

## AFS RESOLUTION: EVOLUTION EDUCATION

### *Resolution of the American Fisheries Society Concerning the Teaching of Alternatives to Evolution*

*Whereas,* the mission of the American Fisheries Society is to improve the conservation and sustainability of fishery resources and aquatic ecosystems by advancing fisheries and aquatic science and promoting the development of fisheries professionals; and

*Whereas,* effective conservation and sustainable management of aquatic resources must be based on sound scientific principles that incorporate physical, biological, and ecological processes; and

*Whereas,* science is a systematic method of continuing investigation based on observation, measurement, hypothesis testing, experimentation, and theory building; and

*Whereas,* the body of knowledge encompassed by the theory of evolution is the foundation and unifying principle of the biological and ecological sciences and is supported by a vast body of interdisciplinary evidence; and

*Whereas,* the theory of evolution satisfies the scientific criteria of being understood through scientific scrutiny, revision, and evaluation through testable hypotheses; and

*Whereas,* many local, state, and national organizations continue to argue for inclusion of creationism, intelligent design, or other political or faith-based doctrines alongside evolution in the science curricula of public schools; and

*Whereas,* none of the various faith-based doctrines have proposed scientifically testable hypotheses or rest upon a credible foundation of scientific evidence; and

*Whereas,* the lack of scientific foundation or scientifically testable structure of faith-based doctrines make them improper for inclusion in scientific curricula; and

*Whereas,* scientific organizations have a duty to demand and ensure scientific principles in research and education,

*Therefore, Be It Resolved,* The American Fisheries Society, in accordance with more than 70 other scientific societies, affirms that the theory of evolution is the only current scientific explanation for the diversity of life on earth for inclusion in the science curricula of public schools.

*Be It Further Resolved,* The American Fisheries Society opposes policies that would allow the teaching of creationism, intelligent design, or other political or faith-based doctrines in public school science classes and encourages citizens, educational authorities, and legislators to oppose such policies at the appropriate federal, state, and local levels of government.

## BACKGROUND STATEMENT: AFS EVOLUTION RESOLUTION

# The Debate over Teaching Evolution in Public Schools: Background of The American Fisheries Society Resolution Concerning the Teaching of Alternatives to Evolution

### INTRODUCTION

At the annual business meeting of the Education Section of the American Fisheries Society (AFS) in Lake Placid, New York, in September 2006, the Montana Chapter of AFS brought forward a draft resolution addressing teaching of evolution in public school science curricula. Support for the resolution was strong among those at the business meeting, and the Section agreed, with the consent of the Chapter, to adopt the project and develop a revised resolution to be put forward for adoption by the Society. The resolution was developed by the Education Section Executive Committee and put to the Section membership for a vote of approval. Upon approval by the Section (48 yes votes, 1 no vote), the resolution was forwarded to the Resolutions Committee of AFS, was approved (9 yes votes, 1 abstain and 2 no responses), and was forwarded for consideration by the Governing Board at the AFS Annual Meeting in San Francisco in September 2007. The resolution was approved by the Governing Board (unanimous vote) and presented to and officially adopted by the membership at the annual business meeting of the Society on 4 September 2007 (voice vote). What follows is a slightly revised version of the background document that was developed in support of the resolution and provided during the process of Section, committee, and membership votes. *Only the resolution itself represents the official position of the American Fisheries Society; this document is provided for background information purposes only.*

### EVOLUTIONARY SYNTHESIS

When Charles Darwin published his theory of evolution by natural selection almost 150 years ago, the scientific com-

munity embarked on a long journey of research, discovery, testing, challenging, and refinement of his ideas and their application to understanding natural processes. Perhaps no other scientific theory has been subjected to more rigorous testing than the theory of evolution, yet it has survived and remains the central tenet of the biological sciences, and the only scientifically acceptable explanation for the diversity of life on our planet. The body of knowledge broadly referred to as the theory of evolution satisfies all requirements of scientific theory in that it has been built by observation and experimentation, has resulted in testable hypotheses, and that supporting evidence has been proven to be repeatable when exposed to further scientific scrutiny. At present, no other explanation or hypothesis for the diversity of life present on Earth today satisfies these central criteria of scientific inquiry.

The immediate aftermath of Darwin's publication included highly charged and public debates within the scientific community. Rapid developments in the field of evolutionary biology occurred in the decade between the mid-1930s and the mid-1940s, resulting in what is now commonly referred to as the evolutionary synthesis. These developments resulted in what Ernst Mayr (1980) characterized as near universal acceptance by biologists of the selectionist interpretation of evolution by the middle of the twentieth century. In the decades that have ensued, research has led to robust debates regarding mechanisms and the finer points of the evolutionary process, but scientific debate over the validity of evolutionary theory as a whole and natural selection as its primary force has all but disappeared.

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### VIEWS OF U.S. PUBLIC

Despite acceptance by the scientific community, the U.S. public at large continues to hold divergent views on Darwinian evolution. Responses to various polls have been shown, not surprisingly, to be highly sensitive to the structure of questions, but typically indicate that a creationist view of the origin and development of life on Earth is more widely held by the general public than an unguided evolutionary process or an evolutionary process guided by a divine being. A series of six Gallup polls conducted since 1982 show a remarkably stable breakdown of public opinion. When asked about their views concerning the origin and development of human beings, 45% of 2004 respondents replied that they felt humans had been created by God in their present form, 38% that humans had evolved through a process guided by God, and only 13% felt humans had evolved through a process unguided by a higher power. These numbers are virtually unchanged from results of the first poll in 1982 (Pew Research Center 2005a). Similar results were obtained by a Pew Research Center poll in 2005. When asked whether they felt humans and other living things had evolved over time or existed in their present form since the beginning of time, 42% of respondents indicated they felt life on earth had existed in its present form since the beginning, 18% that it had evolved with divine guidance, and 36% that it

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had evolved through natural processes (Pew Research Center 2005a). A 2004 General Social Survey found that 54% of respondents felt it was not true that humans developed from earlier species, while 45% felt the statement was true (Pew Research Center 2005a).

Given that the preponderance of the U.S. public has not embraced a strictly naturalistic explanation for the diversity of life on earth, it should perhaps not be surprising that the content of public school science classes, specifically how they handle explanations for life's origin and diversity, has generated emotional and often heated controversy. A 1999 Gallup/CNN/USA Today poll found that 68% of respondents were in favor of teaching creationism along with evolution in public schools, with 40% in favor of teaching creationism instead of evolution (Pew Research Center 2005a). A Pew Research Center poll in 2005 found that 64% of respondents generally favored teaching of both evolution and creationism and 38% favored teaching of creationism alone (Pew Research Center 2005a).

## LEGAL HISTORY

The lack of consensus among members of the public regarding the appropriate content of public school courses covering biology and the diversity of life has generated a long history of debate over curriculum policies that has spilled over into the political and legal arenas. Tennessee, in 1925, became the first state to pass legislation that specifically made it illegal to teach "any theory that denies the story of divine creation of man as taught in the Bible." The American Civil Liberties Union quickly sought opportunities to challenge the law.

In hopes of bringing publicity to their town, Dayton, Tennessee, leaders set in motion events that led to teacher John Scopes' arrest for teaching evolutionary theory in class. *Tennessee v. John Scopes*, the now famous "Monkey Trial," was the first legal case to address the teaching of evolution in public schools. The trial has assumed a legendary role in the public's view of American legal history, largely

because of Hollywood's various portrayals of the courtroom debates about evolution between Clarence Darrow and William Jennings Bryan. Legally, the trial's outcome had nothing to do with the courtroom oratory concerning the merits of evolutionary theory by either side.

Scopes was found guilty of having broken the Tennessee statute and fined \$100 by the judge. The Tennessee Supreme Court later overturned the conviction based on the technicality that it was the jury rather than the judge that should have imposed the fine, thus ending hopes for an appeal to test the legality of the statute itself (Larson 1997).

It was not until 1968 that a high court ruling specifically addressed a state's rights to legislate the teaching of creationism and evolution in public schools. Susan Epperson, a Little Rock, Arkansas, high school teacher, agreed to pursue the Arkansas Education Association's desire to challenge a 1928 Arkansas law that made it unlawful for teachers in public schools to teach or use textbooks that taught "that mankind ascended or descended from a lower order of animals" (Epperson v. Arkansas 1968). After the Arkansas Supreme Court found the statute to be a "valid exercise of the state's power," the case was appealed to the U.S. Supreme Court. The court found the Arkansas statute unconstitutional, ruling that the Establishment Clause of the First Amendment (the clause reads, "Congress shall make no law respecting an establishment of religion") prohibited states from requiring "that teaching and learning must be tailored to the principles or prohibitions of any religious sect or dogma" (Epperson v. Arkansas 1968). *Epperson v. Arkansas*, therefore, established the court's stance that states did not have the authority to prohibit the teaching of evolution because of conflicts with religious beliefs.

The *Epperson v. Arkansas* case was the first in a series of court rulings that frustrated efforts by creationists to introduce faith-based doctrines concerning the origin and development of life into public school curricula. In the 1981 *Segraves v. California* case, the Sacramento Superior Court found that the California State

Board of Education's anti-dogmatism policy, which dictated that classroom discussions of life's origins be presented conditionally and not as dogma, did not violate the plaintiff's claim that classroom discussions of evolution violated his children's right to free exercise of religion under the Free Exercise Clause of the First Amendment (*Segraves v. California* 1981; the clause reads, "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof."). In 1982, a U.S. District Court found in *McLean v. Arkansas Board of Education* that the Arkansas "Balanced Treatment for Creation-Science and Evolution-Science Act" was unconstitutional because it violated the Establishment Clause. The decision was based on the court's opinion that creation science represented introduction of religious doctrine into the school curriculum (*McLean v. Arkansas Board of Education* 1982). In 1987, the U.S. Supreme Court ruled in *Edwards v. Aguillard* that Louisiana's "Creationism Act," which prohibited teaching of evolution unless accompanied by instruction in creation science, was unconstitutional. The court found that the term "creation science" embraced religious belief in the creation of humans by a supernatural being and therefore endorses religion (*Edwards v. Aguillard* 1987). In 1997, a U.S. District Court ruled in *Freiler v. Tangipahoa Parish Board of Education* that the board's requirement that teachers covering the topic of evolution read a disclaimer that included the statement, "It is hereby recognized by the Tangipahoa Parish Board of Education, that the lesson to be presented, regarding the origin of life and matter, is known as the Scientific Theory of Evolution and should be presented to inform students of the scientific concept and not intended to influence or dissuade the Biblical version of Creation or any other concept" was illegal, noting that the requirement singled out evolution and specifically required a religious tenet be considered (*Freiler v. Tangipahoa Parish Board of Education* 2000). The *Freiler* decision was also notable for inclusion in the dicta of the decision the statement that "intelligent design" as a

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proposed area of science education was equivalent to "creation science" (Freiler v. Tangipahoa Parish Board of Education 2000). These and other rulings consistently reaffirm the unconstitutionality of efforts to introduce religious doctrine into public school science classes whether through policy or the actions of individual teachers, and denied claims by teachers that school board requirements that they teach evolution violated their right to free exercise of religion, but the continuation of the legal battles illustrates the continued interest of both individuals and groups in introducing faith-based doctrines into public school science curricula.

## CURRENT DEBATE

It is clear from both the persistence of court challenges and the visibility of the issue in the popular press that the idea of evolution and the issue of its being taught in public schools without the accompaniment of faith-based explanations for the origin and diversity of life on earth strikes a chord with the U.S. public, some 90% of whom indicated they believed in God in a 2003 Harris poll (Taylor 2003). The emphasis on evolutionary theory in science classes has been portrayed as an attack on faith, and the issue has taken on distinctly political overtones that can be argued are designed to play on the public's religious beliefs and concerns about social values while sidestepping more germane issues such as the nature of science and the appropriate objectives of science education.

The Creation Science Research Center was founded in 1970 by "Young Earth" creationist Henry Morris and two housewives (one of whom was Nell Segraves, wife of the plaintiff in *Segraves v. California*). After criticisms that Morris was too soft on evolution, the center split and gave rise to the Institute of Creation Research (ICR) in 1972, dedicated to research and dissemination of information in the field of creation science (Numbers 2006). The ICR offers degrees in a variety of traditional scientific fields and has gained accreditation through the Transnational Association of Christian Colleges and Schools. The institute's

programs adhere to a strictly literal interpretation of the scripture's description of creation, and achieved a high level of visibility with spokespersons such as Duane Gish. The institute's own web page reveals that its mission is not purely scientific, listing among the reasons its programs are needed: "Because the harmful consequences of evolutionary thinking on families and society (abortion, promiscuity, drug abuse, homosexuality, and many others) are evident all around us even infiltrating our churches and seminaries" (ICR no date). The ICR remains active today, but their influence on policy concerning public school science curricula has been minimized through court decisions that teaching of creation science is a form of religious advocacy and therefore unconstitutional.

More recently, the Discovery Institute, a conservative think tank founded in 1990, established the Center for the Renewal of Science and Culture (now known as the Center for Science and Culture; CSC) in 1996 (Numbers 2006). The CSC is the driving force behind the "intelligent design" (ID) movement, described as a scientific area of research that holds "that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection" (Discovery Institute no date). The idea of intelligent design was first elucidated in the book *Of Pandas and People*, which has also been promoted as a textbook for public school science classes (Davis and Kenyon 1993). While the CSC's intelligent design program is characterized as scientific in nature, and arguments that it is appropriate for inclusion in public school curricula were initially based upon this claim, a leaked internal Discovery Institute document now known as the "Wedge Document" reveals a broader cultural and political agenda, including as objectives: "to defeat scientific materialism and its destructive moral, cultural, and political legacies" and "to replace materialistic explanations with the theistic understanding that nature and human beings are created by God" (Center for the Renewal of Science and Culture 1998). The

Institute has played an active role at local, state, and federal levels to promote its agenda. The institute receives substantial financial backing from fundamentalist conservatives, many of whom also make contributions to conservative political candidates (Wilgoren 2005; Numbers 2006).

The most visible case arising from efforts to introduce intelligent design into public schools took place in Dover, Pennsylvania. In 2004, the Dover Public School District implemented new policies, including changes to the biology curriculum that required that "students will be made aware of gaps/problems in Darwin's Theory and of other theories of evolution including, but not limited to intelligent design. The Origins of Life is not taught" and that *Of Pandas and People* would be made available to students desiring further information (Dover Area School District 2004). A subsequent lawsuit (*Kitzmiller v. Dover Area School District*) in U.S. District Court resulted in a widely publicized case, with the court's 2005 decision that the school district policy violated the Establishment Clause, concluding that "the overwhelming evidence at trial established that ID is a religious view, a mere re-labeling of creationism, and not a scientific theory" and that "we conclude that the religious nature of ID would be readily apparent to an objective observer, adult or child" (*Kitzmiller v. Dover Area School District* 2005; Humes 2007).

The defeat of ID in a federal court is likely to encourage increased efforts to undermine the teaching of evolution in the public schools by trying to cast doubt on evolution while remaining silent about religious, and thus constitutionally problematic, alternatives to it. In light of consistent court setbacks for efforts to introduce explicitly religious explanations for the diversity of life into school curricula, a "teach the controversy" movement has gained momentum, which portrays evolution as a highly controversial theory within the scientific community, and argues that critical thinking skills of students require exposure to the controversies and, by implication, alternative theories. The Discovery Institute provides resources for parents and school boards

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to assist in promoting the program, and also provides a model lesson plan (Discovery Institute 2007). The plan was adopted in Ohio, but ultimately removed in 2006 due to fears of a lawsuit after the *Kitzmiller* decision. The science standards adopted in 2005 by the Kansas State Board of Education reflected the movement to cast evolution as a controversial theory among scientists, but election of new board members led to reversal of these standards in early 2007. The judge's ruling in the *Kitzmiller* case touched on the "teach the controversy" movement, establishing a legal precedent for resistance to its incorporation into school curricula: "ID's backers have sought to avoid the scientific scrutiny which we have now determined that it cannot withstand by advocating that the controversy, but not ID itself, should be taught in science class. This tactic is at best disingenuous, and at worst a canard. The goal of the IDM [intelligent design movement] is not to encourage critical thought, but to foment a revolution which would supplant evolutionary theory with ID" (*Kitzmiller v. Dover Area School District* 2005).

On a larger stage, former Senator Rick Santorum (R) of Pennsylvania introduced an amendment to the 2001 federal education funding bill (the No Child Left Behind Act) that clearly sought to incorporate "teach the controversy" into federal law. The amendment, as proposed, read: "It is the sense of the Senate that—(1) good science education should prepare students to distinguish the data or testable theories of science from philosophical or religious claims that are made in the name of science; and (2) where biological evolution is taught, the curriculum should help students to understand why this subject generates so much continuing controversy, and should prepare the students to be informed participants in public discussions regarding the subject" (Numbers 2006). The amendment was stricken from the final bill, in part because of protests from 96 scientific and educational organizations, but it is reproduced in the bill's legislative history and continues to be cited by proponents of "teach the controversy" (see Discovery Institute 2004).

The "teach the controversy" movement exploits an apparent unawareness by the general public of how scientists view evolution. A 2005 Pew Research Center poll indicated that 33% of respondents felt there was disagreement among scientists about evolution. Among respondents that believed in creation, this number rose to 46% (Pew Research Center 2005b). However, public perceptions do not match those within the scientific community. In a recent survey of department chairs and deans of biology programs from 158 research institutions identified in the *Top American Research Universities*, 71 of 73 respondents indicated that there was no controversy within their departments regarding the current biological consensus on the mechanisms of evolution versus intelligent design theory. One response was equivocal, indicating a single faculty member adhered to intelligent design theory, and the sole response indicating an intra-departmental controversy came from a medical university sponsored by a fundamentalist denomination (Camp 2006).

Despite legal setbacks, the programs of the Discovery Institute and those with similar agendas have been well-designed to resonate with the public, particularly those with more conservative backgrounds, and there is no denying that they have effectively equated teaching of evolution to broader social issues that concern or threaten citizens. By conflating the real issues concerning the nature of scientific inquiry and the appropriate content of public school science curricula with broader social and political issues concerning the sanctity of faith and societal values, the various creation movements have turned the issue into a question of values rather than a question of education. The National Center for Science Education (NCSE), which provides advice and information to those defending teaching of evolution, maintains archives of challenges to the teaching of evolution in public school science classes. Between 1999–2000, they recorded 143 state or local cases in 34 states (NCSE no date a). In 2006, bills that challenged teaching of evolution, weakened sci-

ence standards, required disclaimers, or otherwise attempted to alter public school science curricula were introduced in Alabama, Georgia, Indiana, Maryland, Michigan, Missouri, Mississippi, New York, Oklahoma, South Carolina, and Utah (NCSE 2007).

## IMPLICATIONS

It is evident that consensus among the scientific community concerning the validity of evolutionary theory, constitutional mandates about the separation of church and state, and a long history of legal failures to introduce faith-based doctrines into public school science classes have not stemmed the tide of efforts to modify science curricula to include faith-based theories or otherwise discredit or soften the teaching of evolution. That the science education of our students has become embroiled in debates that are motivated by politics and social themes is particularly worrisome in light of the growing evidence that science and math literacy levels of pre-college U.S. students lag well behind the rest of the world. In a recent ranking of 29 Organization for Economic Co-operation and Development (OECD) nations concerning fluency in science and math of 15-year-olds, U.S. students were at or near the bottom (National Science Foundation 2006). These results have obvious implications for the recruitment of new scientists for the next generation as well as U.S. ability to meet the challenges of the future. Continued efforts to use public school science courses as an arena to wage political battles should not be tolerated, as the risks run far beyond simply teaching the theory of evolution. In accordance with the very real threats posed by continued efforts to compromise the quality of science education, more than 70 scientific societies have issued position statements, resolutions, or other public forms of support for barring faith-based doctrines from public school science classes as of 2006 (NCSE no date b). Similar statements have been issued by more than 35 educational organizations (NCSE no date b).

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The American Fisheries Society, the largest organization of professionals in the field of fisheries and aquatic sciences in the world, should join these other organizations in making a strong statement of opposition to continued efforts to introduce faith-based doctrines into public school science curricula, or any similar efforts to undermine the quality of public school science education to serve social or political purposes. As a society whose members work with natural resources, we should find it particularly disturbing that the theory of evolution, the best available scientific perspective from which to understand natural ecosystems, continues to be the target of political efforts to bring issues of faith and social values into public schools. As a profession that promotes the conservation and sustainable management of aquatic resources through the application of the best available science, our voice should be added to the others speaking out to protect science education in public schools.

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