (Ph.D. dissertation, Indiana University, 1966), p. 107-115.

<sup>116</sup>Julian Huxley, "Evolution in the High School Curriculum," School Review 2 (Summer 1960): 164-175.

<sup>117</sup>George Gaylord Simpson, "One Hundred Years Without Darwin are Enough," Teachers College Record 62 (May 1961): 617-26.

considered the teachers to be the heart of the problem: They were poorly prepared, unwilling to accept evolution themselves, and constantly threatened by opposition from parents, administrators, and school boards. Simpson said:

The teachers are parts of the system that produces inadequate preparation, personal bias, and community prejudice. They cannot reasonably be expected to correct defects of which they are themselves both causes and effects. . . . The teacher who has been trained in a school with substandard staff and a watchful anti-scientific board and who has then gone to teach in just such another school is not going to start giving an unbiased and modern course in biology merely because he has listened to a few scientists whom he (or she) is not prepared either to understand or to respect.<sup>118</sup>

Another analysis of the teachers' problem was made by Shotwell, who credited the opposition of religious conservatives in the community with intimidating those high school biology teachers who were willing to pursue the topic.<sup>119</sup>

Troost compared large and small community biology teachers in Indiana in several areas of evolution teaching. He found significant differences in their belief that the development of life was related to evolution, those teachers in the larger community being more receptive to the idea. Credit hours in biology, but not years of experience, were related to the teachers' emphasis on evolution. Attendance

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<sup>118</sup>Ibid. p. 619.

<sup>119</sup>T. K. Shotwell, "The Problem of Evolution," American Biology Teacher 27 (December 1965): 765.

at National Science Foundation Institutes, use of BSCS materials, and a course in genetics also were positively correlated with emphasis on evolution given by the teacher. Self-rated religiosity and courses in historical geology did not influence evolutionary teaching. Troost's questionnaire contained questions designed to uncover misconceptions held by biology teachers concerning evolution. He found that 54 percent believed there was supernatural involvement in evolution, over 50 percent presented evolution as one of several theories, and only 12.4 percent believed that evolution contributes to an understanding of natural events. Furthermore, 65 percent of the teachers answered one or more cognitive questions incorrectly. Troost concluded that the gap between high school biology teachers and professional biologists had not yet been bridged.<sup>120</sup>

The presentation of evolution in biology textbooks has fared just as poorly. In 1979 Gerald Skoog surveyed the status of the theory of evolution in high school biology textbooks and found that emphasis on the topic increased from 1900 to 1950, when a reversal occurred. Introduction of the BSCS curriculum revived interest in evolution during the 1960s. In the 1970s this trend was again reversed, the textbooks being reworded to make statements about evolution more cautious and conciliatory. Of ninety-three textbooks surveyed (published during the period 1900--1977),

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<sup>120</sup>Troost, pp. 164-175.



eighty-seven contained explanations of evolution and six discussed "special creation" (Skoog's survey did not include the creationist text: Biology: A Search for Order in Complexity).<sup>121</sup>

In the decade of the 1970s the National Association of Biology Teachers (NABT) was the primary source of protests against the tactics and influence of creationists. After many articles about creationism appeared in The American Biology Teacher, a compendium on the evolution/creationism controversy was published that gave the most complete review of actions up until that time.<sup>122</sup> Henig reviewed the creationists' tactics in 1979 and suggested that a proposal to include creationism in New York schools might influence revision of the biology curriculum.

As creationist pressure for textbook revision increased, other professional organizations of scientists became concerned. In 1972, spurred by a California controversy over the inclusion of creationism in new science textbooks, the National Academy of Sciences and the Commission on Science Education of the American Association for the

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<sup>121</sup>Gerald Skoog, "Topic of Evolution in Secondary School Biology Textbooks: 1900--1977," Science Education 63 (May 1979): 621-40.

<sup>122</sup>Jerry P. Lightner, ed., A Compendium of Information on the Theory of Evolution and the Evolution--Creationism Controversy (Reston, Va.: National Association of Biology Teachers, 1977).

<sup>123</sup>Robin Henig, "Evolution Called a 'Religion,' Creationism Defended as 'Science,'" BioScience 29 (September 1979): 513.

Advancement of Science (AAAS) adopted resolutions opposing the acceptance of creationist accounts as part of scientific theory.<sup>124</sup> The National Science Teachers Association (NSTA) also took an official position opposing "Inclusion of Nonscience Theories in Science Instruction."<sup>125</sup>

Beginning in the 1980s other well-known scientists became concerned about the inroads made by the creationists into the science curriculum. Isaac Asimov crossed swords with Duane Gish in a debate on the pages of Science Digest<sup>126</sup> and wrote an essay for the New York Times warning of the consequences of turning science education over to the religionists.<sup>127</sup> Stephen Jay Gould, described as a symbol of scientists' opposition to creationism,<sup>128</sup> wrote that "The enemy is not fundamentalism, it is intolerance."<sup>129</sup> Carl Sagan defended evolution to the largest audience ever

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<sup>124</sup>"Resolutions Adopted by the National Academy of Sciences and the Commission on Science Education of the American Association for the Advancement of Science," BSCS Newsletter no. 49 (November 1972): 17. These resolutions are also reprinted in American Biology Teacher 35 (January 1973): 35-36, and in the Compendium, pp. 49-51.

<sup>125</sup>"NSTA's Position on 'Inclusion of Nonscience Theories in Science Instruction,'" Science Teacher 43 (November 1976): 39.

<sup>126</sup>Isaac Asimov and Duane Gish, "The Genesis War," Science Digest, October 1981, pp. 82-87.

<sup>127</sup>Isaac Asimov, "The 'Threat' of Creationism," New York Times, 28 June 1981, sec. 6, p. C9.

<sup>128</sup>James Gorman, "Scientist of the Year: Stephen Jay Gould," Discover, January 1982, pp. 57-63.

<sup>129</sup>Stephen Jay Gould, "A Visit to Dayton," Natural History 90 (October 1981): 18.

assembled for public television when he produced the series Cosmos about the origin and evolution of the universe. "Evolution is a fact," said Sagan emphatically, and millions of high school students across the nation listened.<sup>130</sup> It is interesting that the filmstrips produced from the series carry a comment that Dr. Sagan's views on evolution are unequivocal and that the teacher may wish to make a counter-presentation on creationism.<sup>131</sup>

Stanley Weinberg advises biologists and other scientists to appear before legislative committees, Boards of Education and textbook selection committees.

Arguing with the creationists is a waste of time. . . . The defense of evolution needs two additional components: first, a public education program; second, frank political action.<sup>132</sup>

Michalsky urges confrontation of the "media messiahs and classroom evangelists" whose real goal, he says, is "to smuggle into the classroom religious views disguised as science."<sup>133</sup> Godfrey states that the creationists

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<sup>130</sup>William J. Harnack, "Carl Sagan: Cosmic Evolution vs. the Creationist Myth," The Humanist 41 (July--August 1981): 5-11.

<sup>131</sup>"Evolution: The Four Billion Year Legacy," Cosmos Filmstrip Series (Wilmette, Ill.: Films Incorporated, 1981), Teacher's Guide, p. 2.

<sup>132</sup>Stanley L. Weinberg, "Two Views on the Textbook Watchers," American Biology Teacher 40 (December 1978): 545.

<sup>133</sup>Walt Michalsky, "The Masquerade of Fundamentalism," The Humanist 41 (July--August 1981): 15, 17.

organizations have created "an artificial dichotomy between two models--evolution and creation," and that their real goal is not to test the two models or even to accord them equal time, but to destroy the credibility of evolution in the public mind.<sup>134</sup>

Writers in fundamentalist publications insist that evolution is "the new state religion"<sup>135</sup> while scientists increasingly assert that evolution is a fact and that only the details of its mechanism are debatable.<sup>136</sup> Neither side has had any success in convincing the other, and the argument continues to polarize society. An example of the dichotomy between science and religion dividing the citizens and churches of a community may be seen in the experience of one Georgia school system with the advocates of creationism.

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<sup>134</sup>Laurie R. Godfrey, "The Flood of Antievolutionism," Natural History 90(June 1981): 4, 6, 9-10.

<sup>135</sup>Jeff Calkins, "The New State Religion," Plain Truth, October 1980, reprinted in The Humanist 41 (March--April 1981): 6.

<sup>136</sup>Lewontin, "Evolution/Creation Debate," p. 559.

### A Case Study

In a critique of the trial held in Arkansas over the constitutionality of the "Balanced Treatment of Creation-Science and Evolution-Science Act," Gene Lyons claimed that "Creationism was mortally damaged by the Little Rock spectacle." Duane Gish, said Lyons, seems anxious to avoid state legislatures and to aim creationist influence at local school boards instead.<sup>137</sup> If Lyons is correct, local school boards may come under increasing pressure from fundamentalists to include creationism in the science curriculum. The experience of one Georgia public school system provides an example of the tactics and results that that can be expected.

In the summer of 1978 a group called "Citizens for Another Voice in Education" (CAVE), encouraged by sympathetic clergy,<sup>138</sup> persuaded two school board members from a suburban school district near Atlanta that "scientific creationism" was a valid scientific alternative to the evolutionary approach taught in science classes.

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<sup>137</sup>Gene Lyons, "Repealing the Enlightenment," Harper's 264 (April 1982): 38-40, 73-78.

<sup>138</sup>On March 17--20, 1974, A Bible Conference on "Science and Creation" was held at the Roswell Street Baptist Church, Marietta, Georgia. Dr. Henry Morris, described as "one of the outstanding scientific minds of this century," was the featured speaker (Letter, Rev. Nelson L. Price to the author, 4 March 1974). This meeting was reported by Morris in The Battle for Creation as having an attendance of 1650 (p. 159). During 1978, Judge Braswell Deen of the Georgia Court of Appeals spoke to many groups advocating the legality of teaching creationism in the public schools.

Evolutionary propagandizing was begun in the fourth grade, said a board member, with books that described the earth as forming from a ball of gas and dust. After quoting at length from science textbooks, he introduced a resolution requiring the teaching of "scientific creationism" whenever the subject of "origins" was encountered. The seven-member board passed the resolution unanimously.<sup>139</sup>

This action received little publicity and consequently attracted little opposition. However, teachers on the science textbook selection committee reviewed the books recommended for teaching "scientific creationism" and rejected them as unscientific, poorly written, incomplete, and inadequate for presenting any scientific concepts.<sup>140</sup> Nevertheless, the board member insisted that the books be purchased and placed in the schools and that teachers be required to teach from them. An order was placed with the

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<sup>139</sup> Cobb County Board of Education, minutes of meeting on 23 September 1978.

<sup>140</sup> The author was the chairman of this textbook selection committee and collected the evaluations made by the teachers. The only consistently positive rating the books received was that the reading level was appropriate. Some of the comments on Biology: A Search for Order in Complexity were: "A classical approach often incorrect factually. Out of date in many places and most of all incomplete." "Electrons do not orbit (the) nucleus like planets. Definition of 'substance' (is) confined to molecules--(it) should also include ionic substances. Laws of Thermodynamics (are) misstated." This book received an average rating of 83 out of a possible 200 compared to 188, 180, 164 and 155 for four other biology books evaluated.

Creation-Life Publishers for Origins: Two Models for high schools and The Origin of Life for middle schools, plus numerous reference books including Morris's Scientific Creationism and Gish's Evolution--The Fossils Say No! A committee of teachers was impaneled to write a pamphlet to be sent home to parents explaining the school board's policy.<sup>141</sup> When the policy and its implementation were explained to the science teachers,<sup>142</sup> the majority were violently opposed.<sup>143</sup> A campaign ensued in which teachers insisted that a small group of religious conservatives was attempting to force their views on school children, and teachers were in turn called "atheistic" by spokesmen for the creationists. The Atlanta newspapers picked up the story; the community exploded in controversy. Teachers, parents, preachers and citizens from both sides addressed

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<sup>141</sup>"With Respect for All--A Position on the Question of Origin" (Marietta, Ga.: Cobb County Public Schools). This pamphlet was distributed to all biology students in the county schools in September 1979.

<sup>142</sup>"Curriculum Guide Supplement for Creation Education" (Marietta, Ga.: Cobb County Public Schools, 25 July 1979). This document includes a brief history of the resolution, a summary of the position of scientific creation (taken from the works of Henry Morris), instructions for the teacher about when and how to use the creationist materials, a list of the books purchased and a copy of the resolution.

<sup>143</sup>Susan Milstein, "Tension Builds Over Origin Issue," Atlanta Journal-Constitution Cobb Extra, 6 September 1979, p. 12.

the school board.<sup>144</sup> The ACLU met with parents and teachers who insisted that their rights had been violated. The ministerial association met with an Appellate Court judge who insisted that creationist teaching was constitutional, and necessary for saving youth from the ravages of permissiveness caused by the teaching of animal origins and "barnyard beginnings."<sup>145</sup> Television commentators met with anyone who would talk to them on camera.<sup>146</sup> Reporters from as far away as California interviewed the protagonists,<sup>147</sup> and television vans crowded the parking lot on school board meeting nights.

The pivotal issue proved to be that the resolution was not the result of a local effort but was identical with one written by Henry Morris and circulated by the Institute for

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<sup>144</sup> Susan Milstein, "Creation Resolution Debate Continues in Cobb Schools," Atlanta Journal-Constitution Cobb Extra, 4 October, 1979.

<sup>145</sup> Susan Milstein, "Judge Says Crime Stems from Evolution Teaching," Atlanta Journal-Constitution Cobb Extra, 15 November, 1979.

<sup>146</sup> "Creation or Evolution?" was a series produced by Paul Crawley for WXIA-TV Atlanta. Three episodes were shown during the last week of December, 1979. The programs included films of the Scopes trial, scenes from the Georgia Legislature and the Cobb County Board of Education meetings, and interviews with students, teachers, ministers, and legislators. Part of the series was later incorporated into a segment of ABC's "20/20" program on creationism shown 3 February 1981. John Sheahan of CBS also filmed scenes from the Board of Education meetings that were shown on CBS News 6 March 1980, two days before the Georgia Legislature avoided a vote on House Bill 690, allowing it to die for the 1979--1980 session.

<sup>147</sup> Michael Scott-Blair, "Creationists Seek Say in Schools," San Diego Union, 14 October, 1979.



Creation Research.<sup>148</sup> The discovery that the resolution was promoted by "outsiders" disturbed board members more than any second thoughts on its educational advisability or constitutionality.<sup>149</sup> At a memorable meeting it was proposed to "implement" the resolution by excusing any objecting student from the biology course requirement and providing an elective course in "origins," outside the science discipline, that would provide an opportunity for the student to explore "scientific creationism" in addition to other creation stories.<sup>150</sup>

That the creationists lose interest when compromise is effected is evident from the subsequent history of the "origins" course. This text, developed by a committee of science and social studies teachers, related every available

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<sup>148</sup>The resolution appeared in Impact series no. 26, a pamphlet published by the Institute for Creation Research (ICR) under the byline of Henry M. Morris, who suggested in a "Background and Explanation" that "it would be better not to mention ICR at all in connection with it, so that the officials involved will realize that it is their own constituents who are concerned with the issue." A later issue of the Impact series (no. 71, May 1979) claimed that the resolution was prepared by attorney Wendell R. Bird and published in the Impact series nos. 69 and 70. The resolution is reprinted in vol. 2 of the Acts--Facts--Impacts collection: The Battle for Creation, pp. 104-7.

<sup>149</sup>Susan Milstein, "Creation Resolution Tied to San Diego," Atlanta Journal-Constitution Cobb Extra, 20 September 1979.

<sup>150</sup>Susan Milstein, "School Board Adopts New 'Origins' Policy," Atlanta Journal-Constitution Cobb Extra, 20 December 1979, p. F10.

creation story except, surprisingly, the one in Genesis. The section on "scientific creationism," written by ICR's Robert Kofahl, referred to the biblical creator and pointed out how certain scientific discoveries were in accord with the Genesis account, but the creation story of the Bible was never stated.<sup>151</sup> Instead, the text recounted the Babylonian creation epic, the Enuma Elish, which biblical scholars agree influenced the Hebrew writers to some extent.<sup>152</sup> The course was taught to twenty-two students at one high school in the system during the fall of 1980. When publicity subsided, interest waned, and "Comparative Theories of Origins" was dropped from the curriculum.<sup>153</sup> Today the course catalog identifies all courses dealing with the origin of man in order that parents may claim religious objections if they wish to excuse their children from them.<sup>154</sup> There has been little interest in avoiding evolutionary biology. The CAVE group, if still in existence, has remained silent. The local newspaper editorialized mildly against the decision in Arkansas

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<sup>151</sup>"Comparative Theories of Origin," (Marietta, Ga.: Cobb County Public Schools, 1980).

<sup>152</sup>Charles F. Kraft, Genesis: Beginnings of the Biblical Drama (New York: Woman's Division of Christian Service Board of Missions, The Methodist Church, 1964), pp. 30-31.

<sup>153</sup>Jim Galloway, "Creationism an Edsel of an Idea," Atlanta Journal-Constitution Cobb Extra, 26 February 1981, p. F3.

<sup>154</sup>Cobb County High School Course Catalog (Marietta, Ga.: Cobb County Public Schools, 1982), pp. 47, 63. The courses so identified are Biological Frontiers 101A and 101B; General Biology 102A and 102B, World Geography "A" and World History "A".

but the two board members who started the controversy were defeated in a subsequent election.<sup>155</sup> Would the story have been different if the teachers had not objected, if the board member had written his own resolution, or if the media had been indifferent or unsympathetic? We may never know until the scenario is played in school board meetings across the country.

Walter Lippman wrote in American Inquisitors that it is important to take such an assault on education seriously and not treat it as "a farce which would soon break down through its own inherent absurdity."<sup>156</sup> He urged teachers and administrators to resist the bullying of ignoramuses and "stand up and fight."<sup>157</sup> This experience of one school system would suggest that compromise is unacceptable, and that only resistance is effective.

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<sup>155</sup>"Creation Science: Arkansas Ruling Puzzling" (Editorial), Marietta (Georgia) Daily Journal, 6 January 1982, p. A4.

<sup>156</sup>Lippman, p. 9.

<sup>157</sup>Ibid., p. 34.

### CHAPTER III

#### METHODOLOGY

This chapter includes the hypotheses, experimental design, statistical treatment, definitions and limitations. The design of the questionnaire and its validation are described and the population and sample selection outlined.

#### The Hypotheses

Because interaction between teacher and student is an influential factor in education at the secondary level, the attitude of the teacher toward controversial elements of the curriculum contributes to the acceptance of these elements by the student. The teacher's religious beliefs, educational background, and philosophy might be expected to correlate with the teacher's attitudes and consequently the student's decisions. The characteristics of the surrounding community might also be related to teacher attitude. These factors, then, are of interest in this study.

#### Hypothesis One

The attitude of Georgia science teachers toward teaching creationism is not related to the self-rated religiosity of the teacher.

### Hypothesis Two

The attitude of Georgia science teachers toward teaching creationism is not related to the liberality or conservatism of the teacher's philosophy of religion.

### Hypothesis Three

The attitude of Georgia science teachers toward teaching creationism is not related to the teacher's understanding of the relation of evolution to high school courses in science.

### Hypothesis Four

The attitude of Georgia science teachers toward teaching creationism is not related to the teacher's familiarity with the creationist movement and its literature.

### Hypothesis Five

The attitude of Georgia science teachers toward teaching creationism is not related to the amount of controversy creationism has generated in the community.

### Hypothesis Six

The attitude of Georgia science teachers toward teaching creationism is not related to the size community the school represents.

### Hypothesis Seven

The attitude of Georgia science teachers toward teaching creationism is not related to the academic degree held by the teacher.

### Hypothesis Eight

The attitude of Georgia science teachers toward teaching creationism is not related to the age of the teacher.

### Hypothesis Nine

The attitude of Georgia science teachers toward teaching creationism is not related to the length of the teacher's professional experience.

### Hypothesis Ten

The attitude of Georgia science teachers toward teaching creationism is not related to the area of the teacher's specialization in science.

## The Research Design

The survey was conducted by mail with a Likert-type questionnaire. A stratified random sample of science teachers was drawn from four community sizes selected by school enrollment figures. Statistical analyses employed the Statistical Package for the Social Sciences (SPSS) program available with Georgia State University's computer.

### The Questionnaire

A questionnaire was developed in which teachers were asked to agree or disagree with forty-one questions. Eleven of these questions were designed to determine the teachers' attitude toward creationism, and at least four questions were assigned to each of these other areas of interest:

1. Familiarity with creationism
2. Self-rated religiosity
3. Present religious beliefs
4. Opinions about the importance of evolution in the science curriculum

5. Activity, influence and impact of the advocates of creationism in the local community.

Table 1 lists the areas studied, the numbers of the related questions, and the direction of responses. Questions were worded so as to offer both negative and positive choices for the same attitude, and a "don't know" option was provided. Questions assigned to each area were not sequential but were arranged in the order that a logical train of thought might follow. The questionnaire solicited information on age, academic degree, length of teaching experience, and area of specialization.

A pilot study was carried out with fifty-six Georgia science teachers. A correlation study was made of attitude toward creationism with the positions of the teachers in the five other areas. The results indicated that respondents could be characterized by scores in the proposed areas. Many of the teachers responding to the survey had attitudes toward creationism that were known, and their attitudes correlated with their scores related to approval or disapproval of teaching it. By making use of biographical information, statistical analysis could be made of teacher characteristics with attitude. From the pilot study results it was concluded that the questionnaire provided adequate discrimination in the six areas studied and that the results could be treated statistically.

This statewide survey inquired about the practices of teachers in presenting creationism and explored the pressures exerted on teachers by administrators, school

TABLE 1  
AREAS SURVEYED BY QUESTIONNAIRE

Area	Questions	Low score	High score
1. Familiarity with creationism	1, 2, 3, 4, 5, 6	Familiar	Unfamiliar
2. Attitude toward teaching creationism	8, 9, 10, 11, 13*, 14*, 15, 34,* 39,* 40, 41	Favor teaching creationism	Oppose teaching creationism
3. Religiosity	17*, 19, 21, 22	Religious	Not religious
4. Liberal/conservative attitude toward religion	18, 21, 23*, 24, 25*, 31	Conservative	Liberal
5. Cognizance of importance of evolution in teaching science	27, 28, 29, 30*, 35, 38	Not cognizant	Cognizant
6. Community involvement in creation/evolution controversy	2, 3, 7, 12, 16, 26, 32, 33	Not a controversy in locality	Probably a controversy in locality

\* indicates questions on which scores were reversed



boards, and other community elements. The teacher was asked how creationism should be presented, if at all, and how much opposition he or she would make if required to teach it. The respondent was questioned about present practices in teaching evolution or creationism and what forces were influential in any decision made about this teaching. The questionnaire contained a total of fifty questions. A copy may be found in Appendix I.

### The Sample

The sample consisted of 128 educators teaching the scientific disciplines in Georgia public secondary schools.

Included in the population were secondary science teachers in public school systems. Excluded from the study were administrators, supervisors, college teachers, and support personnel such as State Department of Education employees. Although opinions of these educators might be of interest, direct involvement with students in a classroom situation is a powerful determinant of attitudes about the presentation of controversial subject matter. Elementary and middle school teachers were excluded because biology, as a rule, is not taught at this level.

There are 187 public school systems in Georgia. Their student enrollments and number of teachers employed were obtained from the Georgia State Department of Education.<sup>1</sup>

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<sup>1</sup>1982 Georgia Public Education State and Local Schools and Staff (Atlanta: Georgia Department of Education, November 1981).

The schools were categorized according to average daily attendance (ADA) figures for 1980--81, which were assumed to be an estimate of community size.<sup>2</sup> The following guidelines were used to classify the school systems by community size:

1. Urban: over 20,000 ADA
2. Small town: 8000--20,000 ADA
3. Suburban: counties surrounding Atlanta, which are Cobb, Gwinnett, Clayton and Fulton Counties
4. Rural: less than 8000 ADA

City school systems were included in the counties of which they are a part. An exception is the city of Atlanta, which is classed as urban while its county, Fulton, is included in the suburban category.

The total public school ADA for the state of Georgia is 988,602, of which 40 percent is rural, 29 percent urban, 19 percent small town and 12 percent suburban by the criteria stated above. The number of teachers in the sample were selected in this same proportion of the population. From a list of all secondary schools in each population strata<sup>3</sup> school names were drawn by random numbers. The Southern Association of Schools and Colleges maintains a list of certified teachers in all accredited schools in the state. From this list were selected those full-time science teachers holding certification in biology, chemistry,

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<sup>2</sup>Facts and Trends in Georgia Public Schools (Atlanta: Georgia Department of Education, 1981), pp. 17-18.

<sup>3</sup>Local Schools and Staff, pp. 30-163.

physics, general science, or "science," (a broad field category), for each high school drawn for the sample.

According to the Georgia Department of Education there are 17,494 high school teachers in Georgia.<sup>4</sup> It is estimated that ten percent of the teachers are science certified, giving an estimated population of 1750 public school secondary science teachers. Three hundred questionnaires, representing seventeen percent of the population, were distributed by community size, as shown in Table 2. A questionnaire was mailed to each certified science teacher at the selected schools. The envelopes were be coded by community size, but had no other identifying marks in order to insure anonymity.

TABLE 2  
DISTRIBUTION OF QUESTIONNAIRES

Category	Number Sent	Percent of Total
Urban	89	30
Suburban	37	12
Small town	61	20
Rural	113	38
Total	300	100

<sup>4</sup>Local Schools and Staff, pp. 30-163.

### Statistical Treatment

Programs were devised on Georgia State University's Univac 90/80 computer for computing scores on the six questionnaire areas defined and analyzing the results with the SPSS capability.

Testing of the hypotheses was carried out by the chi-square procedures listed in Table 3. The questions posed in the problem statement were analyzed by frequency and chi-square procedures.<sup>5</sup>

### Definition of Terms

Creation-Science: The definition of creation-science is supplied by Act 590 of the Arkansas General Assembly (page 2, lines 7-16), Senate Bill No. 86 of the Louisiana Legislature (page 4, lines 7-17) and House Bill 690 of the Georgia General Assembly, 1981--82 (lines 130-149).<sup>6</sup> The

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<sup>5</sup>Cochran, William G., and Cox, Gertrude M., Experimental Design (New York: Wiley, 1957), 2nd ed., pp. 74-75. It should be noted that the chi-square analysis available through the SPSS program provides cell frequencies and total frequencies.

<sup>6</sup>Act 590, Ark. Stat. Ann. No. 80-1663 (1981); Balanced Treatment for Creation-Science and Evolution-Science Act, Louisiana Revised Statutes of 1950, secs. 3701-3706 (1981); Balanced Treatment for Creation-Science and Evolution-Science Act, H. B. 690, General Assembly of Georgia, 1979-81.

TABLE 3  
STATISTICAL PROCEDURES FOR TESTING OF HYPOTHESES

Hypothesis	Procedure
The attitude of Georgia Science teachers toward teaching creationism is not related to the:	Chi-Square analysis of attitude toward creationism vs. scores on the dimensions:
1. self-rated religiosity of the teacher	1. self-rated religiosity
2. liberality of the teacher's philosophy of religion	2. liberal-conservative views of religion
3. teacher's understanding of the relation of evolution to high school courses in science	3. understanding of the importance of evolution to science
4. teacher's familiarity with the creationist movement	4. familiarity with the creationist movement
5. amount of controversy creationism has generated in the community	5. amount of controversy generated in the community
	Chi-square analysis of attitude toward creationism vs.:
6. size community the school represents	6. community size
7. teacher's academic degree	7. teacher's academic degree
8. teacher's age	8. teacher's age
9. length of teaching experience	9. length of teaching experience
10. teacher's area of specialization	10. area of specialization

wording is the same in all three:

'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.

Creationism: Although the creationists connect creationism with science by calling it "scientific creationism" or "creation-science," the term "creationism" has persisted. This term suggests broader application, requiring simply faith in a "creator" whose methods and time-frame are unspecified. In this study, "creationism" is used in the same sense as "scientific creationism" and "creation-science," signifying the belief in a sudden, relatively recent creation of the universe in its present form.

Creationist: Many people describe themselves as "creationists" through belief in a creator but do not express a belief in the literal and invariant truth of the Bible or advocate its scientific infallibility. Because today's creationists reject believers in what they call "theistic evolution," we will do the same. A creationist, then, is a believer in, or (adjective) describing the

beliefs in, the requirements for membership in the Creation Research Society:

1. . . . the account of origins in Genesis is a factual presentation of simple historical truths.
2. All basic types of living things, including man, were made by direct creative acts of God during the Creation Week described in Genesis.
3. The great Flood described in Genesis . . . was an historical event, worldwide in its extent and effect.<sup>7</sup>

Evolution is the theory that "all living things on earth are here as a result of descent, with modification, from a common ancestor." Further, evolution "tells us that species are not fixed, unchanging things but have, on the contrary, evolved through a process of gradual change from preexisting, different species."<sup>8</sup>

Natural selection is a mechanism proposed by Charles Darwin that explains evolutionary change as adaptation of an organism to its environment by preferential survival of the strongest and most well adapted organisms, which passed on favorable traits to offspring.

Darwinism includes both the theory of natural selection and the concept of evolution of species as described by Charles Darwin in The Origin of Species (1859) and The Descent of Man (1871).

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<sup>7</sup>"Constitution and By-Laws of the Creation Research Society," Creation Research Society Quarterly (September 1971): 151.

<sup>8</sup>John W. Kimball, Biology (Reading, Mass.: Addison-Wesley Publishing Co., 1978), 4th ed., p. 576.

Microevolution is the development of variations of organisms within one species that may result in changes within a population.

Macroevolution is the development of a new species from another; gross changes that involve "the origin of new species and the establishment of higher taxonomic patterns."<sup>9</sup>

High School: For the purpose of this study, a high school is defined as one that includes grades 10--12. Many high schools included lower grades of 8, 9, and sometimes 7, but unless grades 10--12 were included a school was classed as a middle school or junior high school.

Science Teacher: A high school teacher holding Georgia certification in one or more of these fields: science, general science, physical science, biology, chemistry, or physics, and teaching in one or more of these fields during the major portion of the day.

### Limitations

#### The Sample

The study was limited to public schools and should not be generalized to private schools, which, although not assumed to be rejecting evolution in favor of creationism, are not subject to First Amendment restraints.

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<sup>9</sup>Roger Lewin, "Evolutionary Theory Under Fire, Science 210 (21 November 1980): 883-87. See also Jerry Adler and John Carey, "Is Man a Subtle Accident?," Newsweek, 3 November 1980, pp. 95-96.



The designation of urban/suburban/small town/rural is based on school enrollment figures. Any category selected by school population size alone might have other demographic characteristics more representative of another category. For example, a rural school system with a very large enrollment would be placed in a "small town" category. Therefore, the community size selection must be regarded as arbitrary, although this grouping does seem to correspond with known characteristics of the communities used.

#### The Bias

It is difficult for a science teacher to read the creationist books and deal with creationists in antagonistic situations such as school board meetings and political confrontations and not acquire a certain combativeness. Nevertheless, every effort was made to keep the bias of the writer from appearing in the questionnaire and to avoid presenting creationism in an unfavorable light.

#### The Scope

This study was not intended to supply motives for the creationists. Nelkin<sup>10</sup> and Bates<sup>11</sup> have done this admirably, and other authors have investigated the underlying political and social causes of the movement.

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<sup>10</sup>Dorothy Nelkin, "The Science-Textbook Controversies," Scientific American 234 (April 1976): 33-39; Science Textbook Controversies.

<sup>11</sup>Bates, pp. 72-83.

Whether creationism is a unique philosophy that stands alone or whether it is another branch of the religious political right is for the sociologists to determine. Therefore there was no treatment of any connection between creationists and the conservative religious groups that are attempting to influence society today.

## CHAPTER IV

### RESULTS OF THE SURVEY

The historical purpose of this study was to document instances of the teaching of creationism in Georgia public schools. That creationism is being taught in Georgia is indicated by responses from 34 teachers who taught both creationism and evolution. Their reasons for doing so are summarized in Table 12, p. 93.

A second purpose of the study was to survey teachers about creationist activity in their communities and about their opinions of creationism in the curriculum, and to investigate relationships between their attitudes toward creationism and various characteristics. The results of this part of the survey begin on page 82.

#### Response and Respondents

The questionnaire was sent to 300 certified science teachers at 62 high schools in Georgia. The schools were selected by random numbers from four community sizes, and all science teachers at each school selected were queried. The return rate was 32 percent, representing 128 responses. A follow-up letter to department heads at each school drew only a few additional responses. The proportion of responses was slightly higher from school districts in rural and suburban communities. However, a comparison of the community size proportions in the selected sample with the

percentage of responses received in each category indicated that in no community group were the two proportions more than four percentage points apart, as shown in Table 4.

TABLE 4  
RESPONSE RATE IN DIFFERENT SIZE COMMUNITIES

Community	Questionnaires Sent		Responses Received		
	Number	Percent of Total	Number	Percent Response	Percent of Total
Rural	113	38	53	47	41
Small town	61	20	21	34	16
Suburban	37	12	19	51	15
Urban	89	30	35	39	27
Total	300	...	128	...	...

Seventy percent of the respondents had backgrounds primarily in life science, 66 percent had advanced degrees, and 59 percent had been teaching ten years or more. Characteristics of the respondents are summarized in Table 5.

#### Answering The Questions

Question 1: How many teachers are familiar with the creationist movement?

Virtually all (97%) of the teachers responding were familiar with the term "creation-science." Only one respondent admitted to being unfamiliar with the term. Considerably fewer respondents had read articles and examined the texts, as shown in Table 6, page 83.

Of all the questions, the one about familiarity with creation-science had the highest positive response. This

TABLE 5  
CHARACTERISTICS OF RESPONDENTS

Educational Level	Percent of Respondents	Years Experience	Percent of Respondents
Bachelors	34	Less than 10	41
Masters	55	10 to 20	41
Specialist	10	More than 20	18
Doctorate	1		
Science Background	Percent of Respondents	Age	Percent of Respondents
Life science	70	Under 25	6
Physical Science	16	26--35	41
		36--45	27
Both	14	46--55	20
		Over 55	6

TABLE 6  
RESPONDENTS' FAMILIARITY WITH CREATION SCIENCE

Question	Percent of Respondents		
	Agree	Undecided	Disagree
Familiar with the term "creation-science"	97	2	1
Familiar with articles about creation-science	84	5	11
Have examined creationist texts	45	20	35
Followed the progress of House Bill 690 <sup>a</sup>	52	7	41

<sup>a</sup>A 1979--80 legislative proposal to give creation-science equal time with evolution in Georgia public schools.

suggests that non-respondents may have been teachers unfamiliar with the creation-science controversy.

Question 2: How many teachers approve of including creationism in science courses, and how many would refuse to teach it if it were required? Is any biographical factor related to their position?

Using a composite score on eleven questions designed to indicate approval of creationism, 25 percent approved of teaching creationism, 52 percent disapproved, and 23 percent were undecided. A summary of responses to questions in this category is given in Table 7, page 85.

Although a majority of respondents disapproved of teaching creationism, a minority (8 percent) would actively oppose inclusion of creationism in science courses. Community size was not significantly associated with this decision, nor was the area of scientific expertise or age of the teacher (see Table 8, page 86). Educational level was not related to the decision to teach creationism, although the percent of refusals to teach creationism was higher among those with advanced degrees (page 87).

Eighty percent of teachers who would refuse to teach creationism had 10--20 years of experience, although those at this experience level were only 41 percent of the total sample. Teachers with less than ten years experience made up another 41 percent of the sample but made up only 10 percent of those who would refuse to teach creationism. On the other hand, 10 percent of those who would refuse had twenty or more years of experience, although these comprised 18

TABLE 7

## RESPONDENTS' ATTITUDES TOWARD CREATIONISM

Statements Favoring Creationism	Percent of Respondents		
	Agree	Undecided	Disagree
Creation-science should be included in biology courses.	25	11	64
Creation-science should be included in any courses dealing with the origin of man.	30	14	56
Creation-science should be included in any courses dealing with the origin of the earth and the universe.	30	11	59
If teaching creation-science were favored by a majority in the school district, it should be included in the curriculum.	39	17	44
Statements Opposing Creationism	Percent of Respondents		
	Agree	Undecided	Disagree
Creation-science is a means of introducing a sectarian religious doctrine into the public schools.	55	24	21
I am opposed to teaching creation-science in science courses.	52	14	34
I am opposed to teaching creation-science anywhere in the curriculum.	41	15	45
I would oppose giving equal time to creation-science no matter what the consequences to myself.	32	24	44

percent of the total. It is concluded that length of teaching experience is related to a teachers' decision whether or not to teach creationism (see page 86).

Teachers with more experience tend to ignore the addition of creationism to the curriculum. Inexperienced teachers were more inclined to present creationism, but as a religious concept. Forty-six percent of less experienced teachers (less than ten years) chose to present creationism as religion, 40 percent of this group would teach it as required, and only 2 percent would refuse to teach it. Table 8 illustrates these results.

TABLE 8  
FACTORS INFLUENCING RESPONDENTS' REACTION  
TO A CREATIONISM REQUIREMENT

COMMUNITY SIZE					
	Percent of Respondents				
	Rural	Small Town	Suburban	City	All
Distribution of community size in sample	41	16	15	27	...
Would refuse to teach creationism	40	0	30	30	8
Would ignore the requirement	25	25	12.5	37.5	6
Would present it, but as a religious concept	47	16	12	26	34
Would teach it as required	35	16	19	30	29
Made no response	47	20	10	23	23 <sup>a</sup>

<sup>a</sup>These teachers presumably agree that creationism should be taught.



TABLE 8--Continued

## ACADEMIC DEGREE

	Percent of Respondents		
	Bachelors	Masters	Specialist or Doctorate
Distribution of degree in sample	34	55	12
Would refuse to teach crea- tionism	10	60	30
Would ignore the requirement	13	63	25
Would present it, but as a reli- gious concept	42	44	14
Would teach it as required	38	60	3
Made no response	30	60	10

## SCIENCE BACKGROUND

	Percent of Respondents		
	Life Science	Physical Science	Both Sciences
Distribution of science back- ground in sample	70	16	14
Would refuse to teach crea- tionism	80	10	10
Would ignore the requirement	50	12.5	37.5
Would present it, but as a reli- gious concept	67	12	21
Would teach it as required	81	11	8
Made no response	60	33	7

TABLE 8--Continued

	AGE				
	Percent of Respondents				
	Under 25	26--35	36--45	46--55	over 55
Distribution of age groups in sample	6	41	27	20	6
Would refuse to teach creationism	0	50	30	10	10
Would ignore the requirement	0	37.5	25	37.5	0
Would present it, but as a religious concept	9	44	21	19	5
Would teach it as required	5	30	39	19	8
Made no response	3	50	20	20	7

	TEACHING EXPERIENCE		
	Percent of Respondents		
	Less than 10 Years	10--20 Years	More than 20 Years
Distribution of experience levels in sample	41 (100) <sup>b</sup>	41 (100)	18 (100)
Would refuse to teach creationism	10 (2)	80 (15)	10 (4)
Would ignore the requirement	37.5 (6)	37.5 (6)	25 (9)
Would present it, but as a religious concept	56 (46)	33 (26)	12 (22)
Would teach it as required	24 (17)	23 (40)	27 (30)
Made no response	50 (29)	23 (13)	27 (35)

<sup>b</sup>Numbers in parentheses represent distribution in this experience level (column percents).

Question 3: With what materials and to what extent do teachers believe creationism should be taught, if at all?

This question was asked of those who agreed that creationism should be taught. Of the 56 teachers who responded, 77 percent felt that creationism should be taught with purchased materials. These teachers also felt that creationism should be presented in any course where the age of the earth, development of the universe, or origin of man are treated. Of 57 responding, 84 percent opted for this choice and only 16 percent would confine creationism to biology courses. Opinion was more divided on the frequency of presentation: 41 percent favored presentation once during the course, while 59 percent advocated presenting creation-

TABLE 9

RESPONSE TO THE QUESTION:  
TO WHAT EXTENT SHOULD CREATIONISM BE TAUGHT?

Method and Place of Presentation	Percent of Responses
With creationist materials	77
With no purchased instructional aids	23
Only in biology courses	16
In any course dealing with origins	84
Once during the course	41
With equal emphasis whenever origins of man or the universe is treated	59

science with equal emphasis any time a science course dealt with origins (Table 9). Generally, consensus favored a more extensive application of creationism.

Question 4: How many teachers are actually teaching creationism, and what size communities do they represent?

Thirty-nine percent of the respondents taught only evolution, 27 percent taught both creationism and evolution, and 31 percent taught neither. Of those who taught only evolution, the percentages by community size agreed roughly with the percentages of community sizes in the total population (see Table 10, page 91). The tendency to teach both creationism and evolution was greater in rural areas and small towns; less in the suburbs. The tendency to teach neither was greater in the suburbs and cities.

The response to this question was not related to the area of science background of the teacher. Although 82 percent of those who taught only evolution described their backgrounds as being in biological science, 74 percent of those who taught both creationism and evolution, and 51 percent of those who taught neither, also had backgrounds in biological science. These results are shown in Table 10.

TABLE 10

## PRACTICES IN TEACHING EVOLUTION AND/OR CREATIONISM

PRACTICES BY COMMUNITY SIZE					
	Percent of Respondents				
	Rural	Small Town	Suburban	Urban	All
Distribution by community size in sample	41	16	15	27	...
Teach evolution	46	12	16	26	39
Teach creationism	0	100	0	0	1
Teach both	53	21	6	21	27
Teach neither	28	15	21	36	31
No answer	33	0	33	33	2

## PRACTICES BY SCIENCE BACKGROUND

	Percent of Respondents		
	Life Science	Physical Science	Both Sciences
Distribution by science background in sample	70	16	14
Teach evolution only	82	6	12
Teach creationism	100	0	0
Teach both	74	18	9
Teach neither	51	28	21
No answer	50	25	25

Question 5: How many teachers have been faced with a local proposal that creationism be taught?

Thirty-six percent of the respondents reported that teaching creation science had been proposed in the community. Twenty-nine percent felt that creationists were influential, but fewer than 20 percent had seen creationist books purchased by the school district (Table 11). The proposals to teach creationism were more frequently reported by teachers in suburban systems; 84 percent of suburban teachers, but only 25 percent of rural teachers reporting them.

Fifteen percent of the teachers expected punitive action from supervisors were they to oppose teaching creation-science, and 38 percent didn't know what to expect. Almost half the respondents (48%) in all community groups felt safe from supervisory retaliation.

TABLE 11  
PROPOSALS TO TEACH CREATIONISM

Question	Percent of Respondents		
	Agree	Undecided	Disagree
Teaching creation-science has been proposed in my community.	36	31	33
Creation-science advocates are influential in my community.	29	45	26
I have seen creationist textbooks purchased in my school district.	20	7	73
If I were to oppose teaching creationism, my supervisors might take punitive action against me.	15	38	48

Question 6: What reasons do teachers give for teaching or rejecting creationism? Are school board requirements or administrative decisions frequently reported, and if so, is this typical of any certain size community?

The usual basis for a decision to teach or reject creationism or evolution was personal conviction. Seventy-five teachers (59%) listed this as a reason, of whom 67 listed it as the primary reason. Other reasons were school board requirements, student requests, administrative decisions, pressure from parents, and from peers, in that order. Eleven out of the eighteen teachers who listed school board requirements as a reason were in urban areas, and nine of these made it the primary reason. On the other hand, about half of those teachers listing parent and student requests were in rural areas (See Table 12).

TABLE 12

## REASONS FOR TEACHING OR REJECTING CREATION-SCIENCE

Reason Given	Number of Respondents				
	Rural	Small Town	Suburban	Urban	Total
Personal conviction	36	12	8	19	75
School board requirement	3	2	2	11	18
Student request	8	2	1	4	15
Administrative decision	5	1	3	2	11
Pressure from parents	4	1	1	3	9
Pressure from peers	3	1	1	1	6
Other	...	...	...	...	28

Question 7: Is a teacher's approval of creationism related to any of the following factors: familiarity with creationism, self-rated religiosity, liberal or conservative religious beliefs, perception of the place of evolution in the science curriculum, local activity by creationist supporters, age, length of professional experience, degree level attained, specialization (biological or physical science), community size?

These relationships were investigated in the testing of the hypotheses. The results are reported in the section beginning on page 99.

Question 8: How many teachers have personal doubts about the validity of evolution, and does the area of the teacher's scientific training influence such doubts?

Fifty-eight percent of the respondents were convinced that Darwin's theory of evolution is a valid explanation of the development of man, while 20 percent disagreed with this statement (Table 13). There was no relationship between opinions on this question and either the area of science expertise or the educational level of the teacher. Agreement with the statement was consistent across all age groups, although more teachers age 46--55 were undecided about it. Disagreement with evolution is just as prevalent in the lower age groups.

Comparing answers to this question with community size, it was found that the highest degree of acceptance of evolution was in the suburbs, where 68 percent of the teachers accepted it. Acceptance by all groups was more



TABLE 13

## RESPONDENTS' BELIEFS IN THE VALIDITY OF EVOLUTION

Response to the question: "I am convinced that Darwin's theory of evolution essentially describes the means by which man developed."									
Response	Percent of Respondents by Background and Degree							Specialist or Doctorate	
	All	Life Science	Physical Science	Both Sciences	Bachelor's Degree	Master's Degree			
Agree	58	74	12	14	30	55	15		
Undecided	22	61	25	14	36	61	4		
Disagree	20	65	19	15	42	46	12		
Distribution in sample	100	70	16	14	34	55	12		
Response	Percent of Respondents by Age and Community Size								
	Under 25	26--35	36--45	46--55	Over 55	Rural	Small Town	Suburban	
Agree	5	38	30	19	7	42	14	26	18
Undecided	4	46	14	36	0	32	21	14	32
Disagree	8	46	31	4	12	50	15	27	8
Distribution in sample	6	41	27	20	6	41	16	15	27

than 50 percent, and it appears that those with personal doubts about evolution are in the minority.

Question 9: To what extent have students expressed doubts about evolution because it conflicts with their religious beliefs?

Forty-six percent of the teachers had students who felt that evolution conflicted with their religious beliefs, and 84 percent avoided making "dogmatic" statements about evolution in class (Table 14). There was a slightly greater tendency for students to question evolution in rural areas and small towns (49% and 52%) than in cities and suburbs

TABLE 14

## STUDENTS' OBJECTIONS TO EVOLUTION

Question: I frequently have students who are troubled by a conflict between evolution and their religious beliefs.

Response	Percent of Respondents				
	All	Rural	Small Town	Suburban	Urban
Agree	46	49	52	42	40
Undecided	10	9	10	11	11
Disagree	44	42	38	47	49

Question: I try to avoid making dogmatic statements about evolution in my classes.

Response	Percent of Respondents				
	All	Rural	Small Town	Suburban	Urban
Agree	84	79	76	100	86
Undecided	8	8	19	0	6
Disagree	9	13	5	0	9

(40% and 42%), but questioning was reported in all geographic areas. There was not much indecision on this question.

Question 10: Is creationist activity as reported by the teachers stronger in any particular size community?

Most of the agitation for creationism was in the suburbs, where 84 percent of the respondents reported proposals to teach creationism. It should be noted that five school districts near Atlanta (Fulton, Cobb, DeKalb, Gwinnett, and Fayette counties) are known to have encountered pressure from creationist groups. Rural and small town areas reported the least activity, particularly in purchasing creationist textbooks. Thirty-seven percent of respondents in urban areas reported proposals to teach creationism, but only 17 percent felt the proponents were active.

In suburban school districts, 68 percent of the teachers reported that creationist advocates were influential in the community, whereas only 29 percent of the small town teachers and even fewer of the rural and city teachers did so. The suburban group had definite opinions about the influence of creationists. By contrast, about half the rural, urban and small town groups were undecided about their influence (see Table 15, page 98). It is concluded that creationist activity, at least as it is perceived by teachers, is stronger in the suburban communities near Atlanta.

TABLE 15  
CREATIONIST ACTIVITY IN GEORGIA

Question: Teaching creation-science has been proposed in my community.

Response	Percent of Respondents				
	All	Rural	Small Town	Suburban	Urban
Agree	36	25	19	84	37
Undecided	31	24.5	62	10.5	34
Disagree	33	51	19	5	29

Question: The advocates of creation-science are influential in my community.

	Percent of Respondents				
	All	Rural	Small Town	Suburban	Urban
Agree	29	23	29	68	17
Undecided	45	49	48	21	51
Disagree	26	28	24	11	31

Question: I have seen books on creation science in the materials purchased by my school district.

	Percent of Respondents				
	All	Rural	Small Town	Suburban	Urban
Agree	20	13	9.5	32	29
Undecided	7	6	9.5	5	9
Disagree	73	81	81	63	63

Gene Lyons, in his analysis of the Arkansas Creation-Science Act, describes the creationist supporters as country-come-to-town: "live-wire 'Christian' businessmen (sic) and doctors' wives from the newer suburbs of Little Rock."<sup>1</sup> This study would suggest that his analysis of the regionality of the movement was correct.

### Testing the Hypotheses

The hypotheses concerned the relationship between teachers' approval of teaching creation-science and other opinions and biographical data. The responses to eleven selected statements were compiled as a "score" indicating approval or disapproval of creationism. These statements were:

1. Creation science should be included in biology classes.
2. Creation science should be included in any science courses dealing with the origin of man.
3. Creation science should be included in any science courses dealing with the origin of the earth or the universe.
4. Creation science is not religion, since it provides scientific proof for the theory of origins set forth in its books.
5. I am opposed to teaching creation science in any science class.
6. I am opposed to including creation science anywhere in the curriculum.

---

<sup>1</sup>Gene Lyons, "Repealing the Enlightenment," Harper's 264 (April, 1982): 39-40.

7. Even if creation science proved to have a religious foundation, I would still approve its inclusion in science classes.
8. Creation science is a means of introducing a sectarian religious doctrine into the public schools.
9. I would oppose giving equal time to creation science along with evolution, no matter what the consequences to myself.
10. If teaching creation science is what a majority of the people in my school district want done, it should be included in the curriculum.
11. The issue of equal time for creation science does not concern me.

This score was considered to be a measure of the attitude of the teacher toward teaching creationism. A low score indicates approval; a high score, disapproval. A score in the middle range would be considered either undecided or indifferent. In the same manner, scores were determined in the other areas of opinion stated in the hypotheses.

Analysis of the scores on "approval--disapproval" revealed that 52 percent of the respondents disapproved and 25 percent approved of teaching creationism, while 23 percent were undecided or indifferent.

The chi square test of independence was used to determine whether approval of creationism was related to attitudes in the other areas or to biographical data. For

purposes of comparison the scores were divided in thirds. However, for some comparisons it was necessary to collapse the tables in order to obtain acceptable cell frequencies. In these cases, the scores were divided equally, giving only a high and low score. As a check on the chi-square analysis, the Pearson product-moment correlation coefficient ( $r$ ) was also computed. This test, however, requires for inference that the population be normally distributed. It is not advisable to make this assumption with respect to all the variables studied. Nevertheless, use of the two computations is of value in making decisions about the hypotheses.

Hypothesis One: The attitude of Georgia science teachers toward teaching creationism is not related to the self-rated religiosity of the teacher.

The questionnaire contained four questions designed to estimate the extent of religious beliefs of the respondent. These questions were:

1. I do not believe in God.
2. I regard myself as a religious person.
3. I belong to a church, synagogue, or other organized religious group.
4. I have been a church member since early childhood.

A person with a score of 4--6 would be classified as "religious," while 10--12 would indicate a disinterest in religion. A score of 7--9 would suggest a teacher with religious faith but not a participant in organized religion.

Very few teachers were willing to describe themselves as "non-religious." This resulted in a low cell frequency and

questionable validity of the chi-square test. The Pearson product-moment correlation coefficient indicated a significant relationship, but the normal distribution of the population with respect to religiosity is in question. Since so few respondents could be classed as "non-religious" it was possible that the four questions were not sufficient to discriminate between teachers on the criterion of religiosity. It is not advisable to decide, on the basis of these results, that approval of creationism and self-rated religiosity are related.

TABLE 16

## APPROVAL OF CREATIONISM VS. RELIGIOSITY

	Number of Respondents		
	More Religious	Undecided	Less religious
Approve of creationism	32	0	0
Undecided	26	2	2
Disapprove of creationism	54	8	4

Chi square = 6.95<sup>a</sup>

$r = 0.174^b$

<sup>a</sup>not significant

<sup>b</sup>significant at  $p = .05$

Hypothesis Two: The attitude of Georgia science teachers toward teaching creationism is not related to the liberality or conservatism of the teacher's religion.

Approval of creationism was related to conservatism in religion, with the "conservative" teachers being more likely to approve, and the "liberals" to disapprove.

There were six statements in this area:

1. Statements that the Bible makes are never in error.



2. I believe that the Genesis version of the creation of the world is literally correct.
3. Darwin's theory of evolution is compatible with a belief in God.
4. One cannot believe in evolution and also believe in a Creator.
5. The Bible is not intended to give a scientific description of the origin of the universe.
6. My religious background could be described as Fundamentalist.

A person with a score of 6--12 was designated conservative; one with a score of 13--18 was classed as liberal in matters of religion. The results are shown in Table 17.

TABLE 17  
APPROVAL OF CREATIONISM VS. LIBERALITY OR  
CONSERVATISM IN RELIGION

	Number of Respondents	
	Conservative	Liberal
Approve of creationism	14	18
Undecided	9	21
Disapprove of creationism	7	59

Chi square = 14.1<sup>a</sup>

$r = 0.508^a$

<sup>a</sup>significant at  $p = .01$

Hypothesis Three: The attitude of Georgia science teachers toward teaching creationism is not related to the teacher's understanding of the relation of evolution to high school courses in science.

The relationship between approval of teaching

creationism and the teacher's understanding of the relation of evolution to science courses was not significant, according to chi-square analysis. Those teachers who were cognizant of evolution's importance did, however, tend to disapprove of including creationism in science courses. The Pearson product-moment correlation between these variables was significant.

This factor was measured by six statements:

1. I do not deal with origin of the earth or the universe in any courses I teach.
2. I do not deal with the origin of man in any courses I teach.
3. Creation-science is just as scientific as evolution.
4. I am convinced that Darwin's theory of evolution essentially describes the means by which man developed.
5. It is not necessary to teach evolution as part of the biology course.
6. Giving equal time to creationism is what most science teachers have been doing for years.

A teacher convinced that evolution is important in all science disciplines should have a high score (13--18). A teacher deficient in such understanding should score low (6--12). The question might be raised whether a science teacher not involved in teaching biology would be characterized by these questions as "not understanding the nature of evolution." That evolution cuts across all disciplines is generally accepted by scientists, but since

Darwinian evolution does not, as a rule, appear in high school physics, chemistry, general science, or even some earth science books, it is arguable that a non-biology teacher cannot fairly be characterized as to understanding of evolution by this group of questions. On the basis of the assumption that the population, including as it did non-biology teachers, is not normally distributed, it is concluded that the relationship between approval of creationism and understanding of the role of evolution is unsubstantial. The results are summarized in Table 18.

TABLE 18

APPROVAL OF CREATIONISM VS. COGNIZANCE OF THE  
IMPORTANCE OF EVOLUTION TO SCIENCE

	Number of Respondents	
	Not Cognizant	Cognizant
Approve of creationism	14	18
Undecided	14	16
Disapprove of creationism	19	47

Chi square = 3.745<sup>a</sup>

$r = 0.336^b$

<sup>a</sup>not significant

<sup>b</sup>significant

Hypothesis Four: The attitude of Georgia science teachers toward teaching creationism is not related to the teacher's familiarity with the creationist movement and its literature.

It is concluded that the relationship between familiarity and approval is significant, the teachers more familiar with creationism being less approving of it.

There were six statements related to the teacher's familiarity with creationism:

1. I am familiar with the term "Creation science."
2. The teaching of creation science has been proposed in my community.
3. The advocates of creation science are influential in my community.
4. I am familiar with the text material on creation science.
5. I am familiar with articles written about creation science.
6. I have followed the progress of House Bill 690, which mandated the teaching of creation science in Georgia schools.

A teacher who was familiar with creationism would score low; one unfamiliar, high. The scores were subdivided three ways to allow for respondents who were familiar with the term but might not have been directly involved with it in the community. The results are illustrated in Table 19.

TABLE 19

## APPROVAL OF CREATIONISM VS. FAMILIARITY WITH CREATIONISM

	Number of Respondents		
	Familiar	Undecided	Unfamiliar
Approve of creationism	16	13	3
Undecided	12	12	6
Disapprove	45	19	2

Chi square = 11.42<sup>a</sup>

<sup>a</sup>significant at  $p = .05$

Hypothesis Five: The attitude of Georgia science teachers toward teaching creationism is not related to the amount of controversy creationism has generated in the community.

The responses to the statements in these two areas are not significantly related. The statements that explored the controversy raised by creationism were:

1. The teaching of creation science has been proposed in my community.
2. The advocates of creation science are influential in my community.
3. I have seen books on creation science in the materials purchased by my school district.
4. Many people whose opinions I respect favor the teaching of creation science.
5. If I were to publicly oppose the teaching of creation science, my supervisors might take punitive action against me.
6. I frequently have students who are troubled by a conflict between evolution and their religious beliefs.
7. I try to avoid making dogmatic statements about evolution in my classes.
8. The science teachers in my community would object to teaching creation science in their classes.

A score of 8--16 indicated little impact on the community; 17--24 indicated greater impact (see Table 20).

TABLE 20

## APPROVAL OF CREATIONISM VS. IMPACT ON COMMUNITY

	Number of Respondents	
	Little Impact	More Impact
Approve of creationism	20	12
Undecided	12	18
Disapprove of creationism	38	28

Chi Square = 3.62<sup>a</sup> $r = -0.099^a$ <sup>a</sup>not significant

Hypothesis Six: The attitude of Georgia science teachers toward teaching creationism is not related to the size community the school represents.

There was no significant relationship between respondents' approval of teaching creationism and the size community represented, as shown in Table 21.

TABLE 21

## APPROVAL OF CREATIONISM VS. COMMUNITY SIZE

	Number of Respondents			
	Rural	Small Town	Suburban	Urban
Approve of creationism	17	5	2	8
Undecided	12	3	4	11
Disapprove of creationism	24	13	13	16

Chi square = 6.6<sup>a</sup><sup>a</sup>not significant

Hypothesis Seven: The attitude of Georgia science teachers toward teaching creationism is not related to the academic degree held by the teacher.

The teacher's degree was not significantly related to the teacher's approval of creationism, according to the chi-square test for independence. However, a correlation was indicated by the Pearson product-moment coefficient. Because minimum cell frequency is an acceptable 3.5 and because calculation of  $r$  allows individual, rather than grouped scores to be considered, it is concluded that there is a relationship between degree level and approval of creationism, those teachers with advanced degrees tending to disapprove. The data are shown in Table 22.

TABLE 22

## APPROVAL OF CREATIONISM VS. ACADEMIC DEGREE

	Number of Respondents		
	Bachelor's	Master's	Specialist or Doctorate
Approve of creationism	16	14	2
Undecided	8	19	3
Disapprove of creationism	19	37	10

Chi square = 6.14<sup>a</sup>

$r = 0.186^b$

<sup>a</sup>not significant

<sup>b</sup>significant

Hypothesis Eight: The attitude of Georgia science teachers toward teaching creationism is not related to the age of the teacher.

The data show no significant relationship between the age of the teacher and approval of creationism. The number of respondents under age 25 and over 55 was low, and the low expected cell frequency makes application of the chi-square test questionable.<sup>2</sup> However, the Pearson product-moment coefficient showed no significant correlation either. These results are illustrated in Table 23.

TABLE 23  
APPROVAL OF CREATIONISM VS. AGE

	Number of Respondents Age:				
	25 and under	26--35	36--45	46--55	Over 55
Approve of creationism	2	12	9	7	2
Undecided	1	13	8	4	4
Disapprove of creationism	4	28	17	14	2

Chi square = 5.75<sup>a</sup>

$r = -0.035^a$

<sup>a</sup>not significant

Hypothesis Nine: The attitude of Georgia science teachers toward teaching creationism is not related to the length of the teacher's professional experience.

The length of teaching experience was not significantly related to the teacher's approval of creationism. Table 24 illustrates the results.



TABLE 24

## APPROVAL OF CREATIONISM VS. OF TEACHING EXPERIENCE

	Number of Respondents with Years of Teaching Experience		
	Under 10	10--19	20 or more
Approve of creationism	11	11	10
Undecided	14	11	5
Disapprove of creationism	27	31	8

Chi square = 6.04<sup>a</sup> $r = -0.105^a$ <sup>a</sup>not significant

The inconsistency of this finding with the answer to Question two, reported in Table 8 (page 89), suggests that what teachers approve of teaching and what they will actually teach or refuse to teach are not necessarily synonymous. This is discussed in Chapter V, p. 120.

Hypothesis Ten: The attitude of Georgia science teachers toward teaching creationism is not related to the area of the teacher's specialization in science.

The teacher's degree of approval of teaching creationism was not related to the area of science preparation. It did not matter whether the teacher's background was in life science, physical science, or both. Again the cell frequency was low because of the preponderance of life science teachers in the sample, but data appeared firm enough to reject the existence of a relationship (Table 25).

TABLE 25

## APPROVAL OF CREATIONISM VS. AREA OF SCIENCE BACKGROUND

	Number of Respondents with Backgrounds in		
	Life Science	Physical Science	Both
Approve of creationism	20	9	3
Undecided	23	3	4
Disapprove of creationism	46	9	11

Chi square = 5.01<sup>a</sup> $r = -0.014^a$ <sup>a</sup>not significantOther Findings

Teachers were given an opportunity to list "other" reasons for teaching evolution, creationism, both, or neither; and many did so. Teachers who taught evolution exclusively cited as reasons for doing so the evidence supporting evolution, that scientific literacy requires the presentation of evolution, and that the separation of church and state must be upheld. Teachers who taught both evolution and creationism cited, by contrast, scientific evidence for creation, the desirability of presenting evidence that supports both concepts, and the right of students to decide for themselves which concept they prefer.

Teachers who taught neither evolution nor creationism usually taught courses in which evolution was not appropriate. One respondent claimed it was too much trouble to make sure both sides were presented equally.

One teacher who taught evolution did so because the textbook included it; one who didn't claimed that the

subject was mentioned in only one chapter of the textbook.

Although more than half the respondents either believed Genesis to be a literal description of the creation or considered it a possibility, most of them (74%) felt that evolution did not preclude belief in God. Also, 81 percent refused to accept the Bible as a scientific treatise on creation, and 86 percent asserted that it was possible to "believe" in evolution and also believe in a creator. That there is some theological inconsistency here is undeniable, but the teachers seem comfortable with a position that might be described as "theistic evolution." Responses to questions in this vein are summarized in Table 26.

TABLE 26

## RESPONDENTS' BELIEFS IN SCRIPTURAL LITERALISM

Statement	Percent of Respondents		
	Agree	Undecided	Disagree
Statements the Bible makes are never in error.	23	27	49
I believe that the Genesis version of the creation of the world is literally correct.	33	23	45
Darwin's theory of evolution is compatible with a belief in God.	74	14	12
One cannot believe in evolution and also believe in a creator.	7	7	86
The Bible is not intended to give a scientific description of the origin of the universe.	81	9	9

### Summary

The more familiar teachers were with creationism, the less they approved of it. According to the results of this study, familiarity with creationism was negatively correlated with approval of teaching it. The more advanced the teacher's academic degree, the less likely was the teacher to approve of including creationism in the curriculum. Although the teacher's religiosity could not be said to be associated with attitude toward creationism, the orientation of religious beliefs toward a conservative viewpoint was positively correlated with approval of teaching creationism. Teachers who professed to understand the importance of evolution in science courses tended also to disapprove of teaching creationism, but the correlation was insufficient to claim a relationship. Neither age, experience, area of scientific expertise, or community size was related to the attitude of science teachers toward including creationism in the public school curriculum.

The teachers who disapproved of creationism, then, were likely to exhibit some combination of three characteristics:

1. They were familiar with creationism. Of those familiar with it, 93 percent disapproved; none approved.

2. They might be said to have a "Modernist," or liberal, religious viewpoint; that is, they did not advocate the literal truth of Genesis or claim that biblical statements were inerrant.

3. They tended to have more formal education, as evidenced by a graduate degree.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to document instances of the teaching of creationism in public school science courses and to investigate relationships between the science teachers' approval of creationism and their religious philosophy, understanding of evolutionary biology, locale, academic degree, age, and teaching experience.

#### Summary

The results of the study indicated that creationism is being taught in science courses in some Georgia public schools. Twenty-seven percent of the teachers responding claimed to teach both creationism and evolution. Twenty percent reported that textbooks on creation-science were purchased by the local school district. Thus, despite the lack of legislation requiring presentation of creation-science in public school science classes, creationism is being taught and creationist textbooks purchased in the state.

While some respondents claimed that school board or administrative requirements were responsible for their decisions to teach creationism, most teachers cited personal conviction as the primary reason for tempering evolution

with creationism. It is appropriate to consider the teacher's perception of what constitutes "teaching creation-science," since this might consist of merely allowing a difference of opinion about evolution to be expressed in class. It is assumed that the teachers queried understood that the "creation-science" movement was being evaluated, the letter introducing the questionnaire being specific on this point. Teaching creation-science, then, means presenting it by name in a science class.

Although most of the teachers who presented creationism did so by personal choice, teachers were reluctant to refuse to teach creationism if it were a requirement of the school district, even if they personally disapproved of it. Teachers of a fundamentalist religious persuasion were significantly more approving of creationism, nevertheless, 46 percent of those teachers who described their religious backgrounds as fundamentalist disapproved of teaching creationism.

The extent of science teachers' approval of teaching creationism in science classes was related to the teacher's familiarity with creationism, the conservatism of the teacher's religious beliefs, and the teacher's academic degree. The teachers' attitudes toward creationism were not significantly related to age, length of teaching experience, area of science specialization, self-rated religiosity, agreement about the importance of evolution to the science curriculum, community size, or the impact of creationist activity on the community.

### Conclusions

This study revealed no grassroots enthusiasm among teachers for creationism. On the other hand, the responses suggested that while a majority of teachers registered opposition to teaching creationism, most science teachers were not willing to risk community antagonism and professional careers by opposing its dissemination in the schools (see Table 8, page 86). Thirty-nine percent felt it appropriate for a majority of the community to make the decision to include creationism (see Table 7, page 85).

Responses and comments were offered on questionnaires by many teachers who made plain their disapproval of creationism, but who would teach it if it were required. It is difficult to believe that these teachers, some with advanced degrees and many years of experience, would be willing to promote a doctrine with which they so clearly disagree. It is more likely that they are confident of their ability to discredit the "creation model" simply by the manner of its presentation. If there is to be concerted and sustained opposition to the inclusion of creation-science in the public school curriculum, it will not, according to the results of this survey, come from high school science teachers.

The lack of active opposition notwithstanding, the creationists' contention that teachers prefer to give creationism equal time was not supported by this survey. Only 30 percent of the respondents believed that creation-

science should be included in science courses; more than half were opposed to its inclusion. It is apparent, however, that some science teachers do accept creation-science at face value, agree to its scientific validity, and advocate its presentation as science. Sixteen percent of the respondents agreed that creation-science is just as scientific as evolution, although less than five percent believed that there is scientific evidence for a six-day creation. Two teachers wrote extensive notes about their objections to evolution and their determination to present creation-science as an alternate theory. One teacher had obtained the permission of the principal to personally purchase the books, and taught creationism for six to ten days a term.

The implications of the creationists' avowed goal of removing evolution from the science curriculum have not yet impressed the science teachers. Teachers do not see the theory of evolution as the evil menace portrayed by creationists, but neither do they universally subscribe to the theory's validity nor appreciate its importance in the high school science curriculum. The extent of teachers' indifference to the theory of evolution as a part of science courses implied that many teachers have a faulty understanding of evolution as an underlying principle of biology (see Table 18, page 105). This confirmed Troost's findings in Indiana (see page 54),<sup>1</sup> and suggested either that the situation has not improved during the intervening years, or

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<sup>1</sup>Troost, pp. 113-5.



that Georgia's science teachers are now at the same stage of acceptance of evolution as were Indiana's teachers in 1966.

The responses suggested that teachers with strong religious principles were just as likely to teach evolution and oppose creationism as were those on whom religion was not an impelling influence. When religion took a more conservative, fundamentalist form, teachers were more likely to approve of teaching creation-science.

The responses suggested reasons why Georgia science teachers, in spite of general disapproval of teaching creationism, have not raised serious objections to its inclusion in science courses. First, the responses revealed that many teachers do not believe that evolution is important to the curriculum (see Table 13, page 95, and Table 18, page 105). These teachers may believe that they can handle creationism adequately by omitting or underplaying evolution and other topics that are in conflict with the religious sensibilities of students. Comments by individual teachers supported this conclusion (see page 120).

Second, many respondents exhibited theological misconceptions about the Genesis creation story and may not understand that creation-science is based on a literal interpretation of biblical origins. Although there was substantial belief by teachers in biblical inerrancy and the literality of the Genesis creation story, few respondents agreed that the Bible was intended to give a scientific

description of origins (see Table 26, page 113). Some respondents, therefore, must not perceive that scriptural literalism implies a conflict with scientific accounts of origins. This suggests that some teachers, out of theological naivete, misunderstand the creationist position that evolution and Genesis provide a dichotomy that cannot be reconciled. Since they can accept both the religious and scientific accounts of origins (74 percent agreed with the statement "Darwin's theory of evolution is compatible with a belief in God") they are convinced that their students can also be persuaded to do so.

Third, in spite of an almost universal familiarity with the term "creation-science," responses implied that many teachers were not really aware of the underlying philosophy and purpose of creationism. The creationists reject "theistic evolution," which allows divine guidance of the process of evolution. This not immediately evident from the high school text materials. Consequently, teachers may not see creationism as necessarily conflicting with their private reconciliation of scientific and theological descriptions of origins. One teacher distinguished "creation" from the "creation-science pushed by the group in California." Another attempted to make it clear to students that a Christian need have no conflict, even though many discoveries of science are not supported by the Bible.

As outlined in Chapter II, there are two poles of opinion on the creation-evolution controversy: on the one

hand a purely mechanistic world-view that allows no supernatural intervention, and on the other a belief that all events are governed by a Supreme Being, and that any scientific findings in conflict with scripture must be rejected. Most individuals find an intellectual accommodation somewhere between these two extremes. Teachers, being a microcosm of the population, are no exception. This survey bears out this conclusion (see Table 26, p. 113). High school students will, in their maturity, eventually find such a position. The question at hand is whether teachers have a duty, or even a right, to inject into public school science classes theological explanations along with scientific ones. Responses to the questionnaire suggested that many science teachers were not cognizant of the theological interpretation implicit in the consideration of creation-science as an adjunct to evolution in the public school curriculum.

A study of the historic disagreements of theology with science (see "Darwinism vs. Theology," page 18) reveals that evolution is no longer in conflict with any but the very conservative religions. Creation-science is clearly the brainchild of the fundamentalist faction of Christianity, and it is not accepted by most of the major religious denominations today, as evidenced by the increasing objections from theologians and clergy in the religious press. Creationists claim that there are only two positions and that students are easily persuaded that the creationist

position is the only one compatible with religious belief of any kind. The two models, creationism and evolution, cannot be reconciled. Each faction sees the other's beliefs as heterodoxy. One projection of the current emphasis on the creationists' position is that teachers might be convinced that evolutionary biology is not of enough importance to the high school science curriculum to warrant the conflict and confrontations generated by teaching it. This concern was expressed by Judge Overton in his decision in the Arkansas Creation-Science case.<sup>2</sup>

#### Recommendations

The generalizations made in this study are based on a small proportion (7.3 percent) of the estimated 1750 science teachers in Georgia public high schools. The schools represented, however, extended to every area in the state. It might also be argued that a large number of non-respondents were teachers without acquaintance with creation-science (see page 84). There is no indication that teachers who oppose creationism were over-represented. Many teachers gave responses favorable to creationism, and most appeared to be candid in answering questions related to religion. One questionable aspect of the study is that some teachers responded to two similar questions inconsistently. The use of "scores" on a group of questions rather than responses to a single question was intended to minimize the effect of this inconsistency on the interpretation of

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<sup>2</sup>McLean vs. Arkansas Board of Education.

results. Further reliability studies on the questionnaire would be helpful.

While the survey solicited opinions on creationism and evolution, it was not intended to characterize teachers by their beliefs in any "divine intervention" in the process of evolution. In view of the increasing tendency by writers to portray creationism as fundamentalist religion and evolution as mechanistic, "dogmatic" science, it might be profitable to investigate the position of teachers on the continuum of mechanistic--supernatural origins.

Whether to deal with creationism by persuasion, by education, by compromise, or by decree is a problem that school administrators must solve before another "one hundred years without Darwin"<sup>3</sup> pass by. The strategies of administrators in attacking this problem might also be of interest for future researchers.

This study did not investigate teachers' positions on the legalities of teaching creation-science, opinions on church-state separation, and connections between creation-science and the prayer-in-school movement currently occupying attention. The interaction of these issues is also a possible subject for research.

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<sup>3</sup>Simpson, p. 617.

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In this theological approach, Stevenson deplores the tactics of scientific creationists as a "Trojan Horse."

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Tarbell, William. "Creation and God." Letter to Christian Century 97 (10 December 1980): 1229.

In a response to Skoog's article, the writer says that both creation and evolution models should be presented as belief systems.

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This article outlines in detail the background, personalities, strategies and results of the efforts of the Creation Research Society to rewrite the "Science Framework for California Public Schools."

Weatherly, Jack. "Creationists Lose in Arkansas." Christianity Today 26 (22 January 1982): 28-29.

This is an account of some of the behind-the-scenes maneuvering at the Arkansas trial, including disagreements of Attorney General Clark with creationist attorney Wendell Bird, and the refusal of Gish and Morris to testify for the creationists.



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This article includes a review of Nelkin's book on the textbook controversies and background on the textbook watchdogs from Texas: the Gablers.

Work, Timothy. "In Theory." Letter to Christian Century 97 (17 December 1980): 1251.

### Legal Sources

Arkansas. Act 590, Balanced Treatment for Creation-Science and Evolution-Science Act, Statutes Ann. no. 80-1663 (1981).

This, the first "Creation-Science" bill to be enacted by a state legislature, was sponsored by Senator J. Holsted, passed with little debate and was signed immediately by the governor. It was subsequently declared unconstitutional in McLean v. Arkansas.

Daniel v. Waters, 515 F. 2d 485 (6 Cir. 1975).

This case and Steele challenged a Tennessee statute of 1970 requiring that the Genesis version of creation be taught with equal time and equal emphasis when the theory of evolution was taught. The American Biology Teachers' Association and the ACLU brought this suit on behalf of the biology teachers against Waters, who was chairman of the Textbook Commission. The Sixth Circuit Court of Appeals held that the statute violated the Establishment Clause of the First Amendment.

Epperson v. Arkansas, 393 U.S. 97, 89 Sup. Ct. 266 (1968), 21 L. Ed. 2d 228.

Susan Epperson, a biology teacher at Central High School in Little Rock, sued to have the antievolution statute in Arkansas ruled unconstitutional. The court ruled that the statute violated the Establishment Clause of the First Amendment.

Georgia. House Bill 690, Balanced Treatment for Creation-Science and Evolution-Science Act, General Assembly of Georgia, 1979-81.

Representative Tommy Smith was the sponsor of this bill, which was nearly identical to those passed in Arkansas and Louisiana. After two years of maneuverings through committees, Smith succeeded in getting the bill out of a compromise committee, only to fail to get it to the floor before the closing gavel of the 1979-81 session.

Hendren v. Campbell, Case no. S5777-0139 Marion Superior Court No. 5, 14 April 1977 (Indiana).

A student and his parents sued the Indiana Textbook Committee over the selection of Biology: A Search for Order and Complexity. The court decided the selection was in violation of the Indiana Constitution and the First and Fourteenth Amendments, since a close church relationship of the book was implied. The court was critical of the book's one-sided approach to the question of origins.

Keyishian v. Board of Regents, 385 U.S. 589, 87 Sup. Ct. 675, 17 L. Ed. 2d 629 (1967).

This case set aside a statute that allowed teachers to be fired for "questionable" political connections.

Louisiana. Balanced Treatment for Creation-Science and Evolution-Science Act, Revised Statutes (1950), secs. 3701-3706 (1981).

Senator Bill Keith sponsored this bill, which was passed by the Louisiana Senate 26-12, by the House 71-19, and signed by Governor Dave Treen. At this writing (1982) the law has not yet been enforced, and legal maneuverings continue.

McLean v. the Arkansas Board of Education, 529 F. Supp. 1255 (1982).

The Arkansas "Creation-Science" Law was ruled unconstitutional as a result of a suit brought by the ACLU in federal court. The complete text of Judge Overton's opinion was published in Science 215 (19 February 1982): 934-43.

Scopes v. State of Tennessee, 53 A.L.R. 821, 154 Tenn. 105, 289 S.W. 363 (1927).

Segraves v. State of California, No. 278978.

Kelly Segraves sued in California Superior Court on behalf of his son, claiming that his rights to free exercise of his religion were violated by his being taught about evolution in biology classes. Judge Irving Perluss disallowed the claim but cautioned that evolution should not be taught "dogmatically."

Smith v. State of Mississippi, 242 So. 2d 692 (1970).

This decision struck down the antievolution statute in Mississippi. Mrs. Smith, on behalf of a minor daughter, sought injunction from enforcing the statute prohibiting the teaching of evolution.

Steele v. Waters, 527 S.W. 2d 72 (1975).

See Daniel v. Waters.

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Wisconsin v. Yoder, 406 U.S. 205, 92 Sup. Ct. 1526, 32 L. Ed. 2d 15 (1972).

This decision relieved the Amish of the requirement that they send their children to school beyond the eighth grade. The Amish claimed their religious beliefs and practices were jeopardized by the secular schooling of their young people.

Wright v. Houston Independent School District, 486 F. 2d 137 (5 Cir. 1973), Cert. den. 417 U.S. 969, 366 F. Supp. 1211.

This was a civil rights action to enjoin the school district from teaching evolution, claiming its teaching violated the First Amendment by establishing a sectarian, atheistic religion. The District Court dismissed the case; Court of Appeals affirmed.

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Asimov, Isaac. "The 'Threat' of Creationism." New York Times, 28 June 1981, sec. 6, p. C9.

Blum, Deborah. "Board Declines to Offer Teaching of Biblical Creation." St. Petersburg Times, 25 September 1980, p. B1.

CBS. "Six O'Clock News." 6 March 1980, Walter Cronkite. John Sheahan filmed scenes from the Cobb County Board of Education meeting that were shown on this program, two days before the Georgia General Assembly failed to vote on the Creation-Science bill.

"Creationism Issue Still Touchy for Lawmakers." New Orleans Times-Picayune/States-Item, 15 April 1982, sec. 5, p. 2.

"Creationists Awaiting the Word from Treen on 'The Beginning.'" New Orleans Times-Picayune/States-Item, 19 July 1981, sec. 1, pp. 1, 4.

"Creation Science: Arkansas Ruling Puzzling." Marietta (Georgia) Daily Journal, 6 January 1982, p. A4.

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GEORGIA SCIENCE TEACHERS:

As a science teacher I am interested in your opinions, attitudes and familiarity with the current movement to include the teaching of creationism in the science curriculum. I am surveying a randomly selected sample of high school science teachers in the Georgia public schools, and the results will be part of a study I am conducting for my dissertation as a doctoral student at Georgia State University. Your knowledge, opinions, and experience as a science educator will be very valuable in assessing the extent of creationist and evolutionary teaching in Georgia schools. Will you agree to spend a few minutes of your time expressing an opinion on this matter?

Because creationism has religious overtones, I have also asked some questions regarding your beliefs on this subject. This questionnaire is completely anonymous, and no teacher, school or school system will be identified.

As a classroom teacher, I fully realize the value of your time. I have made this questionnaire as short as possible and enclosed a stamped envelope for returning it. Please do not sign your name or identify your school or school system. If you wish to make comments, I would be delighted to have them, but please enclose them in the envelope separately from the questionnaire.

Your cooperation and assistance will be greatly appreciated.

Paula G. Eglin  
Science Teacher, Wille High School  
951 Powder Springs St.  
Smyrna, Georgia, 30080  
Phone: 404-252-1810 (Home)  
404-432-0177 (School)

QUESTIONNAIRE ON CREATION SCIENCE

DIRECTIONS: If you AGREE with the statement, or if your answer is YES, please put a 1 in the square. AGREE = 1  
If you DISAGREE with the statement, or if your answer is NO, put a 3 in the square. DISAGREE = 3  
If you neither agree nor disagree, or if you don't know, or if the question is not applicable, please put a 2 in the square. DON'T KNOW = 2

- ☐ 1. I am familiar with the term "Creation Science."
- ☐ 2. The teaching of creation science has been proposed in my community.
- ☐ 3. The advocates of creation science are influential in my community.
- ☐ 4. I am familiar with the text material on creation science.
- ☐ 5. I am familiar with articles written about creation science.

- ☐ 6. I have followed the progress of House Bill 690, which mandated the teaching of creation science in Georgia schools.
- ☐ 7. I have seen books on creation science in the materials purchased by my school district.
- ☐ 8. Creation science should be included in biology classes.
- ☐ 9. Creation science should be included in any classes dealing with the origin of man.
- ☐ 10. Creation science should be included in any science courses dealing with the origin of the earth or the universe.
- ☐ 11. Creation science is not religion, since it provides scientific proof for the theory of origins set forth in its books.
- ☐ 12. Many people whose opinions I respect favor the teaching of creation science.
- ☐ 13. I am opposed to teaching creation science in any science class.
- ☐ 14. I am opposed to including creation science anywhere in the curriculum.
- ☐ 15. Even if creation science proved to have a religious foundation, I would still approve its inclusion in science classes.
- ☐ 16. If I were to publically oppose the teaching of creation science my supervisors might take punitive action against me.
- ☐ 17. I do not believe in God.
- ☐ 18. Statements that the Bible makes are never in error.
- ☐ 19. I regard myself as a religious person.
- ☐ 20. I belong to a church, synagogue or other organized religious group.
- ☐ 21. I believe that the Genesis version of the creation of the world is literally correct.
- ☐ 22. I have been a church member since early childhood.
- ☐ 23. Darwin's theory of evolution is compatible with a belief in God.
- ☐ 24. One cannot believe in evolution and also believe in a Creator.
- ☐ 25. The Bible is not intended to give a scientific description of the origin of the universe.
- ☐ 26. I frequently have students who are troubled by a conflict between evolution and their religious beliefs.
- ☐ 27. I do not deal with origin of the earth or the universe in any courses I teach.
- ☐ 28. I do not deal with the origin of man in any courses I teach.
- ☐ 29. Creation science is just as scientific as evolution.
- ☐ 30. I am convinced that Darwin's theory of evolution essentially describes the means by which man developed.

- ☐ 31. My religious background could be described as Fundamentalist.
- ☐ 32. I try to avoid making dogmatic statements about evolution in my classes.
- ☐ 33. The science teachers in my community would object to teaching creation science in their classes.
- ☐ 34. Creation science is a means of introducing a sectarian religious doctrine into the public schools.
- ☐ 35. It is not necessary to teach evolution as a part of the biology course.
- ☐ 36. Creation science presents valid evidence that the universe was created in six 24-hour days.
- ☐ 37. It is entirely possible that the geologic strata and fossil record were caused by a world-wide flood approximately 6000--10,000 years ago.
- ☐ 38. Giving equal time to creationism is what most science teachers have been doing for years.
- ☐ 39. I would oppose giving equal time to creation science along with evolution, no matter what the consequences to myself.
- ☐ 40. If teaching creation science is what a majority of the people in my school district want done, it should be included in the curriculum.
- ☐ 41. The issue of equal time for creation science does not affect me.
- PLEASE CHECK ONE OF EACH PAIR OR SET OF BOXES WHERE APPROPRIATE.
- ☐ 42. If you agree that creationism should be included in science classes, do you think it should be:
- ☐ Presented by the teacher with no purchased instructional aids, or
- ☐ Presented with the help of creationist books, filmstrips and other instructional material.
- ☐ Presented once during the course, or
- ☐ Presented with equal emphasis every time a course deals with the origin of man or the origin of the universe.
- ☐ Presented only in biology courses, or
- ☐ Presented in any course where the age of the earth, development of the universe or the origin of man are treated.
- ☐ 43. If you believe that creationism should not be presented in science classes, please respond to the following:
- ☐ If the school system required me to teach creationism, I would refuse.
- ☐ If the school system required me to teach creationism, I would ignore the requirement, but say nothing.
- ☐ If the school system required me to teach creationism, I would present it but point out that it is a religious concept.
- ☐ If the school system required me to teach creationism, I would teach it as required.

If you are teaching either evolution or creationism, both or neither, somewhere you may have made a decision, or had one made for you, about which to teach. It would be very helpful if you would answer these questions about this decision:

44. Do you teach:

- ☐ Evolution
- ☐ Creationism
- ☐ Both
- ☐ Neither

45. What forces have influenced your decision to teach in this manner? (Please number in order of importance, adding more if appropriate.)

- ☐ School board requirement
- ☐ Administrative decisions
- ☐ Pressure from parents
- ☐ Pressure from peers
- ☐ Students requested it
- ☐ Personal conviction
- ☐ Other (state) \_\_\_\_\_
- ☐ Other (state) \_\_\_\_\_

46. If you teach creationism, approximately how many days do you bring it up during each course?

- ☐ 1 to 5 days ☐ 1 quarter
- ☐ 6 to 10 days ☐ 1 semester
- ☐ 11 to 20 days ☐ 1 year
- ☐ more than 20 days

(A course lasts:)

Please supply the following data by checking the appropriate box:

47. My age is:

- ☐ Under 25
- ☐ 26-35
- ☐ 36-45
- ☐ 46-55
- ☐ over 55

48. My degree is:

- ☐ Bachelor's ☐ Master's ☐ Specialist ☐ Doctoral
- ☐ I have been teaching for \_\_\_\_\_ years.

50. My education is primarily in ☐ BIOLOGICAL ☐ PHYSICAL sciences.

THANK YOU VERY MUCH FOR TAKING THE TIME TO RESPOND.



855 North Island Drive  
Atlanta, Georgia 30327  
May 1, 1981

Dear Science Department Chairman:

PLEASE CIRCULATE THIS LETTER TO THE SCIENCE TEACHERS  
AT YOUR SCHOOL.

Last month I sent you a questionnaire about the teaching of evolution and creationism in high school. Your school was one that was randomly selected from all accredited public high schools in Georgia.

I have received responses from all over the state, and many different opinions and practices are represented. I now have 120 returned questionnaires. If yours was one of them, please accept my sincere thanks for participating in the study.

I would like to be able to report results on at least 200 questionnaires. Regardless of your approval or disapproval of this controversial subject, your views as teachers need to be heard. If you have not yet returned your questionnaire, will you take a few minutes to fill it out and return it in one of the envelopes enclosed with it? You may include more than one questionnaire in an envelope.

The results of this survey will be tabulated this summer and a summary sent to your school. Thank you very much for participating.

Yours very truly,

Paula G. Eglin  
Science Department Chairman  
Wills High School  
951 Powder Springs Street  
Smyrna, Georgia 30080