SENATE EDUCATION
EXHIBIT NO. 8
DATE 2-7-05
BILL NO. SJ-8

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF GEORGIA

ATLANTA DIVISION

JEFFREY MICHAEL SELMAN, et al., Plaintiffs, v. COBB COUNTY SCHOOL DISTRICT, et al., Defendants.	No. 1:02-CV-2325-CC **BRIEF AMICUS CURIAE OF COLORADO CITIZENS FOR SCIENCE, KANSAS CITIZENS FOR SCIENCE, MICHIGAN CITIZENS FOR SCIENCE, NEBRASKA RELIGIOUS COALITION FOR SCIENCE EDUCATION, NEW MEXICO ACADEMY OF SCIENCE, NEW MEXICANS FOR SCIENCE AND REASON, NEW MEXICO COALITION FOR EXCELLENCE IN SCIENCE AND MATH EDUCATION, AND TEXAS CITIZENS FOR SCIENCE, IN SUPPORT OF PLAINTIFFS**

LYNN FANT 254963
Counsel of Record
P.O. Box 668
Marietta, GA 30061-0668
Tel: (770) 590-7294

Attorney for Amici Curiae Colorado Citizens for Science, *et al.*

TABLE OF CONTENTS

Page

TABLE OF AUTHORITIES ii

INTRODUCTION 1

IDENTITY AND INTEREST OF AMICUS CURIAE 1

SUMMARY OF ARGUMENT 2

ARGUMENT 2

I. INTELLIGENT DESIGN ADVOCATES MISREPRESENT EVOLUTIONARY SCIENCE 2

II. THERE IS NO GENUINE SCIENTIFIC CONTROVERSY OVER THE VALIDITY OF EVOLUTION 6

CONCLUSION 10

TABLE OF AUTHORITIES

Page

Cases

Freiler v. Tangipahoa Parish Bd. of Educ., 185 F.3d 337 (5th Cir. 1999), cert. denied, 530 U.S. 1251 (2000)) 6

Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993) 6

Everson v. Board of Ed. of Ewing Tp., 330 U.S. 1 (1947). 9

Other Texts

Gary L Bennett, *A Review of Of Pandas and People as a Textbook Supplement*, NCSE Reports, Nov. 2000 7

Marshall Berman, *Intelligent Design Creationism: A Threat to Society--Not Just Biology*, The American Biology Teacher, Nov. 2003 5

Wesley R. Elsberry, et al., *The "Meyer 2004" Medley*, Panda's Thumb 9

Douglas J. Futuyma, *Evolutionary Biology* (3d ed. 1998) 2, 3

Stephen Jay Gould and Richard Dawkins, *Letter to the New York Review of Books*, Dec. 14, 2001, *in A Devil's Chaplain* (L. Menon ed. 2004) 4

Barbara Carroll Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (2003). 5-6

Stephen Jay Gould, *Evolution as Fact and Theory*, Discover, May 1981 2-3

Paul R. Gross, *Patience and Absurdity: How to Deal with Intelligent Design Creationism* 7

Phillip E. Johnson, *The Wedge of Truth: Splitting the Foundations of Naturalism* (2000) 3, 4

Molleen Matsumura, *Facing Challenges to Evolution Education* 9

Laurence Moran, *Evolution is A Fact And A Theory*, Talk Origins Archive, Jan. 22, 1993. 2

Kenneth R. Miller, *Of Pandas and People: A Brief Critique* 7

NCSE,"*Project Steve,*" 8

NCSE, *Voices for Evolution: Statements from Scientific and Scholarly Orgnaizations*, ... 8

NCSE, *Evolving Banners at Discovery Institute* 8-9

Page

National Academy of Sciences, *Teaching About Evolution And The Nature of Science* (1998) 3

John Rennie, *15 Answers to Creationist Nonsense,* Scientific American, July 2002) 3, 4

Michael Ruse, *Darwinism Defended: A Guide to The Evolution Controversies* (1982) 3, 4

Jonathan Weiner, *The Beak of the Finch: A Story of Evolution in Our Time* (1995) 4

Carl Zimmer, *Evolution: The Triumph of An Idea* (2002) 3, 4

INTRODUCTION

There is no scientific controversy over the validity of the evolutionary explanation of plant and animal diversity, which is the grand unifying concept of modern biology. Although some religious organizations insist that there is, and have recruited spokesmen with only colorable scientific credentials to claim that there is, the fact remains that evolution is the only scientifically valid explanation for the diversity of life. Although a thorough defense of evolution is not possible in a legal brief, amici wish to provide a concise refutation of the notion that evolution is controversial, or that there is scientific debate over it. It is not controversial, and no serious or reliable scientific criticism of the validity of evolution has yet been presented.

IDENTITY AND INTEREST OF AMICUS CURIAE

Amici Colorado Citizens for Science, Kansas Citizens for Science, Michigan Citizens for Science, Nebraska Religious Coalition for Science Education, New Mexico Coalition for Excellence in Science and Math Education, and Texas Citizens for Science, are groups of scientists, concerned citizens, religious leaders, businesspeople, parents and educators, who are committed to maintaining excellence in public school science classrooms in their home states. Because evolution is one of the central unifying ideas in science, and also one of the most evidentially well-supported of all scientific discoveries, these organizations are all committed to protecting evolution education from those who seek to either eliminate it entirely, or water it down by bringing in religious alternatives dressed in scientific-sounding language. Amici are concerned that tactics such as the Cobb County "disclaimer," if left unchecked, will undermine evolution education throughout the nation.

SUMMARY OF ARGUMENT

Amici agree with the plaintiffs that the disclaimer placed by the Cobb County School Board in biology textbooks hurts biology education in a way that appeases sectarian interests. Amici contend that a first-class science education provides students with vital, meaningful ways to understand the world around them and will provide Georgia with the skilled labor force needed to expand our technological economy. Protecting the integrity of science education will contribute directly to the future of our students, our quality of life, and to the prosperity of the state of Georgia. Further, our efforts in Georgia will help other states and nations to protect science education from the incorporation of dogma and pseudoscience. Many educators, including amici, are familiar with the average citizen's lack of education or training in evolutionary biology. Religious interest groups opposed to modern science take advantage of this ignorance to promulgate confusion, as they have done in the amicus curiae brief filed in support of the plaintiffs. We respectfully submit information that we hope will illuminate these attempts to confuse the court.

I

INTELLIGENT DESIGN ADVOCATES MISREPRESENT EVOLUTIONARY SCIENCE

The disclaimer contains two errors: first, that evolution is "not a fact" and, second, that evolution is "regarding the origin of living things."

Evolution is both a fact *and* a theory. *See* Laurence Moran, *Evolution is A Fact And A Theory*, Talk Origins Archive, Jan. 22, 1993 (http://www.talkorigins .org/faqs/evolution-fact.html) (visited Nov. 12, 2004); Douglas J. Futuyma, *Evolutionary Biology* 11 (3d ed. 1998); Stephen Jay Gould, *Evolution as Fact and Theory*, Discover, May 1981 (http://www.stephenjaygould.org/library/gould_

fact-and-theory.html)(visited Nov. 12, 2004) ("Facts are the world's data. Theories are structures of ideas that explain and interpret facts.")[1]

The *fact* of evolution is that characteristics of populations of organisms change over time, producing biological diversity. *See generally* Carl Zimmer, *Evolution: The Triumph of An Idea* 2 (2002) ("In discussing the truth of evolution, we should make a distinction...between the simple fact of evolution—defined as the genealogical connection among all earthly organisms, based on their descent from a common ancestor, and the history of any lineage as a process of descent with modification—and theories...that have been proposed to explain the causes of evolutionary change."). The fact that organisms change over time, producing biological diversity, is undisputed, even by the public. The *theory* of evolution explains the *fact* of evolution, by identifying the mechanisms responsible for changes in populations. Gould, *supra;* John Rennie, *15 Answers to Creationist Nonsense,* Scientific American, July 2002 (http://www.sciam.com/article.cfm?articleID=000D4FEC-7D5B-1D07-8E49809EC588EEDF&sc=I100322) (visited Nov. 14, 2004) ("In addition to the *theory* of evolution, meaning the idea of descent with modification, one may also speak of the *fact* of evolution.... The fossil record and abundant other evidence testify that organisms have evolved through time. Although no one observed those transformations, the indirect evidence is clear, unambiguous and compelling.") Futuyma, *supra*, at 4 (same).

These mechanisms include mutation, gene duplication, natural and sexual selection, migration, and genetic drift (not just mutation and

---

[1] In science a fact is "an observation that has been repeatedly confirmed." National Academy of Sciences, *Teaching About Evolution And The Nature of Science* (1998) at 5 (http://www.nap.edu/openbook/0309063647/html/5.html) (visited Nov. 12, 2004). A theory is "a well-substantiated explanation of some aspect of the natural world that can incorporate facts, laws, inferences, and test hypotheses." *Id.*

selection as the Discovery Institute misleadingly suggests), and have been well tested, studied, and confirmed over the last century. Zimmer, *supra* ("Evolution, the basic organizing concept of all the biological sciences, has been validated to an equally high degree, and therefore may be designated as true or factual."); Jonathan Weiner, *The Beak of the Finch: A Story of Evolution in Our Time* (1995) (detailing intricate, first-hand observations of evolution in action on the Galapagos Islands).

There is *no scientific controversy* or debate about existence or utility of these mechanisms. *See, e.g.,* Stephen Jay Gould and Richard Dawkins, *Letter to the New York Review of Books,* Dec. 14, 2001, *reprinted in A Devil's Chaplain* 220 (L. Menon, ed. 2004) ("no qualified scientist doubts that evolution is a fact, in the ordinarily accepted sense in which it is a fact that the Earth orbits the Sun."). There is healthy debate amongst biologists about the *relative contribution* of various mechanisms, but the overwhelming consensus is that evolution does occur and the theory of evolution explains it exceedingly well. *See* Rennie, *supra* ("Evolutionary biologists passionately debate...how speciation happens, the rates of evolutionary change...and much more.... Acceptance of evolution as a factual occurrence and a guiding principle is nonetheless universal in biology.").

It is important to note what evolution is not. **Evolution is *not* a grand explanation of the origin of everything.** Many critics perceive that the theory of evolution covers everything from the origin of the universe to the origin of species. In reality, **biological evolution** only discusses the origin of the diversity of life, not the origin of the universe, galaxies, solar systems, and not the origin of life. Although terms such as "stellar evolution" and "chemical evolution" are sometimes used, they are distinct from (biological) evolution and the theory of evolution. Evolution is concerned with the origin of the diversity of life, which can

only occur after the origin of life. Therefore, any process leading up to the first life forms is not evolution, and not covered by evolutionary theory.

The placement of the disclaimer on biology textbooks unjustifiably encourages students to single out evolution as suspect, as if it were not a firmly established scientific fact. The disclaimer thus flatters misconceptions amongst students that a theory is a "guess" or a "hunch." This is the colloquial usage, but in science a theory is a well-substantiated explanation for observed phenomena. Good science education should equip students with critical thinking skills. However, such skills are wasted if students are encouraged to imagine that strongly established scientific theories are not really established. Students in secondary education are simply not educated enough about the biological literature to successfully examine the unifying concept of modern biology. As a result the disclaimer encourages unscientific thinking amongst students. As one scientist puts it, "[a]n indifferent purveying of wares is not education. One must offer children the best-sifted and most firmly grounded ideas that we have, together with the tools to move the inquiry forward." Michael Ruse, *Darwinism Defended: A Guide to The Evolution Controversies* 328 (1982).

In fact, the disclaimer is part of a coherent strategy to subvert evolution education. Marshall Berman, *Intelligent Design Creationism: A Threat to Society–Not Just Biology*, The American Biology Teacher, Nov. 2003 at 646-648 (http://sage.csa.com/jlang.html) (visited Nov. 12, 2004). As several scientists have noted, defenders of creationist theories have devised a so-called "wedge strategy" to implement the teaching of non-scientific theories in the biology classroom. *See generally* Phillip E. Johnson, *The Wedge of Truth: Splitting the Foundations of Naturalism* (2000); Barbara Carroll Forrest and Paul R. Gross, *Creationism's*

Trojan Horse: The Wedge of Intelligent Design (2003). As one defender of evolution education puts it,

> If someone were to charge that textbooks present atomic theory using evidence that is erroneous, misleading, and even fraudulent, and that we should therefore question whether matter is composed of atoms, eyebrows would be raised—at least at the accuser.... And if the same person proposed that citizens should encourage local school boards to insert anti-atomic theory disclaimers in science textbooks...and lobby state legislatures to restrict its teaching, it is doubtful that such exhortations would receive much attention.... Unlike atomic theory, evolution has obvious theological implications, and thus it has been the target of concerted opposition, even though the inference of common ancestry of living things is as basic to biology as atoms are to physics.

Dr. Eugenie Scott, National Center for Science Education, quoted in *id.* at 96. Indeed, like the disclaimer which the Fifth Circuit Court of Appeals struck down in *Freiler v. Tangipahoa Parish Bd. of Educ.*, 185 F.3d 337, 348 (5th Cir. 1999), *cert. denied,* 530 U.S. 1251 (2000), this disclaimer is designed to "impl[y] School Board approval of religious principles," and disapproval of the scientifically established principles of evolution. Thus "the disclaimer crafted by the School Board serves only to promote a religious alternative to evolution." *Id.*

II

THERE IS NO GENUINE SCIENTIFIC CONTROVERSY OVER THE VALIDITY OF EVOLUTION

Concepts make their way into science education by first going through the process of science; this involves researching, publishing, defending, confirming, and earning consensus. *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-94 (1993) (citing Karl Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* 37 (5th ed. 1989)). Then educators decide if new concepts are suitable for the level of the students; this involves curriculum

committees, government review, and finally official standards. However, there is no scientific support for supposed "evidence against evolution," and thus anti-evolutionists bypass this process and use politics to influence science education. *See further* Paul R. Gross, *Patience and Absurdity: How to Deal with Intelligent Design Creationism*, (review of *Why Intelligent Design Fails: A Scientific Critique of the New Creationism* by Matt Young and Taner Edis) (http://www.pandasthumb.org/pt-archives/000600.html) (visited Nov. 12, 2004).

A popular political strategy amongst anti-evolutionists is to claim there exists a scientific controversy about evolution that students should learn about. Objective inspection of this claim, however, reveals that it is suspect. The claim relies on citations of popular press works by anti-evolutionists that are not part of the peer-reviewed scientific literature. When actual biological literature is cited, its conclusions are misstated or misunderstood. For example, the popular "intelligent design" textbook *From Pandas To People* (1989) includes a litany of basic, serious mischaracterizations of evolutionary science. *See* Gary L Bennett, *A Review of Of Pandas and People as a Textbook Supplement*, NCSE Reports, Nov. 2000 (http://www.ncseweb.org/resources/rncse_content/vol20/1434_a_review_of_iof_pandas_and_p_12_30_1899.asp) (visited Nov. 12, 2004); Kenneth R. Miller, *Of Pandas and People: A Brief Critique* (http://www.kcfs.org/pandas.html)

Another popular political tactic of anti-evolutionists is compiling lists of scientists who doubt evolution. These lists may look impressive at first, but in reality they contain very few biologists and virtually no one who has ever done scientific work on evolution.[2] Despite claims that their ranks are swelling, the lists

---

[2] Scientists who are not biologists may not necessarily have ever taken a college-level biology course. When, in their writings, intelligent design advocates refer to "scientists" generically, the public receives a deeply misleading impression that a

(continued...)

are stagnant at a few hundred signatures. In response, the National Center for Scientific Education (NCSE) has a growing list of over five hundred scientists, mostly biologists, who support evolution education. To show how many scientists support evolution education, NCSE includes on their list *only scientists named Steve* (or some derivation thereof), which is approximately about 1 percent of all scientists. *See* NCSE, *"Project Steve,"* (http://www.ncseweb.org/article.asp?category=18) (visited Nov. 12, 2004). At present, this list contains over 500 names. It is proposed that this corresponds to perhaps tens of thousands of individual scientists who agree that evolution is the proper scientific explanation that students ought to be taught. Moreover, the list of scientific and scholarly organizations that support evolution education is quite long. *See* NCSE, *Voices for Evolution: Statements from Scientific and Scholarly Organizations*, (http://www.ncseweb.org/resources/articles/344_statements_from_scientific_an_12_19_2002.asp) (visited Nov. 12, 2004). Within the biological and scientific communities, anti-evolutionists are an extremely minor, religiously motivated fringe group.

Amici are gravely concerned about the many attempts by religious organizations to politicize the education of public school science students. Some groups, such as Answers in Genesis and the Creation Research Institute, are candid about their goal to eliminate what they sometimes call "evil-ution," and bring fundamentalist Christian doctrine into public school science classes. But other groups, such as Discovery Institute and IDNet, take pains to hide their agenda by cloaking it heavily in pseudoscientific garb. *See, e.g.*, NCSE, *Evolving Banners at Discovery Institute,* (http://www.ncseweb.org/resources/articles/4116_

---

[2] (...continued)
"scientist" is competent to have an opinion on all types of science.

evolving_banners_at_the_discov_8_29_2002.asp) (visited Nov. 12, 2004). These religious advocates are not engaged in quality science. Intelligent design activists, for example, have yet to publish any peer-reviewed scientific research supporting what they claim are scientific data showing the inadequacy of evolution to explain the diversity of life. *See, e.g.*, Wesley R. Elsberry, *et al., The "Meyer 2004" Medley,* Panda's Thumb (http://www.pandasthumb.org/pt-archives/000484.html) (visited Nov. 12, 2004).; Mark Isaak, *Index to Creationist Claims* (2004) (http: //www.talkorigins.org/indexcc/CI/CI001_4.html) (visited Nov. 12, 2004). Revealing their agenda, the Discovery Institute's president, Bruce Chapman, explained that the Center seeks "[t]o replace materialistic explanations with the theistic understanding that nature and human beings are created by God." *Evolving Banners, supra.*

The bottom line is simple: evolution is an exhaustively tested, highly substantiated explanation for the origin of biological diversity. It is not controversial, although some religious groups have taken great pains to portray it as controversial. The Cobb County disclaimer is a part of a strategy which these groups have adopted in an attempt to undermine evolution education and replace it with a "theistic understanding" of the origins of species. *See further* Molleen Matsumura, *Facing Challenges to Evolution Education,* (http://www.ncseweb.org/ resources/articles/8963_facing_challenges_to_evolution_12_7_2000.asp) (visited Nov. 12, 2004). Such an attempt is simply unconstitutional, since it is not the place of the state's schools to "aid one religion, aid all religions, or prefer one religion over another." *Everson v. Board of Ed. of Ewing Tp.*, 330 U.S. 1, 15 (1947).

//

//

CONCLUSION

For these reasons, Amici urge the Court to find in favor of the Plaintiffs.

DATED: Nov. 15, 2004.

Respectfully submitted,

LYNN FANT

By _____
LYNN FANT

Attorney for Amici Curiae