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BOSTON UNIVERSITY

Darwin, Design, and Disestablisbment: Teacbing the Evolution Controversy in Public Schools

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The controversy over teaching evolution in public schools is once again hot news.[1] Ever since the Supreme Court decided in 1987 that Louisiana could not constitutionally require teachers to give equal time to teaching creation science and evolution,[2] critics of evolution have adopted a variety of new strategies to change the way in which public schools present the subject to their students.[3] These strategies have included teaching evolution as a "theory" rather than as a fact,[4] disclaiming the truth of evolutionary theory,[5] teaching

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1. *See, e.g.*, Holly J. Morris, *Life's Grand Design: A New Breed of Anti-Evolutionists Credits It to an Unnamed Intelligence*, U.S. NEWS & WORLD REPORT, July 29, 2002, at 52 (describing the intelligent design movement in one of a series of stories on evolution in the issue), *available at* 2002 WL 8430902; *see also infra* Part I.

2. Edwards v. Aguillard, 482 U.S. 578, 596-97 (1987):

> The Louisiana Creationism Act advances a religious doctrine by requiring either the banishment of the theory of evolution from public school classrooms or the presentation of a religious viewpoint that rejects evolution in its entirety. The Act violates the Establishment Clause of the First Amendment because it seeks to employ the symbolic and financial support of government to achieve a religious purpose.

3. In addition to the sources cited below, see also Eugenie C. Scott, *Antievolution and Creationism in the United States*, 26 ANN. REV. ANTHROPOLOGY 263, 277-85 (1997) (describing various strategies attempted since *Edwards*).

4. *See, e.g.*, H.R. 888, 2002 Reg. Sess. (Miss. 2002), *available at* http://index.ls.state.ms.us/S:/Documents/2002/pdf/hb/0800-0899/hb0888in.pdf (A failed Mississippi House bill provided that all curricula presenting evolution "shall indicate that evolution is only a theory."); H.R. 2548, 83d Reg. Sess. (Ark. 2001), *available at* http://www.arkleg.state.ar.us/ftproot/bills/2001/htm/hb2548.pdf (An Arkansas House bill, which was postponed indefinitely, required teachers to tell the class whenever a statement made by the teacher was one of theory rather than of fact, and the bill identified the age of the earth as an example of such a theory.); H.R. 391, 146th Gen. Assem. (Ga. 2001), *available at* http://www.legis.state.ga.us/Legis/2001_02/fulltext/hb391.htm (A Georgia House bill, which died in the Georgia House Education Committee, called for teachers to distinguish between "philosophical materialism and authentic science" when presenting material on the origin of life.); H.R. 4382, 91st Leg., 2001 Reg. Sess. (Mich. 2001), *available at* http://www.michigan-legislature.org/documents/2001-2002/billintroduced/house/pdf/2001-HIB-4382.pdf (A Michigan House bill, which died in the Committee on Education, presented evolution as an "unproven theory."); H.R. 511, 1997 Sess. (N.C. 1997), *available at* http://www.ncga.state.nc.us/html1997/bills/CurrentVersion/house/hbil0511.full.html (A North Carolina House bill, which died in the Committee on Education/Higher Education, called for a revised science curriculum to ensure that evolution be taught as theory, rather than as proven fact.); Carrie Smith, *Woman Takes Aim at Textbooks Mother Objects to Information on Evolution*, CHARLESTON GAZETTE (W. Va.), Dec. 2, 2000, at 9A, *available at* 2000 WL 2640103 (describing a complaint filed by a West Virginia parent with the county board of education claiming that science textbooks presented "false and fraudulent" information about evolution in violation of state laws, which require that all classroom material be accurate); *Updates*, REP. NAT'L CTR. FOR SCI. EDUC., Mar.-Apr. 1999, at 5 (describing how the Nebraska state Board of Education changed science content standards when the Deputy

arguments against evolution,[6] teaching the allegedly nontheistic

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Attorney General informed it that teaching evolution as fact may violate a student's constitutional rights); *Updates*, REP. NAT'L CTR. FOR SCI. EDUC., Nov.-Dec. 1998, at 5 (describing the rejection by the Idaho School Boards Association of a resolution that would have prohibited evolution from being taught as fact).

Defenders of evolution concede that evolution is technically a "theory," but they consistently point out that calling evolution a "theory," as that term is used in scientific discourse, does not cast any doubt on evolution's explanatory power or viability. *See, e.g.*, Scott, *supra* note 3, at 278-79 (noting the difference between the meaning of the word "theory" as used in science and among the public); *see also infra* notes 234-35.

5. *See, e.g.*, Frieler v. Tangipaboa Parish Bd. of Educ., 185 F.3d 337, 349 (5th Cir. 1999) (finding a school board resolution, which required a disclaimer of endorsement before evolution could be taught, unconstitutional), *cert. denied*, 530 U.S. 1251 (2001); S. 6058, 57th Leg., 1st Reg. Sess. (Wash. 2001) (A failed Washington Senate bill called for a textbook insert describing macroevolution as an unobserved and unproven theory.), *available at* http://search.leg.wa.gov/pub/textsearch/ViewRoot.asp?Action=Html&Item=0&X=106144514&p=1; H.R. 1876, 47th Leg., 2d Sess. (Okla. 2000) (An Oklahoma House bill, which died in the Education Committee, would have given the Textbook Committee authority to insert one-page notices into any textbook.); S. 1139, 47th Leg., 2d. Sess. (Okla. 2000) (A bill that passed the Oklahoma Senate would have required all textbooks to "include acknowledgement that human life was created by one God of the Universe."), *available at* http://www2.lsb.state.ok.us/measures/1999%2D00%20hb/sb1139%5Fhasb.rtf; 30 Okla. Op. Att'y. Gen. 26, 2000 WL 156576, at *6 (2000) (opining that the Textbook Committee lacked authority to require disclaimer); *Okla. Textbooks to Carry Disclaimer*, ASSOCIATED PRESS ONLINE, Nov. 11, 1999 (reporting on the Oklahoma State Textbook Committee order that required all relevant textbooks to carry a disclaimer stating that evolution is "a controversial theory"), *available at* 1999 WL 28138400; Mary McDonald, *A Textbook Case in Cobb County*, ATL. J. & CONST., Apr. 12, 2002, at 1F (describing a Georgia county school board's order that each new biology textbook include an insert describing evolution as tbeory), *available at* 2002 WL 3718616; Eric Miekle, *Alabama Upgrades Disclaimer*, REP. NAT'L CTR. FOR SCI. EDUC., May-Aug. 2001, at 4 (describing revised Alabama disclaimer inserted into biology textbooks); *Updates*, REP. NAT'L CTR. FOR SCI. EDUC., Sep.-Oct. 2000, at 9, 10 (describing an insert for science textbooks emphasizing that evolution is not fact, which was privately designed by an association that distributes it to students and encourages them to place the inserts in their biology textbooks); *Updates*, REP. NAT'L CTR. FOR SCI. EDUC., Nov.-Dec. 1999, at 9, 11-12 (describing an adopted Oklahoma Senate bill amendment requiring that science textbooks that are adopted by the state textbook committee acknowledge that "human life was created by one god of the universe").

6. *See, e.g.*, H.R. 2585, 44th Leg., 2d Reg. Sess. (Ariz. 2000) (An Arizona House bill, which died in committee, required that "if instruction is provided on the theory of evolution . . . , the teacher shall present scientific evidence that supports . . . and . . . does not support . . . the theory of evolution."), *available at* http://www.azleg.state.az.us/legtext/44leg/2r/bills/hb2585p.htm; H.R. 679, 123d Gen. Assem., Reg. Sess. (Ohio 2000) (An Ohio House bill, which died in the Education Committee, required that teachers present evidence against evolution in order to teach evolution.), *available at* http://www.legislature.state.oh.us/bills.cfm?ID=123_HB_679; *Commission Pares Test Requirements from Five to Three Subjects*, ASSOCIATED PRESS, Oct. 16, 1999, *available at* Westlaw, Allnewsplus Database (describing the Idaho State Board of Education's rejection of graduation standards that called for students to show two strengths and two weaknesses of evolution); Karl D. Frezer, *Consensus of Scientists Often Wrong, Board's Proposed Evolution Standard Should Be Rejected*, CHARLESTON GAZETTE (W. Va.), Nov. 10, 1999, at 5A, *available at* 1999 WL 6755484 (describing Kanawha County's (West Virginia) rejection of a policy that would have permitted teaching arguments for and against evolution); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Jan.-Apr. 2000, at 20 (describing a local Kansas school board's order that required the superintendent to revise the high school science curriculum to include criticisms of evolution); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Jan.-Feb. 1999, at 6, 7

theory of intelligent design instead of creationism,[7] removing

(describing a local Idaho school board's approval of a curriculum that presents strengths and weaknesses of evolution); Pamela R. Winnick, *State Panel Rejects Teaching Creation Science Standards*, PITTSBURGH POST-GAZETTE, July 12, 2001, at B1, *available at* 2001 WL 22209280 (describing the rejection by the Pennsylvania State Board of Education of proposed science standards that required students to analyze data that both supports and refutes evolution).

7. *See* Jay D. Wexler, Note, *Of Pandas, People, and the First Amendment: The Constitutionality of Teaching Intelligent Design in the Public Schools*, 49 STAN. L. REV. 439, 452-68 (1997) (discussing the controversy over using an intelligent design textbook in public schools). The theory of "intelligent design" refers to "an alternate theory of biological origins held by a number of scientists and philosophers who believe that 'intelligent causes rather than undirected natural causes best explain many features of living systems.' " Nicholas P. Miller, *Life, the Universe and Everything Constitutional: Origins in the Public Schools*, 43 J. CHURCH & ST. 483, 484 n.5 (2001); *see* Wexler, *supra*, at 441-42 (discussing the theory of intelligent design). As I summarize there:

> Simply put, proponents of intelligent design argue that the world and its creatures are far too complex to have arisen through random patterns of evolution and must be the product of some intelligent designer. To use a common example drawn from [William] Paley's work, if we were to come across a stone on a beach we might reasonably believe that the stone had lain on the beach forever. However, if we were to come across a watch on the beach, we could only reasonably conclude that someone had designed the watch. Like the watch, such complex natural phenomena as the human eye, the bat's sonar system, the bee's colony, and the spider's web are so intricate and perfect that an intelligent designer must have created them. Because intelligent design theory does not necessarily rely on any particular conception of the designer and does not require belief in any particular biblical story . . . intelligent design theory is put forth as science, not religion, and thus as a worthy complement to evolution in the classroom.

Id. at 442 (footnotes omitted). For a recent history of the movement to promote intelligent design, see Barbara Forrest, *The Wedge at Work: How Intelligent Design Creationism Is Wedging Its Way into the Cultural and Academic Mainstream*, *in* INTELLIGENT DESIGN CREATIONISM AND ITS CRITICS: PHILOSOPHICAL, THEOLOGICAL, AND SCIENTIFIC PERSPECTIVES 5, 6-16 (Robert T. Pennock ed., 2002). A wide range of legislative measures has attempted to require the teaching of alternative theories to evolution. *See, e.g.*, H.R. 1101, 2002 Reg. Sess. (Miss. 2002) (A Mississippi House bill, which died in the Education Committee, provided that teachers could present origin theories only if each theory was given equal instruction time.), *available at* http://www.state.ms.us/frameset.jsp?URL=http://www.ls.state.ms.us/; H.R. 2554, 77th Leg. (W. Va. 2002) (A West Virginia House bill, which died in the Education Committee, provided for teaching evolution and creation science on an equal basis.), *available at* ftp://129.71.164.29/ftp-bouse02/HB2501-2600/; H.R. 1323, 112th Gen. Assem., 1st Reg. Sess. (Ind. 2001) (An Indiana House bill, which failed in the Committee on Education, would have given schools' governing bodies the authority to require the teaching of various theories, including creation science.), *available at* http://www.in.gov/legislative/bills/2001/PDF/IN/IN1323.1.pdf; H.R. 4705, 91st Leg., 2001 Reg. Sess. (Mich. 2001) (A Michigan House Bill, which failed in the Committee on Education, would have prevented school officials from prohibiting the teaching of intelligent design.), *available at* http://www.michiganlegislature.org/documents/2001-2002/billintroduced/house/pdf/2001-HIB-4705.pdf; H.R. 4382, 91st Leg., 2001 Reg. Sess. (Mich. 2001) (A failed Michigan House bill would have revised the science standards by requiring students to explain both evolution and intelligent design.), *available at* http://www.michiganlegislature.org/documents/2001-2002/billintroduced/house/pdf/2001-HIB-4382.pdf; H.R. 588, 91st Gen. Assem., 1st Reg. Sess. (Mont. 2001) (A failed Montana House bill, which was tabled in committee, called for a reasonably balanced presentation of competing theories regarding the origin of life.), *available at* http://data.opi.state.mt.us/bills/-2001/billhtml/HB0588.htm; Josyln Pfau, *Patrick Henry in Need of New School Buses*, N.W. SIGNAL, Apr. 16, 2002 (describing an Ohio local school board's motion that sanctioned the

evolution from academic standards or prohibiting the teaching of evolution,[8] changing the word "evolution" in state science standards to something less controversial,[9] stocking school libraries with texts advocating alternatives to evolution,[10] and establishing elective

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inclusion of intelligent design in classroom discussions), *available at* http://www.northwestsignal.net/archives/index.inn?loc=detail&doc=/2002/April/16-2685-news04.txt; *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Nov.-Dec. 1999, at 10 (reporting on New Mexico Senate Education Committee's encouragement of the Board of Education to allow equal time for creation science and describing a rejected California proposal that required creation science to be taught alongside evolution in state job retraining programs and juvenile detention centers); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Mar.-Apr. 1998, at 5 (reporting that the Tippecanoe Valley School Board in Indiana had adopted an "Origin of Life Curriculum" that requires creation science to be taught alongside evolution). Unfortunately, an important new book on the constitutionality of intelligent design came to my attention too late in the editing process to be considered in this Article. *See* FRANCIS J. BECKWITH, LAW, DARWINISM, AND PUBLIC EDUCATION: THE ESTABLISHMENT CLAUSE AND THE CHALLENGE OF INTELLIGENT DESIGN (2003).

8. Such a removal occurred in Kansas in 1999, when the State Board of Education removed evolution from state science standards. *See* Douglas E. Stewart, Jr., Note, *Going Back in Time: How the Kansas Board of Education's Removal of Evolution from the State Curriculum Violates the First Amendment's Establishment Clause*, 20 REV. LITIG. 549, 552-57, 574-88 (2001) (discussing in detail the decision of the Kansas Board of Education, discussing and applying the Establishment Clause precedent that would be available to the Court, and ultimately concluding that the Board's action was unconstitutional); Marjorie George, Comment, *And Then God Created Kansas? The Evolution/Creationism Debate in America's Public Schools*, 149 U. PA. L. REV. 843, 843, 867-72 (2001) (discussing the Kansas School Board's decision to remove evolution from the state science standards, applying the test announced by the Supreme Court in *Lemon v. Kurtzman*, 403 U.S. 602, 612 (1971), and concluding that the decision would likely be held unconstitutional, primarily because of the Board's improper purpose in making its decision). For other similar efforts, see H.R. 2681, 57th Reg. Sess., 2d Sess. (Wash. 2002) (A Washington state House bill, which failed in the Education Committee, stated that the teaching of evolution was repugnant to the Declaration of Independence, acknowledged a "creator," and required all textbooks and curriculum teaching evolution to be removed in favor of creation science); S. 6500, 57th Reg. Sess., 2d Sess. (Wash. 2002) (same); H.R. 299, 2000 Reg. Sess. (Ky. 2000) (A Kentucky House bill, which failed in the Education Committee, would have banned the teaching of macroevolution.), *available at* http://www.lrc.state.ky.us/2000rsrecord/HB299/bill.doc; Deborah Frazier, *School Has Monkey on Its Back*, DENVER ROCKY MT. NEWS, Aug. 28, 2000, at 5A (describing how state standards do not require the teaching of human evolution in Colorado), *available at* 2000 WL 6605052; *News*, REP. NAT'L CENTER FOR SCI. EDUC., July-Aug. 1999, at 4 (describing the Idaho Board of Education Chairman's statement that students could pass graduation tests even without answering questions about evolution); Dave Thomas, *New Mexico Returns Evolution to Science Standards*, REP. NAT'L CENTER FOR SCI. EDUC., Sept.-Oct. 1999, at 9 (describing state science standards in New Mexico, where evolution was absent between 1994 and 1999, after which it was reinstated by the Board of Education); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Sept.-Oct. 1999, at 10-11 (describing the state of science education in Illinois, where evolution has been absent from state standards since 1996).

9. *See, e.g.*, Liz Sidoti, *Challenges to Evolution's Prominence Set Stage for Ohio Battle*, ASSOCIATED PRESS, Mar. 9, 2002, Westlaw, Allnewsplus Database (describing how West Virginia, Tennessee, and Florida avoid the word "evolution" in their science standards); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Sept.-Oct. 1999, at 11 (describing how Kentucky state science standards use the phrase "change over time" instead of "evolution").

10. *See Updates*, REP. NAT'L CENTER FOR SCI. EDUC., July-Aug. 2000, at 15-16 (describing the Minnesota school board's acceptance of donated books criticizing evolution and the efforts of

creationism courses,[11] among others.[12] These steps have created significant public controversy in many states and have resulted in several lawsuits and threatened lawsuits.[13] For instance, Kansas's decision to eliminate macroevolution from state educational standards made national and international headlines in the summer of 1999,[14] while a Louisiana law requiring teachers to read disclaimers about evolution was held unconstitutional by the Court of Appeals for the Fifth Circuit[15] and missed being taken up by the Supreme Court by a single vote.[16]

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a New Mexico high school "Creation Club" to distribute creationist literature to students on campus); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., July-Aug. 1999, at 5 (describing efforts by Kentucky-based organization to offer free and discounted copies of a creationist text to students outside schools); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Nov.-Dec. 1998, at 5 (describing a local Michigan school board's decision to place nineteen creationist books in school libraries).

11. *See Columbus High Schools Consider Offering Creationism Course*, ASSOCIATED PRESS, Feb. 4, 2002, Westlaw, Allnewsplus Database (describing a proposed elective creationism course for high school students in Indiana that was supported by 1,300 people signing petition); *Pennsylvania School District Cancels Creationism Seminar*, NAT'L CENTER FOR SCI. EDUC. (describing a Pennsylvania local school board's cancellation of a proposed creationist seminar), *at* http://www.ncseweb.org/resources/news/2002/PA/643_pennsylvania_school_district_c_3_1_2002.asp; *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., Jan.-Feb. 1998, at 9 (describing an elective research project offered by an Idaho biology teacher that evaluated evidence supporting evolution and creationism).

12. In some schools, students have taken action to promote creation science. *See, e.g.*, Pervaiz Shallwani, *Pennridge Grad Sues for Speech Freedom*, ALLENTOWN MORNING CALL, July 27, 2001, at B1, *available at* 2001 WL 23153938 (describing a lawsuit filed by a high school graduate who was prohibited from passing out flyers that identified errors regarding evolution in textbooks and presented "10 questions students should ask their science of biology instructors"); *Updates*, REP. NAT'L CENTER FOR SCI. EDUC., July-Aug. 2000, at 16 (describing a "creation club" started by students in a school in New Mexico). Charter schools have also been a center of controversy for evolution-related issues. *See, e.g.*, Daugherty v. Vanguard Charter Sch. Acad., 116 F. Supp. 2d 897, 916 (W.D. Mich. 2000) (granting defendant summary judgment in a suit that claimed the charter school was teaching creationism on the ground that "there is no evidence that defendants [the school] have employed a policy of either preferring the teaching of creationism or restricting the teaching of evolution"); Edward Wyatt, *Charter School to Raise Topic of Creationism*, N.Y. TIMES, Feb. 18, 2000, at B1 (describing a New York charter school that intends to present contrasting theories to evolution), *available at* 2000 WL 16312333. In Louisiana, some state legislators attempted to pass a resolution that would have identified Darwin's theory of natural selection as a justification for racism and stated that Hitler used Darwin's theory to justify the Holocaust. H.R. Con. Res. 74, 2001 Reg. Sess. (La. 2001) (original version). The resolution, which requires education regarding racism, passed without the references to Darwin. H.R. Con. Res. 74, 2001 Reg. Sess. (La. 2001) (enacted version).

13. *See, e.g.*, Freiler v. Tangipahoa Parish Bd. of Educ., 185 F.3d 337 (5th Cir. 1999) (holding unconstitutional a Louisiana law requiring teachers to read disclaimers about evolution), *reh'g en banc denied*, 201 F.3d 602 (5th Cir. 2000), *cert. denied*, 530 U.S. 1251 (2001); Stewart, *supra* note 8, at 552-57 (discussing the decision of the Kansas Board of Education and its constitutional implications).

14. *See* George, *supra* note 8, at 843, 865-67; Stewart, *supra* note 8, at 552-57.

15. *Freiler*, 185 F.3d at 337.

16. *Freiler*, 530 U.S. at 1251 (denying certiorari with three dissenting justices).

For the most part, of course, the controversy over teaching evolution has played out at the state and local levels.[17] In 2001, however, the stakes rose when no less an influential body than the United States Senate jumped into the fray.[18] In a short amendment to President Bush's education bill introduced by Republican Senator Rick Santorum of Pennsylvania, the Senate endorsed the idea that schools should teach students about the evolution-creationism controversy.[19] The amendment, adopted by a 91-8 vote on June 13, 2001, stated the Senate's nonbinding "sense"[20] 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 the subject generates so much continuing controversy, and should prepare the students to be informed participants in public discussions regarding the subject.[21]

Both camps in the evolution-creationism debate were quick to take sides on the amendment. Groups that support the teaching of various forms of "creation science"[22] lauded the amendment for promoting intellectual freedom[23] and for urging public schools to question evolutionary theory.[24] Critics of teaching creationism in schools, on the other hand, such as the watchdog group the National Center for Science Education,[25] countered that the "senseless"[26] amendment was

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17. *See supra* notes 4-12.

18. *See* 147 CONG. REC. S6,147-53 (daily ed. June 13, 2001) (discussing and voting on Senator Santorum's amendment to S.1, 107th Cong. (2001)).

19. *Id.*

20. So-called "sense of the Senate" or "sense of the Congress" provisions are not legally binding. *See* Louis Fisher, *Congressional Abdication: War and Spending Powers*, 43 ST. LOUIS UNIV. L.J. 931, 963 (1999).

21. 147 CONG. REC. S6147-48 (daily ed. June 13, 2001) (reading of Senator Santorum's proposed amendment); 147 CONG. REC. S6153 (reporting vote).

22. In this paragraph and occasionally in other parts of the Article, I use the terms "creationist" and "creation science" loosely. I recognize, for instance, that supporters of the theory of intelligent design distinguish that theory from both creationism and creation science.

23. *See U.S. Senate Supports Intellectual Freedom!*, ANSWERS IN GENESIS MINISTRIES, June 23, 2001 (reporting that Senator Santorum's passed "sense of the Senate" amendment "supports intellectual freedom"), *at* http://www.answersingenesis.org/docs2001/0623news.asp (last visited Jan. 7, 2003).

24. *See U.S. Senate Passes Amendment and Supports Critical Thinking Regarding Evolutionary Theory*, INTELLIGENT DESIGN AND EVOLUTION (IDEA) CLUB (addressing comments of Senators supporting the Santorum amendment because, in the view of IDEA Club members, the amendment "supports critical thinking regarding evolutionary theory"), *at* http://www-acs.ucsd.edu/~idea/senate.htm (last visited Jan. 7, 2003).

25. For more on this group, see NAT'L CTR. FOR SCI. EDUC., *at* http://www.natcenscied.org.

26. Eric Meikle, *Senseless in the Senate*, REP. NAT'L CENTER FOR SCI. EDUC., Nov.-Dec. 2000, *available at* http://www.ncseweb.org/resources/rncse_content/vol20/5810_senseless_in_the_senate_12_30_1899.asp. Even though the official date of this report predates the amendment, the report was in fact issued after the amendment, in late 2001.

the handiwork of proponents of intelligent design creationism[27] and was designed to discourage education about evolution.[28] Both sides looked for the meaning of the amendment not simply to its language but also to its legislative history, which makes it clear that the language was intended, at least by some of its supporters, to encourage the teaching of theories critical of evolution within the science classroom.[29]

Although the disputed language was eventually removed from the bill during a House-Senate conference,[30] the controversy over teaching of evolution in the public schools has remained intense. Largely this is the result of events that have recently transpired in the state of Ohio, where advocates of the teaching of intelligent design pressed for legislative and administrative measures that would require or encourage public schools to teach alternatives to evolution in science classrooms.[31] Public meetings called to debate the proposals drew about a thousand people. Each side looked to the events in the U.S. Congress as support for its position. Supporters of intelligent design pointed to the Senate's passage of Santorum's amendment; their critics emphasized Congress's ultimate rejection of the controversial language.[32]

Whether lawmaking bodies should require or encourage public high schools[33] to teach students about the controversy over evolution,

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27. *From the Editor*, REP. NAT'L CENTER FOR SCI. EDUC., Nov.-Dec. 2000, at 3.

28. Meikle, *supra* note 26, at 4 ("The fact that evolution is singled out from all controversial issues indicates the amendment's intention to discourage evolution education.").

29. *See infra* text accompanying notes 41-61.

30. *See infra* notes 70-71 and accompanying text.

31. *See infra* text accompanying notes 72-108. Another significant recent controversy involving this issue emerged in Cobb County, Georgia, where, in September of 2002, the school board voted unanimously to allow teachers to introduce students to different views about origins. Mary McDonald & Mia Taylor, *Cobb Welcomes Alternate Views on Evolution*, ATL. J. & CONST., Sept. 27, 2002, at A1, *available at* 2002 WL 3739685. However, recent clarifying guidelines emphasize that county teachers should follow state standards and continue to teach evolution as they had taught it previously. *See* Mary McDonald, *Cobb Issues Evolution Guidelines to Teachers*, ATL. J. & CONST., Jan. 9, 2003, at B1, *available at* 2003 WL 8962478.

32. *Compare* Greg Pierce, *Inside Politics*, WASH. TIMES, Mar. 20, 2002, at A05 (reporting that two Ohio congressmen told their state's board of education that federal law requires that the state's "new science standards not 'censure debate on controversial issues in science' "), *available at* 2002 WL 2907097, *with* Kenneth R. Miller, *The Truth About the "Santorum Amendment" Language on Evolution* (noting that the language was taken out of the final bill and observing that "[t]he fact that the anti-evolutionists eagerly misrepresent both the content of the Education Bill and the language in the new Education Act is at once distressing and instructive"), *at* www.millerandlevine.com/km/evol/santorum.html.

33. This Article deals only with the issue of teaching the evolution controversy in public high schools or secondary schools. Separate issues not considered here would be raised by teaching the controversy (or by teaching about religion generally) in elementary schools. *See*

and, if so, what exactly schools should be required or encouraged to teach are complex policy questions situated at the intersection of several fields of inquiry, including educational theory, religious studies, philosophy of science, and constitutional law.[34] To answer those questions requires consideration of, among other things, the goals of our public educational system, the importance of views about origins to religious thought generally, the nature of scientific inquiry and its relationship to religious belief, and the limitations placed on public officials and institutions by the First Amendment. The questions, moreover, are as significant as they are complex. As a theoretical matter, they concern how the government ought to respond when its citizens claim that the messages it sends regarding religion are offensive, alienating, and untrue. As a practical matter, the recurring and prevalent nature of the controversy over the past century testifies to the issue's enduring importance. Because of the complexity and significance of these issues, it is important that they be considered both in the abstract, with reference to general principles,[35] and through an examination of specific proposed legislative and administrative measures, to determine whether these measures represent wise educational policy and are consistent with the disestablishment principles of the U.S. Constitution.

This Article takes up this task, using the recent events in Ohio and Congress as a vehicle for the analysis.[36] Most centrally, the Article argues that although reformers are right to criticize public education in the United States for fostering the view that religion is unimportant, and although the teaching of evolution may contribute to this atmosphere, the remedy is not to reform *science* education but

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WARREN A. NORD & CHARLES C. HAYNES, TAKING RELIGION SERIOUSLY ACROSS THE CURRICULUM 62-68 (1998).

34. Part of this question, of course, concerns proper institutional authority, i.e., even if schools should teach about the evolution controversy, who should make that decision—teachers, schools, school boards, local legislatures, state legislatures, Congress, etc.? That question is not addressed here.

35. For one sophisticated analysis of these general principles, see Kent Greenawalt, *Establishing Religious Ideas: Evolution, Creationism, and Intelligent Design*, 17 NOTRE DAME J.L. ETHICS & PUB. POL'Y 321 (2003)

36. Obviously, any full treatment of these issues requires the analysis and input of scientists who have expertise in the relevant scientific fields. I am not a scientist and have attempted not to make any arguments that require any independent scientific knowledge. I do occasionally make arguments, however, based on my understanding of what the scientific community generally thinks about certain issues, most specifically what it thinks of the theories of evolution and intelligent design as a general matter. *See infra* text accompanying notes 233-37. This should not be surprising or alarming, as many policy issues involving scientific matters are discussed and even decided by policymakers who themselves are not scientists but who rely on their assessment of the views articulated on scientific matters by those who are experts. Surely, many supporters of teaching intelligent design are not themselves scientists.

rather to teach students more about *religion* and, specifically, about religious views on the origins of life. To the extent that legislative and regulatory measures can be read as encouraging schools to inform their students in classes about religion of the important differences of opinion among American citizens on the topics of origins, there is certainly a germ of laudable educational policy in the proposals. If schools are going to train citizens to be capable of participating effectively and knowledgeably in American democracy, they must do a better job of teaching students about religious ideas, and religious views on the origins of universe and mankind are among the most important of these ideas that students ought to know. Both constitutional and policy arguments support pursuing such a goal.

It is critical, however, to distinguish this goal from the quite different, and far more troublesome, objective of conveying to students that there is a significant *scientific* dispute over the question of origins, which is by far the overriding thrust of the proposals. This latter objective, which would involve teaching the theory of intelligent design in science classrooms,[37] would be constitutionally problematic and of extremely little educational value even if it were taught accurately, which it probably would not be. What is important for schools to teach their students about the creationism-evolution controversy is not that there is a small group of nonmainstream scientists who believe evolution is scientifically unpersuasive, but rather that there is (and always has been) a large portion of the American population which, for religious reasons, does not believe in evolution. Reformers are right to stress the importance of teaching the controversy, which is a central feature of American life, but they are generally wrong about where to locate their reforms. The recent lawmaking efforts in the Senate and Ohio exemplify this failure.

The Article proceeds in four Parts. Part I of the Article briefly describes the events in Congress and in Ohio. Part II begins the examination of the general principles that should govern consideration of specific legislative and administrative proposals regarding the teaching of the evolution controversy. It argues that public schools should teach about the controversy in social science classrooms within the broader context of a general program of teaching students about religion to prepare them for citizenship. This part further argues that when teaching about the origins controversy in the social science classroom, schools should locate the controversy not just within the narrow context of the clash between evolution and conservative

37. *See supra* note 7 (discussing intelligent design); *infra* text accompanying notes 217-29 (same).

Christianity, but instead within the broader context of how various religious traditions around the world have understood the question of the universe's origins. Part II also highlights possible constitutional issues raised by teaching about religious views on origins in social science classrooms and argues that these potential problems are not substantial enough to counsel against implementing such educational programs.

Part III of the Article then argues that because teaching about the origins controversy within the biology classroom would raise significantly more substantial constitutional concerns and be of significantly more limited educational value at best, lawmakers should not focus their energies on the science classroom. Finally, Part IV returns to the Santorum amendment and the intelligent design efforts in Ohio and evaluates them in light of the general principles set out in Parts II and III. Through an analysis of the specific language of these legislative and administrative proposals, the Article explains why they do not represent wise educational policy, particularly given the constitutional issues raised by their focus on reform in the science classroom.

I. THE EVOLUTION CONTROVERSY IN CONGRESS AND OHIO

A. Congress

During the 2000 presidential campaign, George W. Bush declared numerous times that if elected, his top priority would be to improve American education.[38] True to his word, the first pieces of proposed legislation of the Bush Presidency focused on implementing these campaign pledges by, among other things, promoting accountability of public schools nationwide through mandatory testing and other methods.[39] Senate Bill 1, entitled the "Better Education for Students and Teachers Act," was introduced by Senator Jeffords in March of 2001.[40] Under Senator Kennedy's management, the full

38. *See, e.g.*, Mike Allen & Cici Connolly, *Nominees Hit Trail as Race Narrows; Bush Criticizes Gore in Tenn.; Democrats Embark on River Tour*, WASH. POST, Aug. 19, 2000, at A1 (quoting George W. Bush as saying: "But my first legislative priority, my first priority, will be the education of our children."), *available at* 2000 WL 25410939; Glen Johnson, *Campaign Rivals Fire Away; Bush Goes on the Offensive on Education*, BOSTON GLOBE, Aug. 29, 2000, at A1 ("Bush has proclaimed education as the top priority of his administration . . . ."), *available at* 2000 WL 3340010.

39. *See* Dana Milbank, *Bush Makes Education 1st Initiative*, WASH. POST, Jan. 24, 2001, at A1 ("The Bush plan would require states to test students annually, and schools would be rewarded or punished based on those results."), *available at* 2001 WL 2538947.

40. 147 CONG. REC. S3052 (daily ed. Mar. 28, 2001).

Senate took up consideration of the bill in May and then again after returning from its Memorial Day recess.[41]

On June 13, Senator Santorum introduced the amendment quoted earlier for discussion and a vote. In addition to reading the amendment into the record, Santorum also spoke briefly on the amendment's behalf. In his remarks, Santorum indicated that, in his view, the amendment would endorse academic freedom in public school science classrooms and promote better science education by showing students that scientific knowledge is not absolute and by encouraging open discussion of rival scientific theories:

> It is a sense of the Senate that deals with the subject of intellectual freedom with respect to the teaching of science in the classroom. . . . [I]t says there should be freedom to discuss and air good scientific debate within the classroom. In fact, students will do better and will learn more if there is this intellectual freedom to discuss. . . . It simply says there are disagreements in scientific theories out there that are continuously tested. Our knowledge of science is not absolute, obviously. We continue to test theories. Over the centuries, there were theories that were once assumed to be true and have been proven, through further revelation of scientific investigation and testing, to be not true. One of the things I thought was important in putting this forward was to make sure the Senate of this country, obviously one of the greatest, deliberative bodies on the face of the Earth, was on record for this kind of intellectual freedom; we are for this kind of discussion going on; it will enhance the quality of science education for our students.[42]

Santorum also read into the record a long passage written by David DeWolf, a law professor who, in law review articles and other publications, has advocated that schools teach the scientific controversy over origins within the science classroom.[43] Santorum's amendment apparently had its roots in an earlier briefing given to certain members of Congress and their staffers by critics of public school evolution education,[44] including law professors DeWolf and

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41. *Special Update: Evolution Opponents on the Offensive in Senate, House*, AM. GEOLOGICAL INST., June 19, 2001, *at* www.agiweb.org/gap/legis107/evolution_update0601.html.

42. 147 CONG. REC. S6147-48 (daily ed. June 13, 2001) (remarks of Sen. Santorum).

43. *Id.* at S6148; *see, e.g.*, DAVID K. DEWOLF ET AL., INTELLIGENT DESIGN IN PUBLIC SCHOOL SCIENCE CURRICULA: A LEGAL GUIDEBOOK (1999) [hereinafter LEGAL GUIDEBOOK] (discussing "design theory," concluding that courts would likely not consider unconstitutional the teaching of design theory, and advising that education regarding design theory would enhance science curriculum); David K. DeWolf, *Academic Freedom After* Edwards, 13 REGENT U. L. REV. 447, 459-81 (2000-01) (suggesting methods of teaching alternatives to evolution, such as design theory, without running afoul of the constitutional limitations delineated by the Supreme Court in *Edwards v. Aguillard*, 482 U.S. 578, 596-97 (1987)); David K. DeWolf et al., *Teaching the Origins Controversy: Science, or Religion, or Speech?*, 2000 UTAH L. REV. 39, 67-109 (2000) [hereinafter *Teaching the Origins Controversy*] (promoting the teaching of alternatives to and criticisms of evolution and concluding that such education would not be considered unconstitutional).

44. *See Special Update: Evolution Opponents on the Offensive in Senate, House*, *supra* note 41 ("Last summer, proponents of intelligent design creationism held a Capitol Hill briefing to educate congressional members and staff on the failures of Darwinism and their alternative

Phillip Johnson, a long-time critic of evolutionary theory and public school treatment of evolution,[45] who reportedly proposed specific language for the amendment.[46]

Santorum's reliance on DeWolf provides particularly good insight into the purpose of the amendment, because DeWolf has laid out his position on teaching the origins controversy in some detail.[47] In his writings, DeWolf[48] has argued that many well-credentialed scientists have criticized important aspects of Darwinian theory[49] and have advocated the rival scientific theory of intelligent design,[50] which, as DeWolf puts it, posits that "contrary to neo-Darwinian orthodoxy, nature displays abundant evidence of real, not just apparent, design."[51] Teaching students about this scientific controversy, DeWolf argues, would be constitutional both under *Edwards v. Aguillard*[52] and under generally employed definitions of religion,[53] and teachers who seek to teach about the controversy might

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proposals . . . . A panel discussion was moderated by David DeWolf, a law professor at Gonzaga University . . . ."); Larry Witham, *Senate Bill Tackles Evolution Debate*, WASH. TIMES, June 18, 2001, at A4, *available at* 2001 WL 4155682 ("Law professor Phillip E. Johnson, who has written widely on evolution being taught dogmatically in public schools, helped frame the language earlier this month while visiting Washington for a public lecture.").

45. For a few of Professor Johnson's writings on the subject, see PHILLIP E. JOHNSON, DARWIN ON TRIAL (1991); PHILLIP E. JOHNSON, REASON IN THE BALANCE: THE CASE AGAINST NATURALISM IN SCIENCE, LAW & EDUCATION (1995); Phillip E. Johnson, *Evolution as Dogma: The Establishment of Naturalism*, FIRST THINGS, Dec. 1990, at 15-22.

46. *See* Witham, *supra* note 44, at A4 (reporting that Johnson said that "I offered some language to Senator Santorum, after he had decided to propose a resolution of this sort").

47. *See supra* note 43. This, of course, is not to say that Santorum necessarily endorses all of DeWolf's positions or even that Santorum is familiar with all of these positions. But Santorum's reliance on DeWolf does provide some evidence that Santorum thinks about these issues in a way similar to DeWolf.

48. I refer to DeWolf alone here for convenience and because Santorum specifically referred to him in his floor statements. Of course, some of DeWolf's writing on the subject was coauthored, and my reference to DeWolf alone is not meant to denigrate the influence of his co-writers in the development of the ideas to which I refer.

49. *Teaching the Origins Controversy*, *supra* note 43, at 66 (noting that "many well-credentialed scientists now dispute the adequacy of the neo-Darwinian mechanism (and other similarly materialistic theories)").

50. *Id.* (noting that "some [well-credentialed scientists] publicly advocate the (actual) design issues raised by neo-Darwinian theory").

51. *Id.* at 59. Examples of works that have advocated design theory, according to DeWolf and his co-writers, include MERE CREATION: SCIENCE, FAITH & INTELLIGENT DESIGN (William A. Dembski ed., 1998); MICHAEL J. BEHE, DARWIN'S BLACK BOX (1996); PERCIVAL DAVIS & DEAN H. KENYON, OF PANDAS AND PEOPLE: THE CENTRAL QUESTION OF BIOLOGICAL ORIGINS (1993); and WILLIAM A. DEMBSKI, THE DESIGN INFERENCE: ELIMINATING CHANGE THROUGH SMALL PROBABILITIES (1998). *See Teaching the Origins Controversy*, *supra* note 43, at 43 n.13, 54 n.56, 59 nn.68-69.

52. 482 U.S. 578 (1987).

53. *Teaching the Origins Controversy*, *supra* note 43, at 79-109. Here, DeWolf and his coauthors take issue with the position that I took in a student note published in 1997, in which I

even have a First Amendment right to do so in their own science classrooms.[54] DeWolf concludes that schools should teach rival theories to Darwinian evolution in science classrooms because such instruction would (1) more fully inform students of the state of scientific knowledge regarding origins; (2) improve science education generally by teaching students about the actual practice of science; and (3) train students to think about difficult and contentious public issues. Senator Santorum read this tripartite normative conclusion into the record on June 13, 2001:

> Several benefits will accrue from a more open discussion of biological origins in the science classroom. First, this approach will do a better job of teaching the issue itself, both because it presents more accurate information about the state of scientific thinking and evidence, and because it presents the subject in a more lively, and less dogmatic way. Second, this approach gives students greater appreciation for how science is actually practiced. Science necessarily involves the interpretation of data; yet scientists often disagree about how to interpret their data. By presenting this scientific controversy realistically, students will learn how to evaluate competing interpretations in light of evidence—a skill they will need as citizens, whether they choose careers in science or other fields. Third, this approach will model for students how to address differences of opinion through reasoned discussion within the context of a pluralistic society.[55]

After Santorum's statements, several other members of the Senate took to the floor to support the proposed amendment.[56] Senator Kennedy spoke next and urged his colleagues to support Santorum's proposal.[57] Kennedy argued that the amendment made "eminently good sense" because teaching students about the origins controversy would enable them to "be able to speak and examine various scientific theories on the basis of all the information that is available to them so they can talk about different concepts and do it intelligently with the best information that is before them."[58] Senator Byrd, Democrat from

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argued that teaching *Of Pandas and People* in the public schools would, under many circumstances, be unconstitutional. *Id.*; *see* Wexler, *supra* note 7. I address DeWolf's criticism of my position below. *See infra* text accompanying notes 268-87.

54. *See* DeWolf, *supra* note 43, at 474-81 (discussing the First Amendment rights of teachers to present information in various ways that undermine evolution).

55. 147 CONG. REC. S6148 (daily ed. June 13, 2001) (statement of Sen. Santorum) (quoting LEGAL GUIDEBOOK, *supra* note 43, at 3).

56. 147 CONG. REC. S6148-52 (comments of Senators Welstone, Hollings, Kennedy, Thomas, Byrd, and Brownback).

57. 147 CONG. REC. S6150-51 ("[F]irst of all, on the Santorum amendment, I hope all of our colleagues will vote in support of it.").

58. 147 CONG. REC. S6150-51 (statement of Sen. Kennedy). Senator Kennedy subsequently denied in a newspaper editorial that he had ever supported the idea of teaching intelligent design in the public schools. Edward M. Kennedy, *Evolution is Designed for Science Classes*, WASH. POST, Mar. 21, 2002, at A18 (noting that a recent commentary by Senator Santorum "erroneously suggested that I support the teaching of 'intelligent design' as an alternative to biological evolution"), *available at* 2002 WL 2907018. Senator Santorum previously claimed that

West Virginia, also spoke in favor of Santorum's amendment, emphasizing both the importance of open debate in public school classrooms and the close connection between design theory and his own religious beliefs:

> Scientists today have numerous theories about our world and its beginnings. I, personally, have been greatly impressed by the many scientists who have probed and dissected scientific theory and concluded that some Divine force had to have played a role in the birth of our magnificent universe. These ideas align with my way of thinking. But I understand that they might not align with someone else's. That is the very point of tbis amendment—to support an airing of varying opinions, ideas, concepts, and theories. If education is truly a vehicle to broaden horizons and enhance thinking, varying viewpoints should be welcome as part of the school experience.[59]

Finally, Senator Brownback, a Republican from Kansas, used discussion of the amendment as a vehicle for discussing the recent controversy over the teaching of evolution in his own state.[60] Explaining that he found the global response to Kansas's decision to remove questions about macroevolution from a state assessment examination "shocking," Brownback urged his colleagues to support the amendment to "clarif[y] the opinion of the Senate that the debate over scientific fact versus scientific assumption is an important debate to embrace."[61]

After probably no more than twenty minutes of discussion,[62] the Senate voted 91-8 to adopt Senator Santorum's amendment.[63] The eight Senators who voted against the amendment reportedly did so on federalism grounds rather than because of any substantive disagreement with the amendment.[64] Those Senators were simply

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Kennedy had "approve[d] of having alternate theories taught in the classroom" and suggested tbat one alternate theory would be the theory of intelligent design. Rick Santorum, *Illiberal Education in the Ohio Schools*, WASH. TIMES, Mar. 14, 2002, at A14, *available at* 2002 WL 2906644. In Kennedy's response, he said that it "simply is not true" that he supports teaching intelligent design as an alternative to evolution. Kennedy, *supra*. According to Kennedy: "I believe that public school science classes should focus on teaching students how to understand and critically analyze genuine scientific theories. Unlike biological evolution, 'intelligent design' is not a genuine scientific theory and, therefore, has no place in the curriculum of our nation's public school science classes." *Id.*

59. 147 CONG. REC. S6152 (daily ed. June 13, 2001) (statement of Sen. Byrd).

60. 147 CONG. REC. S6152. (Senator Brownback noted that the issue of "how to teach scientific theory and philosophy was recently an issue in my home State of Kansas.").

61. 147 CONG. REC. S6152.

62. The amendment was introduced forty minutes before it was voted on. *See* 147 CONG. REC. S6147 (statement of Sen. Kennedy) ("[W]e have 40 minutes of debate on the Santorum and Hollings amendments concurrently."). Most of the time between the introduction and the vote was in fact spent on discussion of a different amendment. 147 CONG. REC. S6147-53.

63. 147 CONG. REC. S6152 S6153. One Senator (Senator Dodd) did not vote on the amendment.

64. *See* Witham, *supra* note 44, at A4 ("Opponents of the amendment said it was a federal intrusion.").

opposed to dictating educational policy to states and localities, rather than to the idea of teaching alternatives to evolution in science classrooms generally.[65]

As mentioned above,[66] groups on both sides of the evolution controversy spoke out on the amendment. Intelligent design supporters publicly praised the Senate's action.[67] Evolution supporters, on the other hand, took quick steps to persuade members of Congress to delete the language from the final bill.[68] In a letter sent to the Chairmen of the House and Senate Education Committees and signed by over seventy-five representatives of scientific and educational organizations, these supporters argued that Senator Santorum's amendment (1) had not been given adequate consideration by the Senate; (2) interfered with local control over education; (3) improperly singled out biological evolution as a controversial subject, thus masking an anti-evolution agenda; and (4) confused political controversy with scientific controversy in a manner guaranteed to weaken science education.[69]

The evolutionists got their wish. When the Joint House and Senate Conference Committee conferred in December, 2001 to create a final version of the education bill to present to the President,[70] it deleted the controversial amendment from the text of the legislation. Instead, an altered version of the amendment was inserted into the explanatory committee report, which does not itself constitute a source of law.[71] Thus, although it flirted with the idea for a while, for the

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65. *See id.* (quoting Senator Fred Thompson as saying: "I do not believe that it is the appropriate role of the federal government to dictate the content of education curriculum to local communities.").

66. *See supra* notes 23-26.

67. *See supra* notes 23-24.

68. *See supra* notes 26-27.

69. *See* Letter to John Boehner, Chairman, Committee on Education and the Workforce, U.S. House of Representatives, and Edward M. Kennedy, Chairman, Committee on Health, Education, Labor & Pensions, U.S. Senate (Aug. 22, 2001), *available at* http://www.agiweb.org/gap/legis107/evolutionletter.html. The letter was signed by representatives of organizations such as the American Geological Institute, the American Institute of Biological Sciences, the American Psychological Association, the Association of American Universities, the Citizens for the Advancement of Science Education, the National Association of Biology Teachers, the National Science Teachers Association, and the Society of Protozoologists.

70. The President signed the bill (H.R. 1) into law on January 8, 2002. No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 Stat. 1425 (2002).

71. The conference report states:

> The conferees recognize that a quality science education should prepare students to distinguish the data and testable theories of science from religious or philosophical claims that are made in the name of science. Where topics are taught that may generate controversy (such as biological evolution), the curriculum should help

time being at least, the U.S. Congress as a whole has made no official pronouncement on the question of how public schools ought to teach their students about the origins of life and the universe.

B. Ohio

1. Administrative Proposals

Not long after the events in the U.S. Senate transpired, the center of the origins controversy moved westward to the state of Ohio,[72] where the state's Board of Education began to revise the science education standards pursuant to state law.[73] After an independent educational review committee gave the existing state science standards a grade of "F" for their scanty and superficial treatment of evolution,[74] a state-sponsored advisory committee issued a set of draft standards for comment intended to improve treatment of the subject considerably.[75] An advocacy group called Science Excellence for All Ohioans ("SEAO"), which refers to itself as "a network of concerned citizens who support excellent state science

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students to understand the full range of scientific views that exist, why such topics may generate controversy, and how scientific discoveries can profoundly affect society.

H.R. CONF. REP. NO. 107-334, at 703 (2001), *available at* http://frwehgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=107_cong_reports&docid=f:hr334.107.pdf. For a discussion of why the statement found in the commentary included in the conference report is not law, see Dennis D. Hirsch, *Science vs. Intelligent Design: The Law*, *at* http://ecology.cwru.edu/ohio-science/santorum.asp (2002). For more on the conference report language, see Letter to Eugenie C. Scott, Executive Director, National Center for Science Education, from Congressman George Miller, May 10, 2002 ("[T]he report language should not be construed to promote specific topics within subject areas . . . . Such decisions are best left to the scientific community, rather than legislators."), *available at* http://www.ncseweb.org/resources/news/2002/US/233_congressman_clarifies_dispute_6_7_2002.asp.

72. Ohio has been a center of origins controversy before, when the town of Louisville, Ohio, voted to urge the local school board there to adopt the intelligent design textbook, *Of Pandas and People*, as a supplement to the teaching of evolution in science classes. *See* Wexler, *supra* note 7, at 443 ("In September 1994, residents of Louisville, Ohio voted to urge the local school board to adopt the book as a supplement to the teaching of evolution . . . .").

73. *See* S. 1, 124th Gen. Assem. (Ohio 2001) (requiring the revision of state science standards by the end of 2002).

74. *See* LAWRENCE S. LERNER, GOOD SCIENCE, BAD SCIENCE: TEACHING EVOLUTION IN THE STATES (2000), *available at* http://www.edexcellence.net/library/lerner/gsbsteits.html#KeyRole (placing Ohio in a group of "[t]welve states [that] fail so thoroughly to teach evolution as to render their standards totally useless.").

75. Evolution experts have noted that the draft standards, if adopted, would earn a grade of "A" for their treatment of evolution. *See Ohio's Draft Standards Earn an A From National Science Standards Expert*, NAT'L CENTER FOR SCI. EDUC. (Mar. 11, 2002) ("Ohio's science education will improve from an F grade to an A if the new proposed statewide science standards are accepted as is, according to Dr. Lawrence Lerner, a nationally recognized expert on state science standards."), *at* http://www.ncseweb.org/resources/news/2002/OH/893_ohio-39s_draft_standards_ear_3_11_2002.asp (last visited Jan. 10, 2003).

standards that are fair, reasonable, and objective," quickly instigated efforts to include the presentation of intelligent design (alongside evolution) in the new standards.[76]

In its first group of proposed reforms to the draft standards, put forth in December of 2001, SEAO suggested several changes to those standards and proposed one completely new standard dealing with intelligent design.[77] Some of the proposed changes to the existing standards consisted of minor wording changes designed to weaken the curriculum's endorsement of evolution and its various tenets.[78] For example, one proposal would have changed the sentence "[students should learn to] [a]nalyze how natural selection and its evolutionary consequences provide a scientific explanation for the diversity and unity of all past life forms" to "[students should learn to] [a]nalyze how natural selection and its evolutionary consequences *may* explain the diversity and unity of all past life forms."[79] Two other proposed changes suggested removing the word "evolution" from the draft standards.[80] Other changes were intended to promote design theory in one way or another.[81] For instance, in the proposed draft standard designed to ensure that students "[k]now historical scientific developments that occurred in evolutionary thought (e.g., Darwin, Mendel, Lamarck)," SEAO proposed to add William Paley and Michael Behe, two proponents of intelligent design (one historical and one current), to the list of examples.[82] In another proposed change, SEAO suggested that students "[k]now that natural selection does not explain the origin of life itself, and that biological evolution is a naturalistic theory that specifically excludes design from consideration."[83]

Finally, and most importantly, SEAO proposed to add an entirely new standard, which would have read as follows:

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76. *Science Excellence for All Ohioans ("SEAO")*, SCIENCE EXCELLENCE FOR ALL OHIOANS, *at* http://www.sciohio.org/whatisseao.htm (last visited Jan. 14, 2003). For further information on Science Excellence for All Ohioans, see its website at http://www.sciohio.org.

77. *An Analysis of Proposed Changes to Ohio Science Standards*, NAT'L CENTER FOR SCI. EDUC. (2002) (presenting both the original Ohio science education standards and the changes proposed by the SEAO and commenting on the changes), *at* http://www.ncseweb.org/resources/news/2002/OH/rebuttal-SEAO-changes-v3.pdf (last visited Jan. 14, 2003).

78. *See id.* at 3-12.

79. *Id.* at 4-5 (emphasis added). SEAO's explanation for this change is that "[t]he modified wording makes it clear that evolution is a *theory* for the development of life on earth." *Id.* at 5 (emphasis in original).

80. *Id.* at 3.

81. *See id.* at 7.

82. *Id.*

83. *Id.* at 4-5.

> [Students should] [k]now that some scientists support the theory of intelligent design, which postulates that the influence of some form of intelligence is a viable alternative explanation for both the origin and diversity of life. [Students should be able to] [c]ompare and contrast the evidence that supports the design hypothesis with the evidence that supports the evolutionary hypothesis.[84]

In the "Explanation" accompanying this proposed change, SEAO argued that the standard should be adopted because it is consistent with the definition of science provided in the standards themselves and because censorship of design theory (1) is contrary to the scientific method; (2) suggests that "*naturalism* has been employed as an underlying assumption in the Standards"; (3) is inconsistent with the Establishment Clause's requirement of neutrality toward religion; and (4) constitutes viewpoint discrimination under the First Amendment's Free Speech Clause.[85]

SEAO's proposed changes to the draft standards attracted a great deal of public comment. Many of the received comments were positive;[86] some were negative.[87] Despite the positive comments, the science writing team responsible for the standards decided in February of 2002 not to adopt SEAO's changes and to keep the draft standards in their original form.[88] In March of 2002, the School Board convened a special three-hour-long public meeting to hear arguments for and against the idea of teaching intelligent design.[89] An audience of about a thousand citizens attended and heard a series of presentations by experts on both sides of the issue.[90] The meeting apparently became contentious at times;[91] at one point a dispute arose over whether Congress had in fact endorsed the idea of teaching alternatives to evolution in the public schools.[92]

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84. *Id.* at 9.

85. *Id.* at 9-10.

86. *See Public Response to Second Draft of Science Standards*, SCIENCE EXCELLENCE FOR ALL OHIOANS ("Thousands of Ohioans responded to ODE's [Ohio Department of Education] request for input on the second draft of the science standards. A large majority of respondents called for modification of the 'evolution only' biological origins standards . . . ."), *at* http://www.sciohio.org/response.htm (last visited Jan. 14, 2003).

87. *See, e.g.*, *An Analysis of Proposed Changes to Ohio Science Standards*, *supra* note 77, at 2 (discussing the "misconceptions about science" underpinning SEAO's proposed changes).

88. *See Public Response to Sccond Draft of Science Standards*, *supra* note 86 ("*Despite this overwhelming mandate for change, the Writing Team nevertheless decided to ignore the public comments!* The 'evolution only' draft standards remain intact in the document that was prepared by the Writing Team.").

89. *See* Larry Witham, *'Design' Draws Big Debate: Evolution Alternative Proposed for Ohio Schools*, WASH. TIMES, Mar. 12, 2002, at A06.

90. *Id.*

91. *See id.* (noting that the presentations of the experts "bordered on passionate debate").

92. *See* Miller, *supra* note 32.

In April of 2002, SEAO issued a second set of proposed changes that it claimed were "largely unchanged" from the first set issued the previous December.[93] The purpose of these changes, according to SEAO, were to: "(a) distinguish between microevolution and macroevolution, (b) state that biological evolution and chemical evolution are naturalistic theories, (c) make a distinction between empirical and historical sciences, and (d) teach the controversy surrounding the evidence for biological evolution and the definition of science."[94] Specifically, the new proposed changes were as follows:[95]

No.[96]	Draft Standard	Proposed Change
1	Students will explain that unity and diversity of life reflect their evolutionary relationships.	Students will describe how the diversity of life is related to classification, structure and function, and survivability of organisms.
2	Know that biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities which reflect their evolutionary relationships. Species is the most fundamental unit of classification.	Know that biological classifications are based on how organisms are related. Know that organisms are classified into a hierarchy of groups and subgroups based on similarities in form and/or function. Know that species is the most fundamental unit of classification.
3	Know that biological evolution is change in gene frequency (genetic composition) in a population over time.	Know that biological evolution may be defined as change in gene frequency (genetic composition) in a population over time. Know that evolutionary theory posits that microevolution (minor genetic

93. *See Skeptical News for 10 May 2002: Suggested Modifications to Draft Indicators*, NORTH TEXAS SKEPTICS, *at* https://www.ntskeptics.org/news/news2002-05-10.htm (last visited Jan. 12, 2003).

94. *Id.*

95. *Id.* (explaining and discussing the proposed SEAO changes).

96. Tbis number does not come from the proposed changes themselves; it is added by the author to ease reference back to the proposed changes. Additionally, the chart omits both the explanation for the proposed change and the citation of the particular draft standard involved (e.g., the first change would be to the draft standard: "Grade 10, Life Sciences (Diversity and Interdependence of Life) No. 7." *See id.* The chart also omits several draft standards that SEAO has not suggested modifications to but nonetheless comments upon. *See Suggested Modifications to Draft Indicators*, SCIENCE EXCELLENCE FOR ALL OHIOANS, *at* http://www.sciohio.org/seaoindi.htm (last visited Jan. 12, 2003).

		variation within a population) over long periods of time results in macroevolution (descent with modification from a single common ancestry).
4	Know historical scientific developments that occurred in evolutionary thought (e.g., Darwin, Mendel, Lamarck).	Know historical scientific developments that occurred in evolutionary thought, including alternative theories that have been considered historically as well as in recent years (e.g., Paley, Darwin, Lamarck, Mendel, Behe).
5	Students will know how natural selection and other evolutionary mechanisms account for unity and diversity of life forms past and present.	Students will know how natural selection and other evolutionary mechanisms may account for unity and diversity of life forms past and present.
6	Analyze how natural selection and other evolutionary mechanisms (e.g., genetic drift, immigration, emigration, mutation) and their consequences provide a scientific explanation for the diversity and unity of all past life forms as depicted in the fossil record and present life forms.	Analyze how natural selection and other evolutionary mechanisms (e.g., genetic drift, immigration, emigration, mutation) and their consequences may explain the diversity and unity of all past life forms as depicted in the fossil record and present life forms. Know that evolutionary biology, as a historical science, forms a tentative reconstruction of events and processes that have already taken place.
7	Know life on earth is thought to have begun as simple, one-celled organisms about 4 billion years ago. During most of the history of the earth, only single-celled microorganisms existed, but once cells with nuclei developed about a billion years ago, increasingly complex multicellular organisms evolved.	Know that according to evolutionary theory, life on earth is thought to have begun as simple, one-celled organisms shortly after the time when the earth first became habitable. During most of the history of the earth, only single-celled microorganisms existed, but after cells with nuclei appeared, increasingly complex multicellular organisms appeared in the fossil record. Know that biological

		evolution and chemical evolution are naturalistic theories that are based on the assumption that phenomena result only from naturalistic processes and not by intelligent causes.
8	Know how the evolution of life on earth has changed the oxygen composition of the earth's atmosphere.	Know how the presence of life on earth has changed the oxygen composition of the earth's atmosphere.
9	Scientific knowledge is limited to natural explanations for natural phenomena (material world perceived hy our senses or technological extensions).	Know that science involves the systematic search for the best explanation of phenomena in the natural world. There is disagreement as to whether scientific inquiry should consider all logical explanations for phenomena, or whether inquiry should be limited to naturalistic (materialistic) explanations.
10	No existing standard.	New Proposed Standard: Discuss how various types of scientific evidence may either support or not support the theory of biological evolution (e.g., embryological development in vertebrate classes, fossil progression, biogeographical distribution, homologies, vestigial structures, biological complexity, biological information). (NOTE: The consideration of alternative theories, such as intelligent design, is permitted—but not required—under this standard).

The second set of proposed changes focused more on weakening the presentation of evolution than on promoting intelligent design. Three of the proposed changes would have eliminated references to "evolution" (Nos. 1, 2, and 8). Two others would have added the word "may" to signal that evolution may not be the only theory to describe the "diversity and unity" of past and present life forms (Nos. 5 and 6). Change No. 6 referred to evolution as "tentative," and change No. 7

would have added the phrase "according to evolutionary theory," while change No. 10 would have required teachers to discuss arguments against evolution.[97] Two of the changes (Nos. 7 and 9) specifically addressed the so-called principle of methodological naturalism that intelligent design advocates argue characterizes modern science. Change No. 7 specifically stated that evolution is a naturalistic theory that assumes intelligent causes have not been at work; change No. 9 pointed out that some scientists believe nonnaturalistic explanations should be considered when interpreting data. Finally, two standards specifically addressed intelligent design theory. Like the first set of changes, change No. 4 of the new set would have required teachers to teach about design advocates such as Paley and Behe. Most importantly, change No. 10 would have permitted, though it would not have required, teachers to present alternative theories to evolution, such as intelligent design, as part of their presentation of evidence that both does and does not support evolutionary theory.

In support of this last proposed change, SEAO suggested that a standard that allows but does not require presentation of alternative theories constitutes a desirable "teach the controversy" approach "consistent" with both the language of the final conference report of House Bill 1 and of the pending Ohio legislation.[98] Specifically, SEAO argued that such a standard "seems reasonable" for a number of reasons:

1. It calls for coverage of evolution with intellectual honesty (since evidence both supporting and not supporting evolutionary theory is presented).

2. It promotes academic freedom for teachers (since they are permitted to discuss various aspects of evolution as well as alternative theories).

3. It enhances critical thinking in students (since they are exposed to a variety of viewpoints on the issue).

4. It generates student enthusiasm for science (since the controversy is interesting).

5. It aligns Ohio with the Santorum language in the federal education law.

6. It maintains government neutrality on a matter (biological origins) touching on religion.

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97. SEAO's "[e]xplanation" of change No. 10 stated that the proposed change would be consistent with a proposal made by Dr. Stephen Meyer at the March 2002 public meeting, in which he stated that schools should "[m]andate mastery of the scientific evidence and arguments *for* and *against* Darwinism. Students should know the scientific case for modern Darwinism and contemporary scientific critiques of the theory as well." *Suggested Modifications to Draft Indicators*, *supra* note 96.

98. *See id.*

7. It is supported by public opinion polls showing that Ohioans strongly favor an objective treatment of biological origins.[99]

Not surprisingly, these proposed reforms generated much controversy. For example, a rival group called Ohio Citizens for Science promptly formed to oppose the teaching of intelligent design in Ohio and has countered SEAO at every turn,[100] while a group of fifteen presidents of Ohio Universities sent a letter to the State Board of Education opposing the inclusion of intelligent design in science curricula.[101]

On October 15, 2002, the State Board of Education preliminarily (and unanimously) approved the draft standards.[102] The approved standards did not include the proposed reforms advanced by SEAO, but they did contain two controversial changes to the draft standards. One change excised the phrase "natural explanations" from the standards' definition of science, while a second called for schools to "describe how scientists continue to investigate and critically analyze aspects of evolutionary theory."[103] These changes were viewed by SEAO, as well as by some news accounts, as victories for supporters of intelligent design.[104] The State Board of Education officially adopted the changes on December 10, 2002.[105]

2. Legislative Proposal

In addition to the administrative proposals, citizens of Ohio debated the following legislative proposal, which was introduced by sixteen state representatives:

> Sec. 3313.6013. It is tbe intent of the general assembly that to enhance the effectiveness of science education and to promote academic freedom and the neutrality of state government with respect to teachings that touch religious and nonreligious beliefs, it is

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99. *Id.*

100. *See About Ohio Citizens for* Science, OHIO CITIZENS FOR SCIENCE (explaining the short- and long-range goals of the OCS), *at* http://ecology.cwru.edu/ohioscience/about-ocs.asp (last visited Jan. 12, 2003). For further information on Ohio Citizens for Science, see its website at http://ecology.cwru.edu/ohioscience.

101. Letter from the Presidents of the Inter-University Council of Ohio, to the Ohio State Board of Education (Mar. 15, 2002), *at* http://www.ncseweb.org/pdf/InterUniversity-CouncilOH.pdf (last visited Jan. 12, 2003).

102. *See* Liz Sidoti, *Ohio OKs Creation in Science Class,* ASSOCIATED PRESS ONLINE, Oct. 15, 2002, *available at* 2002 WL 101562263; Larry Witham, *Ohio Schools to Teach Evolution 'Controversy',* WASH. TIMES, Oct. 17, 2002, at A1, *available at* 2002 WL 2919885.

103. *See* Witham, *supra* note 102, at A1.

104. *See Standards Substantially Incorporate the Teach-the-Controversy Approach,* SCIENCE EXCELLENCE FOR ALL OHIOANS, *at* http://www.sciohio.org/sbe1015.htm (last visited Jan. 12, 2003); Witham, *supra* note 102, at A1.

105. *See* Catherine Candisky, *Evolution Backers, Critics Claim Victory in Science Standards,* COLUMBUS DISPATCH (Ohio), Dec. 11, 2002, at 1A, *available at* 2002 WL 103878636.

> necessary and desirable that 'origins science,' which seeks to explain the origins of life and its diversity, be conducted and taught objectively and without religious, naturalistic, or philosophic bias or assumption. To further this intent, the instructional program provided by any school district or educational service center shall do all of the following:
>
> (A) Encourage the presentation of scientific evidence regarding the origins of life and its diversity objectively and without religious, naturalistic, or philosophic bias or assumption;
>
> (B) Require that whenever explanations regarding the origins of life are presented, appropriate explanation and disclosure shall be provided regarding the historical nature of origins science and the use of any material assumption which may have provided a basis for the explanation being presented;
>
> (C) Encourage the development of curriculum that will help students think critically, understand the full range of scientific views that exist regarding the origins of life, and understand why origins science may generate controversy.[106]

The debate over the proposed legislation mirrored the debate over the proposed changes to the state's educational standards. Defenders of intelligent design, such as SEAO, claimed that the bill sought "to promote academic freedom by encouraging critical thinking and teaching that seeks to open discussion rather than to censor it through the use of assumptions and biases,"[107] while critics, such as Steven Edinger, a founding member of Ohio Citizens for Science, argued that if the legislation passed, "Ohio [would have] become an international laughingstock, the butt of late night jokes, and possibly . . . involved in a costly lawsuit that will keep [it] in the spotlight as a scientific and intellectual backwater for years to come."[108] The bill was referred to the state legislature's education committee in 2002, but no final action was taken on the legislation before the end of the legislative session.

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106. H.B. 481, 124th Gen. Assem., Reg. Sess. (Ohio 2001-02) (referred to the state legislature's education committee in 2002, but no final action was taken before the end of the legislative session), *available at* http://www.legislature.state.oh.us/bills.cfm?ID=124_HB_481. The state legislature also considered a procedural bill that would require both houses of the legislature to approve any science curriculum standards adopted by the State Board of Education prior to December 31, 2002. H.B. 484, 124th Gen. Assem., Reg. Sess. (Ohio 2001-02) (referred to the education committee in 2002), *available at* http://www.legislature.state.oh.us/bills.cfm?ID=124_HB_484.

107. *See Federal Santorum Amendment*, SCIENCE EXCELLENCE FOR ALL OHIOANS, *at* http://www.sciohio.org/seaoleg.htm (last visited Jan. 12, 2003) (reprinting legislation and supporting H.B. 481).

108. *An Open Letter on Science Education to Offieials Serving the State of Ohio*, SCIENCE EXCELLENCE FOR ALL OHIOANS (Jan. 30, 2002), *available at* http://ecology.cwru.edu/ohioscience/letter-open.asp (last visited Jan. 12, 2003) (letter from Steven A. Edinger, Physiology Lab Instructor and a founding member of Ohio Citizens for Science).

II. TEACHING ABOUT THE EVOLUTION CONTROVERSY IN THE SOCIAL SCIENCE CLASSROOM

To evaluate these specific legislative and administrative efforts, it is helpful to begin with a consideration of how, as a general matter, the controversy over origins ideally should be handled in the public school curriculum. This part begins the inquiry. Here, the Article argues that public schools should teach students about religious views on origins in social science classrooms as part of a general program of teaching them about religion for civic purposes. The first subpart explains why schools should teach these views. The second subpart considers how they should do so. The third subpart addresses constitutional issues.

A. Why Teach About Religious Views on Origins?

Although surely some public schools have ignored the edicts of the Supreme Court and continue to teach some form of creationism,[109] the critics of evolution are probably correct that religious views of the origins of life often do not make their way into the public school curriculum. As education expert Warren Nord observes, most graduating high school seniors will have learned something about scientific evolution but probably very little about religious accounts of origins:

> World history texts may contain a sentence or two about religious views of origins in their sections on the major religions. Some American history texts devote several paragraphs to the Scopes Trial (though none of the five most commonly used texts in North Carolina do so). Some students may read the first chapter of Genesis in a world literature class, and a few will read *Paradise Lost* or some literary account of religious origins. . . . In sum, college-bound students will most likely be given a good introduction to scientific evolution; exposure to religious accounts will be brief and haphazard at best.[110]

The absence of religious views on origins in the public school curriculum is a symptom of a broader phenomenon: although things are starting to change somewhat, public schools generally do not teach

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109. *See* WARREN A. NORD, RELIGION & AMERICAN EDUCATION: RETHINKING A NATIONAL DILEMMA 288 (1995) (noting that according to one survey, 30.3% of school districts teach "creationism" along with evolution, but also observing that "what is involved in such teaching was not made clear"). Some would disagree with Nord's assertion that most graduating high school seniors will have learned quite a bit about scientific evolution. *Cf., e.g.*, Brian J. Alters & Craig E. Nelson, *Perspective: Teaching Evolution in Higher Education*, 56 EVOLUTION 1891, 1892 (2002) (noting that "public understanding of evolution is considered woefully lacking by most researchers and educators"). Even if true, this does not bear on the independent point about the knowledge of graduating seniors with respect to religious views on origins.

110. NORD, *supra* note 109, at 288-89.

their students much about religion.[111] Teachers are not trained to teach about religion,[112] and materials to help them teach about religion have been slow in coming.[113] Teachers, administrators, and school board officials have been wary of introducing religion into the public school curriculum for fear of inciting controversy and inviting litigation.[114] As a result, graduates of America's public high schools often have not learned much of anything about religion itself or the important role that religion has played in America's (and the world's) history, culture, and politics.

This state of affairs is unfortunate. Regardless of what theory of public education one supports, the omission of religious studies from the curriculum undermines the effectiveness of the instruction that students receive.[115] For example, if public education is meant to be "liberal," in the sense that its primary goal is to introduce students to various visions of the good life that they may choose ultimately to

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111. *See* Jay D. Wexler, *Preparing for the Clothed Public Square: Teaching About Religion, Civic Education, and the Constitution*, 43 WM. & MARY L. REV. 1159, 1164-66 (2002) (arguing that public schools should teach students about religion to prepare them for citizenship in a pluralistic democracy); *see also* NORD, *supra* note 109, at 212 (citing a study from the 1980s indicating that "only 640 of 15,000 public high schools offered courses in religion, and only two-tenths of one percent of all students were enrolled"); NORD & HAYNES, *supra* note 33, at 2 (noting that the typical high school curriculum "all but ignores religion"). In recent years, however, there has been significant progress in teaching about religion in public schools, in large part due to the efforts of educational reformers such as Charles C. Haynes and Warren A. Nord. *See* Wexler, *supra*, at 1166-67.

112. *See* NORD & HAYNES, *supra* note 33, at 91 ("For the teacher, the challenge of achieving even minimal fairness in the treatment of religion when teaching world and U.S. history is daunting to say the least. Few teachers have much hackground in religious studies."); George R. La Noue, *The Conditions of Public School Neutrality*, *in* RELIGION AND PUBLIC EDUCATION 22, 30 (Theodore R. Sizer ed., 1967) ("Assuming it were possible to design a satisfactory comparative religion course, the enormous shortage of qualified teachers in this field remains a serious problem.").

113. *See* NORD & HAYNES, *supra* note 33, at 78-79:

> [T]extbooks are still woefully inadequate in their treatment of religion. World history texts do provide brief accounts of the basic teachings and practices of the major religions as they appear in history, but, in our view, the texts do not give enough space to the topics to enable students to make sense of these traditions. [;]

Gilbert T. Sewall, *Religion and the Textbooks*, *in* CURRICULUM, RELIGION, AND PUBLIC EDUCATION: CONVERSATIONS FOR AN ENLARGING PUBLIC SQUARE 73, 79-82 (James T. Sears & James C. Carper eds., 1998) (criticizing civics and history texts).

114. *See* George W. Dent, Jr., *Religious Children, Secular Schools*, 61 S. CAL. L. REV. 863, 871-72 (1988) ("[T]he Court's rulings have facilitated challenges to any sympathetic portrayal of religion. School authorities may decide that including religion in the curriculum is not worth a lawsuit, even if they probably would prevail in the end.").

115. *See* Kent Greenawalt, *Teaching About Religion in the Public Schools*, 18 J.L. & POL. 329 (2002) (discussing many of the issues raised by the idea of teaching about religion in public schools).

adopt,[116] then the omission of teaching about religion will be harmful because students will only be introduced to a limited range of visions. If, instead, public education is meant to be utilitarian in its purpose,[117] with the goal being, for example, to prepare students to be successful members of the global economy, then the omission of religious studies from the curriculum is harmful because students will not learn as much about different cultures and nations as they will need to participate successfully in cooperative ventures with people from other parts of the world. Finally, if public education is best conceived as "civic education," with the goal being to prepare students to participate effectively in America's liberal democracy,[118] then the omission of religious studies is harmful because it is simply impossible to understand the public life of the nation (or the world) without understanding something about religion.

It is on this last point that the Article will focus in some depth. Elsewhere I have argued that public schools should teach about religion to prepare their students for citizenship in a religiously active and diverse nation and world.[119] Teaching students about religion furthers the project of civic education in a variety of important ways.[120] It teaches students about their history, allowing them to better understand current controversies.[121] It helps them understand how government action can negatively affect religious belief and practice so that they can intelligently evaluate the plethora of

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116. *See* BRUCE ACKERMAN, SOCIAL JUSTICE IN THE LIBERAL STATE 160 (1980) (noting that "[t]he ideal liberal education is one that permits the child to move from his initial resistances to an ability to define his own objectives in the light of the universal culture defined by all humankind"); AMY GUTMANN, DEMOCRATIC EDUCATION 8 (1987) (noting that liberal education theories "aim at developing individual autonomy").

117. Utilitarian theories of education seek, as Mill says, to "render the individual, as much as possible, an instrument of happiness, first to himself, and next to other beings." JAMES MILL, JAMES MILL ON EDUCATION 41 (W.H. Burston ed., 1969); *see* Amy Gutmann, *What's the Use of Going to School? The Problem of Education in Utilitarianism and Rights Theories, in* UTILITARIANISM AND BEYOND 261, 264 (Amartya Sen & Bernard Williams eds., 1982) (discussing utilitarian theories of education and summarizing Bentham's theory of education); R.M. Hare, *Opportunity for What? Some Remarks on Current Disputes About Equality in Education,* 3 OXFORD REVIEW OF EDUCATION 207, 211 (1977) (discussing a relatively modern example of a utilitarian theory of education). "[L]et us ask what I say is the main question: What principles of justice as regards tbe provision of education will have the highest acceptance-utility?" MILL, *supra*, at 41.

118. *See* William Galston, *Civic Education in the Liberal State, in* LIBERALISM AND THE MORAL LIFE 89, 90 (Nancy Rosenblum ed., 1989) (defining the purpose of civic education as "the formation of individuals wbo can effectively conduct their lives within, and support, their political community").

119. *See* Wexler, *supra* note 111, at 1200-20.

120. *Id.* at 1200.

121. *See id.* at 1202-03.

legislative and administrative proposals that impact religion.[122] It educates them regarding the different ways that religious and nonreligious citizens reach conclusions on issues of public concern so they can participate more thoughtfully in discussions and debates on such issues.[123] And it promotes such civic virtues as mutual understanding, respect, tolerance, and empathy.[124]

Critics of evolution education, including those who supported the Santorum Amendment and the legislation in Ohio, are correct to the extent that they criticize public schools for not teaching students about religious views on origins. Although it is far more difficult to determine precisely *what* schools should teach about religion than to decide in theory that they *should* teach about religion,[125] a strong case can be made, based on the criteria just articulated, that education about religious views on origins and evolution should be included in the curriculum. Teaching students about religious views on origins would be a promising way to achieve the civic goals that teaching about religion can generally further.

First, although it may seem both obvious and tautological, one reason that schools should teach about religious views on origins is that these views drive the current controversy over how public schools should teach about origins. Surely public schools have a civic responsibility to educate their students about important issues of current concern. The fact that those issues may concern the purpose and nature of education itself does not mean that schools should, in the interest of defending their own choices (teaching only evolution in science classes, for instance), pretend that their choices are not controversial. Many Americans do not believe in evolution and do not think that schools should present only evolution in their science classes.[126] Students may not be able to change school policy while they are still attending classes, but once they graduate and become full-fledged voting citizens, they will be responsible for future educational

122. *See id.* at 1203-13.

123. *See id.* at 1214-18.

124. *See id.* at 1219-20. In addition, teaching about religion is civically important because only by understanding religion can citizens make thoughtful choices about whether religion ought to be allowed to play a prominent role in public life. *See* Jay D. Wexler, *Framing the Public Square*, 91 GEO. L.J. 183, 194-95 (2002).

Obviously, there are practical problems involved in implementing a program of teaching about religion. For a brief discussion of these problems, and why they are surmountable, see Wexler, *supra* note 111, at 1220-22 n.248.

125. *See* Wexler, *supra* note 111, at 1168-69 (observing that in light of limited space in the curriculum and the variety of things that could be taught about religion, "[o]ne critical task for the future is prioritization").

126. *See* NORD, *supra* note 109, at 288 (citing 1991 Gallup Poll statistics regarding belief in evolution).

policy. To prepare students for that challenge, schools should teach them about the educational controversies they will have to face once they are charged with making the decisions.

Second, schools should teach about religious views on origins so that students can understand their own history more fully. Religious skepticism regarding evolution has played a prominent role in American intellectual, social, and cultural history ever since Darwin published *The Origins of Species* in 1859. One of the most compelling reasons for teaching American students about religion is to ensure they are informed about their own history.[127] Historical understanding is crucial to good citizenship. Citizens can only fully and accurately understand current issues of public concern if they understand the historical developments that give rise to or affect the current situation.[128]

Quite clearly, present-day America is marked by sharp cultural differences that find their roots in religious belief.[129] With respect to basic values and policy areas such as abortion rights, rights for gays and lesbians, family values, education, regulation of the media, and (perhaps) legal interpretation, among others, there is much truth in James Davison Hunter's observation that "the contemporary culture war evolved out of century-old religious tensions."[130] Because the cultural divide is so wide, and because the divide originates largely from differences in religious belief, American schools have an obligation to teach students about religion generally, and its history in America specifically, so that students can understand their own cultural, social, and political milieu.

Teaching about religious views of origins should be part of this educative project. The history of the origins controversy in this country mirrors that of the culture war itself. Although in the years following Darwin's famous publication, the controversy centered mostly on internal debates within the scientific and religious communities struggling to understand the relationship between science and faith,[131] it soon erupted into the political and cultural mainstream in the 1920s when Williams Jennings Bryan instigated a

127. *See* NORD & HAYNES, *supra* note 33, at 35-39 (stressing the importance of religion in the curriculum).

128. *See* Wexler, *supra* note 111, at 1202.

129. *See generally* STEPHEN L. CARTER, GOD'S NAME IN VAIN: THE WRONGS AND RIGHTS OF RELIGION IN POLITICS (2000); JAMES DAVISON HUNTER, CULTURE WARS: THE STRUGGLE TO DEFINE AMERICA (1991).

130. *See* HUNTER, *supra* note 129, at 67.

131. *See* RONALD L. NUMBERS, THE CREATIONISTS 3-19 (1992) (discussing Darwinism's impact on Creationism in America); RONALD L. NUMBERS, DARWINISM COMES TO AMERICA (1998) (providing general information about the early reception of Darwinism in the United States).

nationwide assault on evolution, culminating in the Scopes Trial in 1925.[132] The clash between science and religion that animated the revolt against evolution was symbolic of the clash over the very idea of modernity. As Hunter explains:

> From the perspective of many traditionalists, the further introduction of sinful ideas was precisely what happened in the last decades of the nineteenth century and first decades of the twentieth century in the contest between science and faith, between the evolutionary and creationist views of human origins. The organizational efforts by Protestant Fundamentalists (and some Catholics) to dam the flow of these intellectual currents made the contest a national issue. Behind these efforts was a profound hatred of modernism in all of its forms.[133]

Fast-forwarding several decades, the next major chapter of the evolution-creationism controversy exemplifies how national interests can exert pressure on religious beliefs and practices. In the wake of the Scopes Trial, textbook publishers, afraid of losing sales, eliminated or largely diluted their treatments of evolution in science textbooks.[134] But with the military and economic challenges posed by the Cold War and the space race instigated by the Soviet launch of Sputnik in the late 1950s, newfound pressure was exerted on high schools to teach science (and thus evolution) rigorously.[135] The result, among other things, was the development of a series of evolution-heavy textbooks funded by the National Science Foundation that creationists saw as an "attempt to ram evolution down the throats of [their] children."[136] These developments spurred efforts among creationists to publish rival textbooks and to promulgate laws regulating the teaching of evolution.[137] These efforts, in turn, culminated in the famous legal battles of the 1960s, 1970s, and 1980s[138] that produced two landmark Supreme Court decisions widely hailed as victories for the evolutionists.[139]

Although it might be inaccurate to say that students will graduate uneducated if they do not learn about this basic history of the origins controversy in the United States, there is good reason to

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132. *See* NUMBERS, THE CREATIONISTS, *supra* note 131, at 41-44. *See generally* EDWARD J. LARSON, SUMMER FOR THE GODS: THE SCOPES TRIAL AND AMERICA'S CONTINUING DEBATE OVER SCIENCE AND RELIGION (1997) (discussing the Scopes Trial).

133. HUNTER, *supra* note 129, at 137-38.

134. *See* NUMBERS, THE CREATIONISTS, *supra* note 131, at 238.

135. *See id.* at 238-40.

136. *Id.* at 239 (quoting William J. Tinkle, *Formation of the Creation Research Society*, NATURALIST, Spring 1966, at 26, 31).

137. *See* Wexler, *supra* note 7, at 447-52.

138. In addition to the Supreme Court cases cited below, see McLean v. Ark. Bd. of Educ., 529 F. Supp. 1255, 1255 (E.D. Ark. 1982).

139. *See* Edwards v. Aguillard, 482 U.S. 578, 578 (1987); Epperson v. Arkansas, 393 U.S. 97 (1968).

believe that understanding this history will help students think intelligently about current issues of public concern involving religion and culture. They should know that our current controversies regarding religion have not arisen out of thin air, but have developed incrementally in response to specific scientific, cultural, and political events. They should know that these issues have always engendered controversy and have always drawn the attention of large portions of the population. They should know that the controversies have attracted the serious attention of the legal system, which has grappled with the difficult issues presented by the conflict between science and faith. Perhaps most importantly, they should understand that religion has had to struggle mightily for its own survival against political, scientific, cultural, and legal forces that have threatened to overwhelm it.[140]

Third, and strongly related to the previous point, students should learn about the origins controversy because it will help them to understand how government laws and other activities affect religious belief and practice so that they can thoughtfully evaluate these government actions.[141] Government legislation and regulation often place significant burdens on religious individuals and organizations.[142] Other laws specifically accommodate religious needs by providing specific exemptions from general prohibitory laws for religious individuals and organizations.[143] Finally, aid programs often provide financial support to religious individuals and organizations.[144] Despite

140. An important, related point—but one perhaps slightly more removed from the civic education rationale for teaching about origins—is that students should learn about religious views on origins because those views are often (as in the case of Christianity) central tenets of the religious traditions that have played a monumental role in the course of world history. It is difficult to see how students could really understand the world around them without understanding something of the religious traditions that have populated the world over time, and it is difficult to see how they could understand those traditions without learning about the views on origins that are held by those traditions.

141. *See* Wexler, *supra* note 111, at 1203-13 (developing this point more generally).

142. *See, e.g.*, Dep't of Human Res. v. Smith, 494 U.S. 872, 872 (1990) (involving a drug prohibition that had the effect of prohibiting religious use of peyote); Goldman v. Weinberger, 475 U.S. 503, 503 (1986) (involving a military regulation that had the effect of prohibiting a Jewish soldier from wearing his yarmulke).

143. *See* Michael W. McConnell, *The Problem of Singling Out Religion*, 50 DEPAUL L. REV. 1, 5 (2000) (citing study showing that over two thousand federal and state statutes included a specific accommodation for religion).

144. *See, e.g.*, Zelman v. Simmons-Harris, 122 S. Ct. 2460, 2462-63 (2002) (upholding a Cleveland school voucher program that funnels public moneys to religious schools against an Establishment Clause challenge); Mitchell v. Helms, 530 U.S. 793, 801-03 (2000) (upholding a federal aid program providing computers and other instructional equipment to private schools, including religious schools); Witters v. Wash. Dep't of Servs. for the Blind, 474 U.S. 481, 482 (1986) (holding that the state of Washington could provide aid to a blind student in order to help him attend Bible school).

serious arguments to the contrary,[145] the Supreme Court has largely condoned these kinds of government actions as generally being constitutional.[146] Evaluation of these actions, then, rests primarily with the nation's citizens. To know whether to support the government when it engages in activities affecting religion, either positively through aid or accommodation, or negatively through prohibitory laws or regulations, citizens need to know something about religion.[147]

Schools have a number of religious topics and concepts from which to choose to help students in this task. Teaching about religious views on origins, however, would be well suited to the objective. The conflict between these views and evolution as taught in science classes represents a paradigmatic and accessible example of how government action can burden religious believers. By learning about, for example, Christian views on the divine creation of the universe, students will better understand why learning evolution is objectionable to some believers and will gain insight into how believers feel when they are forced to study something that violates their basic beliefs. Moreover, students will learn this lesson in a context—the controversy concerns their own schools, their own education—that should be both familiar and understandable. Students can then use this knowledge and understanding to evaluate more esoteric controversies involving the clash of religion and government—for example, the regulation of religious use of drugs, zoning regulation of religious property, or the application of antidiscrimination laws to religious organizations.

Fourth, because the evolution-creation controversy splendidly illustrates the differences between how religious and nonreligious people confront important questions, teaching about the controversy would be a particularly useful way to help students understand these differences—an important step to understanding our often fractured and uncivil discourse regarding public issues. Although it is easy to

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145. On the Free Exercise Clause, see Michael W. McConnell, *Free Exercise Revisionism and the* Smith *Decision*, 57 U. CHI. L. REV. 1109 (1990). On accommodation, see Ira C. Lupu, *Reconstructing the Establishment Clause: The Case Against the Discretionary Accommodation of Religion*, 140 U. PA. L. REV. 555 (1991). On funding religious organizations, see *Mitchell*, 530 U.S. at 867-68 (Souter, J., dissenting).

146. On the Free Exercise Clause, see *Smith*, 494 U.S. at 875-76 (denying a Free Exercise Clause challenge to a state statute prohibiting the ceremonial ingestion of peyote). On accommodation, see Corp. of the Presiding Bishop of the Church of Jesus of Latter-day Saints v. Amos, 483 U.S. 327, 327 (1987) (finding that the religious exemption from Title VII as applied to secular nonprofit activities of religious institutions did not violate the Establishment Clause). On aid, see *Zelman*, 112 S. Ct. at 2467-69; *Mitchell*, 530 U.S. at 793-94 (upholding a statute providing public funds to public and private schools); *id.* at 837 (O'Connor, J., concurring) (arguing that the Court's rule was too broad).

147. *See* Wexler, *supra* note 111, at 1203-13.

overgeneralize about the nature of religion or science—claims that religion is inevitably "irrational" or that science is always "objective" have been adequately countered[148]—citizens who are deeply religious will often think about public issues differently from those who are not, relying on religious authority primarily,[149] and other considerations only secondarily, if at all. This reliance on religious authority—scripture, official pronouncements of religious leaders, etc.[150]—can appear bizarre or unreasonable to those who do not rely upon such sources (and vice versa). This, in turn, can cause public discourse to become unenlightening, divisive, and uncivil.[151]

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148. For an argument in defense of religion's rationality, see Franklin I. Gamwell, *Religion and Reason in American Politics*, 2 J.L. & RELIGION 325 (1984). For a classic critique of pure objectivity in science, see generally THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS (2d ed., 1970).

Indeed, some philosophers of science have argued that it is extremely difficult, if not impossible, to identify criteria that meaningfully distinguish or demarcate science from nonscience. *See* LARRY LAUDAN, BEYOND POSITIVISM AND RELATIVISM: THEORY, METHOD, AND EVIDENCE 211 (1996):

> Whatever the specific strengths and deficiencies of the numerous well-known efforts at demarcation . . . it is probably fair to say that there is no demarcation line between science and nonscience, or between science and pseudo-science, which would win assent from a majority of philosophers. Nor is there one which *should* win acceptance from philosophers or anyone else.

See also PHILIP KITCHER, ABUSING SCIENCE: THE CASE AGAINST CREATIONISM 40-50 (1982) (arguing against a theoretical distinction based on falsifiability and arguing that the important difference is between "successful" science and unsuccessful science); LEGAL GUIDEBOOK, *supra* note 43, at 15 ("The demise of demarcation arguments within the philosophy of science has made it difficult for critics to label design theory as unscientific in principle."); NUMBERS, THE CREATIONISTS, *supra* note 131, at xv ("Lately many scholars, including the philosopher of science Larry Laudan and the sociologist of science Thomas F. Gieryn, have shown the sterility of efforts to demarcate between science and pseudoscience on analytical grounds."); Larry Laudan, *Commentary on Ruse: Science at the Bar—Causes for Concern*, *in* CREATIONISM, SCIENCE, AND THE LAW: THE ARKANSAS CASE 161, 165-66 (Marcel Chotkowski La Follette ed., 1984), at 161, 165-66 (rejecting the idea that science can be neatly demarcated from nonscience); Miller, *supra* note 7, at 496-500 ("[C]an a principled line be drawn between science and non-science in a way that excludes creationism and includes evolution? Many scholars and philosophers of science, including some who believe in evolution themselves, believe that it cannot be done."); Michael Ruse, *Creation-Science is Not Science*, *in* CREATIONISM, SCIENCE, AND THE LAW: THE ARKANSAS CASE, *supra*, at 150, 151 (arguing for certain factors that support defining creation science as non-science, but nonetheless suggesting that "[i]t is simply not possible to give a neat definition—specifying necessary and sufficient characteristics—which separates all and only those things that have ever been called 'science' ").

149. *See* KENT GREENAWALT, RELIGIOUS CONVICTIONS AND POLITICAL CHOICE 30 (1988) ("Religious convictions of the sort familiar in this society bear pervasively on people's ethical choices, including choices about laws and government policies.").

150. *See id.* at 31 (noting that religious believers rely on various "sources of ethical guidance" such as "sacred texts, authoritative statements by church organizations and religious leaders, consultation with the community of believers, and direct inspiration, usually through prayer and meditation").

151. *See* Wexler, *supra* note 111, at 1214-18.

The controversy over origins is an excellent example of this phenomenon. There are many possible ways to think about the relationship between scientific and religious claims.[152] Some see religion and science as making directly contradictory claims; others find ways to reconcile the two realms of inquiry.[153] The same is true for religious and scientific views on origins.[154] Many have historically been able to find ways of reconciling the scientific theory of evolution with religious claims about origins.[155] But for a great many Americans, religious claims about origins simply take precedence over any conflicting scientific claims.[156] Those religious citizens have a different way of understanding the world: for these believers, religious sources of authority are determinative, and claims from other sources that are inconsistent must yield.[157] Thus, to the extent that believers see scientific evolution as being in conflict with religious accounts of origins, they must reject evolution. For those who take science as their starting point, and who do not understand or empathize with those who take a different view, this view seems completely incomprehensible.[158] As a result, meaningful discourse over origins and education about origins becomes impossible, and the discourse often turns uncivil and hostile.[159]

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152. *See* IAN BARBOUR, RELIGION IN AN AGE OF SCIENCE 3-30 (1990) (describing various ways of relating science and religion, including conflict, dialogue, independence, and integration); *see also* STEVEN GOLDBERG, SEDUCED BY SCIENCE: HOW AMERICAN RELIGION HAS LOST ITS WAY 38-39 (1999) (discussing various views of religion and science); Greenawalt, *supra* note 35, at 25-30; NORD, *supra* note 109, at 283-86 (noting four different ways of understanding the relationship between religion and science).

153. *See* NORD, *supra* note 109, at 283-84 (arguing that science and religion are not necessarily exclusive).

154. *See id.* at 286-89 (describing "four ways of understanding the origins of human life in modern science and the major religions of the world").

155. The Pope, for example, has made this claim. *See* Stewart, *supra* note 8, at 559, 559 n.55; *see also* KENNETH R. MILLER, FINDING DARWIN'S GOD 260-92 (1999) (reconciling theories of evolution and creation); NUMBERS, THE CREATIONISTS, *supra* note 131, at 3-19 (discussing Darwinism's impact on Creationism in America).

156. *See* NORD, *supra* note 109, at 283 ("For many religious conservatives, religious claims, grounded in Scripture or tradition, always trump science."); *see also* Miller, *supra* note 7, at 506-07 (discussing the conflict between evolution and Christianity and noting that "many Protestant theologians . . . view evolution and Christian theology as inherently contradictory").

157. *See* NORD, *supra* note 109, at 283; Miller, *supra* note 7, at 506-07.

158. *See* STEPHEN L. CARTER, THE CULTURE OF DISBELIEF: HOW AMERICAN LAW AND POLITICS TRIVIALIZE RELIGIOUS DEVOTION 167 (1993) (noting that "the critics of creationism often overlook that the creationist rejection of evolution theory rests on a nontrivial hermeneutic and a rational application of it to the evidence").

159. *See id.* at 158-59 (illustrating the conflict between creationism and evolution); HUNTER, *supra* note 129, at 138, 153; Wexler, *supra* note 7, at 441 (describing the creation and evolution debate and providing examples of the charged rhetoric).

Schools should teach about religious views on origins so that students can at least understand the perspective of religious people when they reject scientific theories like evolution that conflict with religious claims. Schools should not, however, try to make nonreligious students question their own views but rather should help students understand why religious people think the way they do about origins. This will hopefully further the broader goal of helping nonreligious students understand why religious people think differently about a whole range of important public issues (abortion, rights for gays and lesbians, etc.) so that discourse over these issues may at least be based on a foundation of understanding. In addition, by treating these issues openly, and by encouraging discussion, schools might promote understanding in the other direction too—helping religious students understand why nonreligious students think the way they do about public issues. This exchange (hopefully) could result in a more civil public discourse over the issues that divide us most deeply and could perhaps lead students to treat each other with greater empathy, tolerance, and mutual respect.[160]

B. How to Teach About Religious Views on Origins

The argument developed above supports an educational policy that would have schools teach about the evolution controversy in social science classrooms in the context of a general program of teaching about religion. Because the material to be taught does not directly concern competing scientific theories of origins, the science classroom is not the best place for schools to locate this new element of the curriculum. Although it might be possible to devote some amount of time to the discussion of the broad range of historical, cultural, political, and religious issues discussed above in a science classroom, the issues are not of the type that are generally discussed there, and it is unlikely that science teachers would be in the best position to teach effectively about religion and the social and cultural controversies that it creates.[161]

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160. *See* Wexler, *supra* note 111, at 1219-20 (discussing the need to teach tolerance and mutual respect).

161. *See* James T. Sears & James C. Carper, *Science: Who and What Are We*, *in* CURRICULUM, RELIGION, AND PUBLIC EDUCATION, *supra* note 113, at 219 ("There is . . . agreement that many teachers charged with teaching science are ill equipped to go beyond lesson plans and textbook formulations even if we could agree that their students ought examine such knotty issues."). It is worth emphasizing that this argument does not rest on any strong notion that certain ways of thinking about the world are "scientific" and others are not, and that therefore, since these broader issues are not "scientific," they do not belong in a "science" class. The idea that science can be neatly demarcated from nonscience has been questioned by some

But where in the social science curriculum should schools place origins education? One possibility is to teach about it in bits and pieces whenever it happens to fit into an existing class. For example, history teachers could teach about the history of the opposition to evolution in American history classes; civics teachers could teach about the ongoing controversy over origins in those classes; philosophy teachers could teach about the epistemological claims of science and religion there. This approach to education about religion, generally referred to in the literature as "natural inclusion,"[162] certainly would represent an improvement over the current system, in which schools do not teach religion even when its relevance is quite apparent, but it is far from ideal. Without teaching religion as a separate class, or at least as a separate unit within an existing class, schools are unlikely to teach students enough about religion to achieve the goals that education about religion seeks to accomplish. To give religion the attention that it deserves and to give students the time and incentive to focus on the issues raised by religion in contemporary culture, schools should teach separate religion courses.[163] For the reasons discussed above, education about religious views on origins should play an important role in that general program of teaching about religion and should ideally involve a separate unit in a general class about religion.[164]

One final question of some importance is how broad a range of religious views on origins should schools teach? Clearly, the clash of views on origins between conservative schools of Christianity and scientific evolution is the most important historical, social, and cultural phenomenon regarding origins in America. For this reason, it makes sense for schools to focus in some depth on Christian views of

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philosophers of science, *see supra* note 148, and I am not confident that school officials or other political decisionmakers could identify criteria to distinguish science from nonscience in any broadly persuasive manner. Instead the argument is based on recognition of the type of topics and approaches that are generally discussed in science classrooms as opposed to other types of classrooms. Broader discussions regarding historical, cultural, and political issues are generally handled outside the science classroom rather than inside.

162. *See* NORD & HAYNES, *supra* note 33, at 44-45 (discussing problems with natural inclusion).

163. *See* NORD, *supra* note 109, at 387 (advocating teaching a separate course, or a sequence of three courses, about religion); NORD & HAYNES, *supra* note 33, at 44-46 (arguing for incorporating religion into existing courses and creating new courses in religion).

164. *See* Miller, *supra* note 7, at 492 (advocating teaching about comparative origins either as a stand-alone class or as part of a class in comparative religion). It should be stressed that, although important, religious views on origins should be only one of the many topics taught in a general religious studies course. Clearly, there are many other aspects of religious belief and practice that also ought to play important roles in the general program of teaching about religion.

origins (although they should not focus only on those that conflict with Darwinism, but also on those schools of thought that have found ways to reconcile with evolution) and to examine explicitly the controversy that has played such a major role in recent American history. But schools should not stop there. Teaching only about Christian views on origins would not allow schools to reap all the benefits of teaching about religion. Limiting instruction in this way would be underinclusive with respect to the goals of teaching about religion, which should include teaching students to understand (1) the perspective of minority religious traditions, so that they can evaluate government action which affects those traditions;[165] (2) how all seriously religious people think about important public issues—not just those who belong to prominent religious groups; and (3) the religious dimensions of conflicts and issues beyond our own borders and around the world.[166]

To achieve these goals, schools should teach not just about Christian views on origins but also about the views on origins held by religious traditions from all parts of the globe. Nicholas Miller suggests that schools teach about "comparative origins" either as a stand-alone class or as part of a course in comparative religion.[167] Such instruction would include not only a "full-blown literalist version of the Genesis creation and flood," but also a variety of other views on origins, both ancient and modern, including, for example, "the Babylonian Gilgamesh epic, the Hindu cycles of creation, different Native American creation stories as well as the evolutionary story of the modern secularist."[168] This makes good sense.[169] Schools should

165. This point is particularly important since most clashes between the government and religion involve minority traditions, as majority traditions are often able to convince legislatures to grant them exemptions from generally applicable laws. *See* Wexler, *supra* note 111, at 1239 (discussing the importance of preparing students to participate in a diverse political community).

166. This would include learning about the religious history of other nations, as well as the role of religion in current global conflicts and issues. *See id.* at 1237-41 (arguing in favor of teaching about a wide range of religions).

167. Miller, *supra* note 7, at 492.

168. *Id.*

169. Although I agree with Miller regarding teaching about religious views on origins outside the science classroom, I disagree with his position on teaching about alternatives to evolution inside the science classroom. *See* discussion *infra* Part III. For similar reasons, I disagree with the original position of Charles Haynes, perhaps the most influential figure in the teaching about religion movement, who initially argued that schools should both teach about religious views of origins in social studies courses and also present alternative views to evolution in science classes. *See* Charles C. Haynes, *Evolution Deadlock Needs a New Script*, FREEDOM FORUM, Aug. 22, 1999, *at* http://www.freedomforum.org/templates/document.asp?documentID=9023 (last visited Jan. 12, 2003). Haynes, however, has recently taken a position on the issue very similar to the one defended in this Article. *See* Charles C. Haynes, *'Teaching the Controversy' over Evolution*

teach about these varied perspectives, as well as others.[170] Particular emphasis might be placed on the similarities and differences among Native American creation stories, such as the stories told by the Cherokees, the Sioux, and the Navajo.[171] On the one hand, teaching these stories would inform students of their own nation's history, which, of course, began long before European settlers landed on our shores. On the other hand, students would learn about the differences between minority religious views on origins and views of majority traditions such as Christianity, while at the same time learning to appreciate the diversity among minority religions on the subject.

Finally, at least for older students, schools should consider teaching a systemized approach to religious views on origins, perhaps classifying them according to their similarities and differences. For instance, according to one scholarly account, creation beliefs come in essentially five varieties: creation from chaos or nothingness; creation from a cosmic egg or primal maternal mound; creation from separated world parents; creation from a process of earth-diving; and creation in several stages from other worlds.[172] Moreover, creation stories often contain common elements across cultures, such as accounts of a great flood or characters like the flood hero, the first man and woman, and the nefarious "trickster."[173] Schools might illustrate these relationships among creation beliefs to teach students that people around the world and across history have thought about these fundamental concerns in similar ways. This could potentially have the salutary effect of promoting virtues of mutual understanding, respect, and tolerance. Also, as discussed more fully below, couching the presentation of Christian religious views on origins within the broader context of teaching students about a wide range of views and the relationships among those views would diminish the chance that any program of teaching about religious views on origins would be found constitutionally suspect.

Could Be Disastrous, FREEDOM FORUM, Oct. 27, 2002, *at* http://www.freedomforum.org/templates/document.asp?documentID=17157.

170. The Japanese story of creation depicted in *The Kojiki* and *The Nihongi*, for example, comes to mind. *See* DAVID LEEMING & MARGARET LEEMING, A DICTIONARY OF CREATION MYTHS 148-50 (1994).

171. *See id.* at 44-47 (presenting Cherokee creation stories); *id.* at 202-08 (presenting Navajo creation stories); *id.* at 245-53 (presenting Sioux creation stories).

172. *See id.* at viii (noting the five types of creation myths); *see also* Charles H. Long, *Cosmogony*, *in* 4 ENCYCLOPEDIA OF RELIGION 94, 94-99 (Mircea Eliade ed., 1987) (laying out similar typology); *id.* at 99-100 (citing other sources on cosmogony).

173. Long, *supra* note 172, at 99 (noting that there may be similarities among myths of different communities). The trickster often takes the form of an animal, such as a raven, a coyote, or a spider. *See* LEEMING & LEEMING, *supra* note 170, at viii (describing the common elements in creation stories).

C. Constitutional Issues

Various members of the Supreme Court, past and present, have said on multiple occasions that public schools may teach about religion without violating the Constitution.[174] A concurrence even made such a suggestion in *Edwards*, the Louisiana case involving "creation science."[175] In view of these remarks, the case for teaching about religion and, specifically, for teaching about religious views on origins, would appear particularly strong from a constitutional perspective—and it is. But there are several possible constitutional concerns that are important enough to warrant some mention and discussion, though none of them ultimately counsels against the idea that schools should start teaching their students about religious views on origins.[176]

To begin with, particular schools or teachers might decide to hide behind the "teaching about origins" label while in fact attempting to impart a particular religious view of origins to their students. In other words, a teacher may say he is teaching "about" creationism when he is really teaching students that they should believe in the Biblical version of creation instead of evolution. Alternatively, a teacher might also send such a message unintentionally, either through what he says, or through other, less explicit means, such as body language or tone of voice.[177] In light of these possibilities, one might argue that it would be better for schools to say nothing about religious views on origins (or religion generally, for that matter), to avoid the increased possibility of either intentional or unintentional

174. *See, e.g.*, Stone v. Graham, 449 U.S. 39, 42 (1980) ("This is not a case in which the Ten Commandments are integrated into the school curriculum, where the Bible may constitutionally be used in an appropriate study of history, civilization, ethics, comparative religion, or the like."); Abington Sch. Dist. v. Schempp, 374 U.S. 203, 225 (1963) ("Nothing we have said here indicates that such study of the Bible or of religion, when presented objectively as part of a secular program of education, may not be effected consistently with the First Amendment."); *id.* at 300 (Brennan, J., concurring) ("The holding of the Court today plainly does not foreclose teaching *about* the Holy Scriptures or about the differences between religious sects in classes in literature and history."); *id.* at 306 (Goldberg, J., concurring) ("[T]he Court would recognize the propriety of . . . teaching *about* religion, as distinguished from the teaching *of* religion in the public schools."); McCollum v. Bd. of Educ., 333 U.S. 203, 236 (1948) (Jackson, J., concurring) ("One can hardly respect a system of education that would leave the student wholly ignorant of the currents of religious thought.").

175. *See* Edwards v. Aguillard, 482 U.S. 578, 607 (1987) (Powell, J., concurring) ("Courses in comparative religion of course are customary and constitutionally appropriate.").

176. For a discussion of constitutional issues implicated by teaching about religion generally, see Wexler, *supra* note 111, at 1243-62 (discussing issues of intentional and unintentional inculcation, coercion, endorsement, disapproval, and Free Exercise Clause burdens).

177. *See* Stanley Ingber, *Religious Children and the Inevitable Compulsion of Public Schools*, 43 CASE W. RES. L. REV. 773, 778 (1993) (arguing that a value-free curriculum is unachievable).

inculcation of religion, both of which are prohibited by the First Amendment's Establishment Clause.[178]

To be sure, a sudden increase in the amount of religious inculcation occurring in public schools would be problematic, and it is at least possible that encouraging schools to teach about religious views on origins would have this effect. But this outcome is far from certain. It is at least equally, if not more, possible that those schools and teachers who would be inclined to promote religious beliefs in classrooms are already doing so, without the help of the "teaching about religion" label, and that by explicitly adopting a program of teaching about religious views on origins, schools and school boards can in fact discourage inculcation by making clear which types of behavior are acceptable and which are not.[179] What *is* clear is that by not teaching about origins, schools are failing to teach students important knowledge and ways of thinking about critical public issues involving religion. Because the advantages of teaching about religious views on origins are concrete, and the disadvantages, from the perspective of inculcation, are speculative at best, schools should at least begin programs of teaching about religion and origins. If it turns out that the level of inculcation dramatically increases as a result of these efforts, schools and policymakers can then reevaluate whether continuing the efforts makes sense.

Second, schools should be concerned with the possibility that some instructors who teach about religious views on origins will express disapproval of those views, violating the Establishment Clause without realizing that they have done so. Although the doctrine is hardly developed, the Supreme Court has hinted at the notion that the Establishment Clause prohibits not only government endorsement of religion,[180] but also government "disapproval" of religion.[181] The extent of this prohibition is unclear.[182] It surely does

178. *See* Lemon v. Kurtzman, 403 U.S. 602, 619 (1971) ("The State must be certain, given the Religion Clauses, that subsidized teachers do not inculcate religion . . . .").

179. They can do this through adoption of guidelines or standards that distinguish inculcation from appropriate objective education. *See* NORD & HAYNES, *supra* note 33, at 46-47; *Rationale and Guidelines for Teaching about Religion*, FINDING COMMON GROUND 7-1 to 7-17 (Charles C. Haynes ed., 1994).

180. *See infra* text accompanying notes 195-201 (discussing endorsement).

181. *See* Lynch v. Donnelly, 465 U.S. 668, 694 (1984) (O'Connor, J., concurring) ("Every government practice must be judged . . . to determine whether it constitutes an endorsement or disapproval of religion."); Bd. of Educ. v. Mergens, 496 U.S. 226, 249 (1990) ("Because the Act on its face grants equal access to both secular and religious speech, we think it clear that the Act's purpose was not to 'endorse or disapprove of religion.' ").

182. No court of which I am aware has ever struck down a law or other government action on tbe basis that it "disapproved" of religion. For academic commentary on the "disapproval" prohibition, see Micbael W. McConnell, *Religious Freedom at a Crossroads*, 59 U. CHI. L. REV.

not reach every instance in which the government takes an action or puts forth a message that is at odds with someone's religious belief or that offends a religious believer. Government actions and messages often have these effects (teaching of evolution is one example; promoting and engaging in warfare is another), and it is not clear that the government could function if it were prohibited from acting in ways that offend religious believers. Instead, such messages and actions are best handled under the Free Exercise Clause, with the remedy, if any, being exemptions from having to hear these government messages or from being subject to requirements that are offensive. Nonetheless, by including "disapproval" within its endorsement test for the Establishment Clause, the Court has suggested that at least some government messages may be so offensive—perhaps because they are so direct, immediate, and derogatory—that they violate the Establishment Clause.

If this is true, then teachers must be particularly careful not to express their own disapproval of religious views of origins in class.[183] This concern might be slightly more worrisome than the concern about inculcation of religion. Many nonreligious people are hostile to religious views on origins like creationism,[184] and it may not be as clear that expressing disapproval of religious beliefs is as inappropriate and perhaps unconstitutional as promoting religious beliefs. It is possible to imagine a teacher telling a class in connection with a discussion of religious views on origins that such beliefs are irrational or primitive compared with scientific views. The teacher might say this without intending to disparage religious believers or without any knowledge that such a statement might cause offense. It would certainly be surprising to the teacher that such a statement might even violate the Establishment Clause, if a court were to find

115, 151-53 (1992); Eugene Volokh, *Equal Treatment is Not Establishment*, 13 NOTRE DAME J.L. ETHICS & PUB. POL'Y 341, 368-70 (1999).

183. I say "their own" to distinguish a situation in which a teacher says, for example, "anyone who believes in the Biblical account of creation is irrational and crazy" from a situation in which a teacher, as a way of teaching about the controversy over origins says something like "many evolutionists believe that anyone who believes in the Biblical account of creation is irrational and crazy." The former is the state, through the teacher, expressing disapproval of religion; the latter is the state teaching students about the controversy that exists over origins. It is worth adding that as a matter of fairness and respect to religious students, teachers should be careful not to express their own disapproval of religious views on origins in class even if doing so would not be unconstitutional.

184. *See, e.g.*, CARTER, *supra* note 158, at 159 (noting several harsh criticisms about creation); HUNTER, *supra* note 129, at 153 (describing a cartoon in which five brains of different sizes were shown and the brain that was the size of a pin was identified as the " 'brain of a creationist' "); Wexler, *supra* note 7, at 469 (noting that "evolutionists have argued that evolution renders religious beliefs 'superfluous,' undermines rational belief in the existence of a supernatural being, and leads 'straight to a vision which is equivalent to atheism.' ").

that it sufficiently disapproved of the religious belief, however that disapproval might be measured. In light of these concerns, teachers, schools, and school boards should stress (through guidelines, training, and materials) that those who teach about religious views on origins, while certainly free to tease out the differences between religious and scientific ways of thinking,[185] should not make explicit first-person statements disapproving of religious viewpoints on origins.[186] If such steps are taken, then this potential constitutional concern should not pose much of an obstacle to the implementation of a program of teaching about religious views on origins.

Third, some religious students and parents will find it offensive, and perhaps a violation of free exercise rights, for schools to teach about religious views on origins without allowing objecting students to opt out of such instruction. Because it treats religious belief and practice as phenomena to be studied rather than truths to be lived, teaching *about* religion is, as Nomi Stolzenberg says, a "quintessentially secular humanist activit[y]."[187] This is as true for religious views on origins as for any other aspect of teaching about religion. Some devoted believers would surely find objectionable any class that teaches about religious views on origins in an objective manner, particularly one that teaches a broad range of views from around the world and across history. Such a class, to those believers, may be understood as conveying a state-sponsored message that their children can pick and choose what to believe about origins. Such a message would directly contradict their own message to their children that there is one truth about origins and that there is no choice in the matter.

For better or for worse, as a matter of constitutional law, objecting parents and students are unlikely to convince a court that schools violate their free exercise rights by requiring students to learn about religious views on origins. The Supreme Court has held that religious believers generally have no right to be exempted from neutral, generally applicable laws.[188] Although the Court has recognized an exception from this rule for cases involving "hybrid" claims—claims in which the plaintiff asserts a violation of her free

185. Although the teacher might want to point out that the project of demarcating science from other forms of inquiry is a hazardous enterprise. *See supra* note 148.

186. *See* Andrew Koppelman, *Secular Purpose*, 88 VA. L. REV. 87, 131 n.147 (2002) ("[I]t is sometimes alleged that some science teachers who teach Darwin's theory of evolution tell their students that the theory proves that God does not exist. The teaching of that conclusion would, in my view, violate the Estahlishment Clause.").

187. Nomi Maya Stolzenberg, *"He Drew a Circle That Shut Me Out": Assimilation, Indoctrination, and the Paradox of a Liberal Education*, 106 HARV. L. REV. 581, 614 (1993).

188. *See* Dep't of Human Res. v. Smith, 494 U.S. 872, 879-81 (1990).

exercise rights as well as some other right, such as the parental to raise one's own children[189]—the actual vitality and scope of this exception is far from certain.[190] Moreover, as the most analogous federal court of appeals case on the issue of teaching students about subjects to which their parents object on religious grounds demonstrates, courts are likely to find that teaching students about religious views on origins either does not "burden" the religion of objecting students or that, even if it does, that burden is outweighed by sufficiently compelling state interests,[191] such as the ones identified earlier in the Article.[192] Nonetheless, conscientious school administrators should demonstrate respect for religious believers by allowing them to opt out of instruction about religious views on origins if they make a sincere claim that such instruction burdens their religious beliefs.[193] It would be a shame for schools to teach about religious views on origins to foster mutual respect and tolerance but not show such respect in the administration of the educational program.[194]

Finally, reformers should pay attention to two somewhat more subtle Establishment Clause "endorsement" issues.[195] The Supreme Court has, on some occasions, articulated an Establishment Clause test that prohibits the government from endorsing religion.[196] Specifically, the test prohibits the state from sending a message to nonbelievers " 'that they are outsiders, not full members of the

189. *See id.* at 881 (noting that *Pierce v. Society of Sisters*, 268 U.S. 510 (1925), acknowledged the right of parents to direct the education of their children).

190. *See* Timothy J. Santoli, Note, *A Decade After* Employment Division v. Smith: *Examining How Courts are Still Grappling with the Hybrid-Rights Exception to the Free Exercise Clause of the First Amendment*, 34 SUFFOLK U. L. REV. 649, 665-67 (2001) (observing that in applying the hybrid-rights analysis, the circuit courts have interpreted it in three different ways).

191. *See* Mozert v. Hawkins County Bd. of Educ., 827 F.2d 1058, 1070 (6th Cir. 1987).

192. *See supra* text accompanying notes 125-60.

193. Some school districts provide such opt-outs for students who object to classes in comparative religion and the like. *See* Wexler, *supra* note 111, at 1261-62 n.387 (noting several examples of guideline opt-in or opt-out provisions for teaching about religion).

194. It should be noted that a class on religious views on origins would likely be seen by most believers as a positive development, given that it signals the schools' respect for the importance of religious views, in contrast to the current curriculum which, by ignoring religion altogether, signals exactly the opposite. *See, e.g.*, NORD & HAYNES, *supra* note 33, at 2 ("[M]any religious conservatives are outraged by [the absence of teaching about religion in the curriculum]; they take the absence of religion to imply a hostility to religion. This has fueled our culture wars and has driven many to private schools and to support the voucher movement.").

195. It is also possible that the issues discussed here could be analyzed by courts under the traditional version of the *Lemon* test, which prohibits the government from taking actions that have the effect of advancing or promoting religion. *See* Lemon v. Kurtzman, 403 U.S. 602, 612-13 (1971).

196. *See* Koppelman, *supra* note 186, at 103.

political community, and an accompanying message to adherents that they are insiders, favored members of the political community.' "[197] In deciding whether the state has sent such a message through its laws or activities, the Court analyzes both the state's purpose for its actions and its effects; the test, in other words, has both objective and subjective components.[198] The Court looks to whether a "reasonable observer," "deemed aware of the history and context of the community and forum" in which the challenged action takes place, would perceive the action as endorsing religion.[199] The history of the practice "is relevant," according to the test, "because it provides part of the context in which a reasonable observer evaluates whether a challenged governmental practice conveys a message of endorsement."[200] The test, of course, is malleable and unpredictable,[201] and government actors, including school boards, administrators, and teachers therefore must give serious thought to whether their proposed actions might be seen by a "reasonable observer" as endorsing either religion as a whole or a particular religious tradition, practice, or belief.

The first endorsement issue concerns the possibility that a teacher, using either her own lesson plan or flawed materials prepared by somebody else, could teach the Biblical account of creation (or some aspect or part of that account) from a uniquely Christian perspective, while purporting to teach it from a nonsectarian perspective. The problem arises because the Bible is a text shared by more than one religious tradition. Where certain passages or stories of a shared text have contested meanings among traditions, it would be inaccurate and inappropriate for the teacher to present only one of those meanings as the definitive meaning of the text. For example, different Buddhist sects have different

197. Santa Fe Indep. Sch. Dist. v. Doe, 530 U.S. 290, 309-10 (2000) (quoting Lynch v. Donnelly, 465 U.S. 668, 688 (1984) (O'Connor, J., concurring)).

198. *See* County of Allegheny v. ACLU, 492 U.S. 573, 626 (O'Connor, J., concurring) ("In *Lynch*, [O'Connor] concluded that the city's display of a crèche . . . had neither the purpose nor the effect of conveying a message of government endorsement . . . .").

199. Capitol Square Review & Advisory Bd. v. Pinette, 515 U.S. 753, 780 (1995) (O'Connor, J., concurring); *see also Santa Fe*, 530 U.S. at 317.

200. *Allegheny*, 492 U.S. at 630 (O'Connor, J., concurring); *see also id.* at 629 ("To be sure, the endorsement test depends on a sensitivity to the unique circumstances and context of a particular challenged practice and, like any test that is sensitive to context, it may not always yield results with unanimous agreement at the margins. . . .").

201. *See id.* at 675-78 (Kennedy, J., concurring in part and dissenting in part) ("Deciding cases on the basis of such an unguided examination of marginalia is irreconcilable with the imperative of applying neutral principles in constitutional adjudication."); McConnell, *supra* note 182, at 148-51 (noting "the impossibility of defining 'endorsement' "). *See generally* Steven D. Smith, *Symbols, Perceptions, and Doctrinal Illusions: Establishment Neutrality and the "No Endorsement" Test*, 86 MICH. L. REV. 266 (1987).

interpretations of the Lotus Sutra; contrary to other schools, the Tendai sect has interpreted the text to mean that striving to fulfill desires while on earth is not significantly different from a state of enlightenment.[202] It would be inaccurate, then, for somebody teaching Buddhism to say that the Lotus Sutra teaches that earthly striving is fundamentally different from enlightenment. Such a message would take the non-Tendai view as normative; it would privilege non-Tendai interpretations relative to Tendai ones.

Although schools and preparers of materials should try to minimize these educational mistakes with respect to all religious traditions, the mistake becomes more problematic and arguably takes on constitutional dimensions when the privileged interpretation favors the majority religious tradition of the community and classroom. In those cases, the privileging may possibly and reasonably be understood as having the effect (if not the purpose) of endorsing that majority tradition. Using this type of analysis, courts have struck down portions of educational programs that have taught the Bible from Christian points of view.[203] In light of these decisions and the Court's endorsement test, schools (and those who prepare materials for use in schools) must be careful not to present portions of the Biblical creation story that have contested meanings solely from a Christian perspective without making clear that they are doing so.[204] For example, as the liberal watchdog group People for the American Way notes, schools should not tell students that the story of Adam and Eve necessarily represents the "Fall of Man" or that the serpent in that story represents "Satan," an interpretation of the Genesis story

202. This explanation is, of course, a simplification of the sect's position. For discussions of the Tendai sect's interpretation of the Lotus Sutra, see PETER OCCHIOGROSSO, THE JOY OF SECTS: A SPIRITED GUIDE TO THE WORLD'S RELIGIOUS TRADITIONS 122 (1996); Paul Groner, *The* Lotus Sutra *and Saichō's Interpretation of the Realization of Buddhahood with This Very Body, in* THE LOTUS SUTRA IN JAPANESE CULTURE 53, 61-69 (George J. Tanabe, Jr. & Willa Jane Tanabe eds., 1989); Tamura Yoshirō, *Tendaishū, in* 14 THE ENCYCLOPEDIA OF RELIGION 396, 397, 399 (Mircea Eliade ed., 1987).

203. *See* Gibson v. Lee County Sch. Bd., 1 F. Supp. 2d 1426, 1434 (M.D. Fla. 1998); Wiley v. Franklin, 474 F. Supp. 525, 531 (E.D. Tenn. 1979). Although these courts did not explicitly rely on an endorsement rationale, instead simply invoking the Establishment Clause's prohibition on the promotion of religion, an endorsement concern does seem to be in the background; it is difficult to imagine that the same courts would find a constitutional violation, for example, in the Tendai Buddhism example described above. *See supra* text accompanying note 202. Key to the courts' decisions would seem to be the fact that the majority of the community and class was Christian. *See also* PEOPLE FOR THE AM. WAY FOUND., THE GOOD BOOK TAUGHT WRONG: 'BIBLE HISTORY' CLASSES IN FLORIDA'S PUBLIC SCHOOLS (1999) (arguing that many schools in Florida have been unconstitutionally teaching the Bible from a Christian perspective).

204. Schools should also be wary of differences among Christians themselves regarding scriptural meaning. Christians by no means all think the same way about anything, much less their foundational text. *See* CARTER, *supra* note 129, at 62-63, 190.

not shared by Jews.[205] Although these are tricky and important issues, they are surely not prohibitive of the entire project; with some care (and, if appropriate, consultation with religious scholars), developers of materials and other education professionals should be able to deal with shared text issues in a successful manner.

The second endorsement issue is potentially more sweeping and significant because it goes not to the constitutionality of presenting certain topics or sources or other material, but rather to the project of teaching about religious views on origins as a whole. The argument might be made that the decision to teach about religious views on origins in a public school curriculum that has heretofore ignored such topics itself sends a message of endorsement of religion. Given the historical context of the exclusion of religious topics altogether from the public schools, a skeptic might say, the sudden decision to include religious views on origins in the curriculum would be recognized by a reasonable observer as an attempt to endorse religion and, perhaps, some particular religious belief (a Christian one, for instance). As will become apparent in the next part of the Article, this argument carries substantial weight in the context of teaching about alternatives to evolution in the science classroom. But how much weight does it carry here?

The answer is probably not too much, and to the extent that a valid endorsement issue might arise, schools can take simple steps to avoid the problem. Of course, it is unclear how a particular court might choose to apply the endorsement test, but there are several reasons why policymakers ought not be overly concerned about this type of challenge. First, teaching about religious views on origins brings with it very real and substantial secular educational benefits, as described above.[206] These secular purposes are not sham purposes,[207] and they are not in any way subordinate to any religious purpose that might animate the educational reforms. Second, unlike religious efforts to influence the science classroom, there is no comparably significant and prominent history of overtly religious efforts to promote the objective teaching of religion (as opposed to actual religious teaching or prayer) in schools. Indeed, by focusing on the social science classroom instead of the science classroom,

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205. *See* PEOPLE FOR THE AM. WAY FOUND., *supra* note 203, at 5. Of course, it would be fine for teachers to present these views of the Genesis story if they say that these are specifically Christian interpretations of those events. The problem would arise if the teachers simply said (for instance) that "according to the Bible," the story of Adam and Eve represents the fall of man.

206. *See supra* text accompanying notes 125-160.

207. *See* Edwards v. Aguillard, 482 U.S. 578, 586-87 (1987) (noting that the state's articulation of a secular purpose must "be sincere and not a sham").

policymakers will send a signal to observers that traditional, explicitly religious, efforts to affect the curriculum have been rejected. Third, also in contradistinction to efforts surrounding the science classroom, the current leaders of the teaching about religion movement have not defended their reforms in religious or Christian terms (indeed, they have explicitly disclaimed religious rationales),[208] and many supporters of teaching about religion in the public schools are either non-Christians or nonreligious. For example, a 2001 statement of principles supporting the idea that schools should teach about religion was endorsed by Jewish groups such as the Union of American Hebrew Congregations, educational groups such as the National Association of Secondary School Principals, and liberal watchdog groups such as People for the American Way.[209] Finally, as already observed, various Supreme Court Justices have explicitly approved of the idea of teaching students about religion. Given these contextual facts, it is unlikely that any court would find that the decision to include an objective presentation of religious views on origins would send a message of religious endorsement to any reasonable observer.

But given the malleability and manipulability of the endorsement test,[210] schools should take steps to minimize the possibility of a successful Establishment Clause lawsuit if such steps are feasible and educationally valuable. In the case of teaching about religious views on origins, two such steps easily meet these criteria. As already argued, schools should teach religious views on origins within broad contexts along two dimensions. First, they should teach about a wide range of religious views on origins. This variety will decrease the possibility that anyone would understand the decision to teach these views as endorsing particular religious beliefs, such as conservative Christian ones. Second, schools should teach about religion generally, as opposed to teaching just about religious views on origins. To the extent that courts might be more skeptical of educational reforms that center on origins education than they would be of other types of education about religion (because of the historical controversy over evolution education and the Court's decisions on that issue), such a step will further minimize the chance of a successful constitutional

208. *See, e.g.*, NORD & HAYNES, *supra* note 33, at 57 ("[W]e would point out that although there are religious arguments for taking religion seriously in schools, we haven't appealed to them. Our civic, constitutional, and educational frameworks, and the arguments for using them, are fully secular.").

209. *See Religious Liberty, Public Education, and the Future of American Democracy: A Statement of Principles*, FIRST AMENDMENT CENTER (First Amendment Center, Nashville, Tenn.) (2001), *at* http://www.fac.org/publications/first/statementofprinciples/religious-liberty.statementofprinciples.pdf (last visited Mar. 23, 2001).

210. *See supra* note 201.

challenge. By disassociating the educational reforms even further from the traditional assault on evolution education, schools not only can help to ensure that their programs will survive judicial scrutiny but can also assuage the fears of secular skeptics that this move is just another attempt to promote religion in the public schools.

III. TEACHING ABOUT THE EVOLUTION CONTROVERSY IN THE SCIENCE CLASSROOM

As the recent events in the U.S. Senate and in Ohio demonstrate, critics of evolution education continue to focus on reforming the science classroom, rather than on pressuring schools to teach more about religion.[211] The main focus of this reform movement is the push to include the purportedly scientific theory of intelligent design in science classes as an alternative to the Darwinian theory of evolution. In this part, the Article argues that public schools should not focus their efforts in this way. Introducing intelligent design into science classrooms will bring slight educational benefits at best[212] and will carry significant constitutional (and other) risks. The first subpart considers the benefits; the second subpart considers the risks. In the third subpart, the Article considers a hypothetical reform somewhat different from the ones envisioned by Ohio and by the U.S. Senate—teaching about a wide range of minority scientific views, including but not limited to intelligent design, in science classrooms—and concludes that although such a reform would solve certain problems, it might create others that are even more troublesome.

A. Why Teach Intelligent Design?

Critics of evolution education generally begin their case for teaching intelligent design in science classrooms by identifying alleged flaws in evolutionary theory.[213] Often this argument is accompanied

211. *But see* Miller, *supra* note 7, at 510 (advocating reform of both science classes and education about religion). Nord and Haynes, whose project first and foremost is to reform the way that schools teach about religion, also emphasize reform of science education in modest respects to conform to their views of proper education about religion. *See* NORD & HAYNES, *supra* note 33, at 134-63.

212. This assumes that intelligent design is presented accurately, which it very well might not be. *See infra* text accompanying notes 290-310.

213. *See* Jon A. Buell, *Foreword* to LEGAL GUIDEBOOK, *supra* note 43, at iii ("[I]n fact there is substantial scientific literature that critiques the adequacy of the Darwinian explanation for the complexity and 'apparent design' of biological organisms. Thus the debate—*the scientific debate*—over Darwinian evolution remains very much alive."); JOHN H. CALVERT & WILLIAM S. HARRIS, TEACHING ORIGINS SCIENCE IN PUBLIC SCHOOLS: MEMORANDUM & OPINION 5 (2001) ("The important thing to note is that Darwinian evolution has not been proved."); PERCIVAL

by citations to scientific publications that have called certain details of the Darwinian account into question. For example, DeWolf argues that "scientists writing in technical journals across the subdisciplines of biology have questioned neo-Darwinian theory on many evidential and theoretical grounds . . . ."[214] As illustrations, DeWolf notes, among other things, that "[e]vidence from developmental biology suggests clear limits to the amount of evolutionary change that organisms can undergo, casting doubt on the Darwinian theory of common descent"; that the fossil record "does not conform to neo-Darwinian expectations about the history of life"; and that "geochemists have failed to find evidence of the nitrogen-rich 'prebiotic soup' required by the standard chemical evolutionary model."[215] The SEAO website makes similar claims, concluding that, "[b]ased on the writings of biological professionals who are highly esteemed authors, the fossils, which are the facts related to evolution, do not support the theory of evolution," and that, "[f]aced with the total lack of supporting fossil facts, evolutionists resort to the use of ambiguous weasel-words to describe imagined lineages."[216]

Next, critics generally explain that a significant number of scientists have developed an alternative theory of origins, namely the theory of intelligent design, which, according to the SEAO website, is a "theory about the origin of life that holds that intelligent causes best explain the origin of many features of living systems."[217] "The theory," according to the website, "is based on the testable assumption that structures that exhibit high information content are more likely to be the result of intelligent design than of undirected natural causes."[218] Supporters argue that intelligent design is supported by a convincing "formal theory," as well as empirical evidence.[219] With respect to the

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DAVIS & DEAN H. KENYON, OF PANDAS AND PEOPLE: THE CENTRAL QUESTION OF BIOLOGICAL ORIGINS 88-89 (1993); Phillip E. Johnson, *The Two Controversies Over Evolution, in* CURRICULUM, RELIGION, AND PUBLIC EDUCATION, *supra* note 113, at 231, 233; *Teaching the Origins Controversy*, *supra* note 43, at 49-56 (discussing the "problem with the NeoDarwinian synthesis and the re-emergence of design").

214. *Teaching the Origins Controversy*, *supra* note 43, at 50.

215. *Id.* at 50-55.

216. Walter L. Starkey, *Evolution: Theory or Fact?*, SCIENCE EXCELLENCE FOR ALL OHIOANS, *at* http://www.sciohio.org/evolfact.htm (last visited Jan. 14, 2003).

217. *Intelligent Design*, SCIENCE EXCELLENCE FOR ALL OHIOANS, *at* http://www.sciohio.org/IDdefinition.htm (last visited Jan. 13, 2003); *see also supra* note 7 (discussing further the definition of intelligent design).

218. *Intelligent Design*, *supra* note 217.

219. *See* Buell, *supra* note 213, at iv (arguing that "contemporary design theorists see impressive evidence of *actual* design in living systems"); *see also Teaching the Origins Controversy*, *supra* note 43, at 61 (noting that "design theorists point to specific empirical evidence of design, both in biology and in physics").

formal theory, DeWolf points to the writing of mathematician William Dembski, whose book *The Design Inference*,[220] published by Cambridge University Press, argues that systems with certain types of characteristics ("high complexity" and "specification") "invariably result from intelligent causes."[221] With respect to the empirical evidence, DeWolf, citing the work of "design theorists" such as Michael Behe and Dean Keynon,[222] points to (among other things) " 'irreducibly complex' " systems as the "acid-powered rotary engines that turn the whiplike flagella of certain bacteria"; the "assembly instructions inscribed along the spine of DNA" which "display the characteristic hallmarks of intelligently encoded information"; and the fossil record, which "reveal[s] a 'biological big bang' near the beginning of the Cambrian period 530 million years ago."[223]

According to intelligent design supporters,[224] by teaching only one of two valid competing scientific theories of origins, public schools inappropriately enforce a Darwinian orthodoxy in the science classroom.[225] Such a Darwinian orthodoxy, it is said, reflects a "naturalistic" philosophy because it arbitrarily censors any theories, evidence, or arguments that point to nonnaturalistic explanations for observable data. This way of thinking is sometimes referred to in the literature as "methodological naturalism." As the SEAO website argues:

> Science standards use a little known "Rule" to censor the evidence of design. The Rule, which is usually unstated, is often referred to as "*methodological naturalism*." It declares design inferences invalid by definition and not by any objective evaluation of the evidence. It assumes the naturalistic hypothesis prior to examination of the facts. Although advocates of the "Rule" claim it is needed to maintain scientific objectivity, its use in origins science does just the opposite. Instead of promoting an objective search for

220. *See supra* note 51 (citing the writings of William Dembski on design theory).

221. *Teaching the Origins Controversy*, *supra* note 43, at 60-61; *see also* DAVIS & KENYON, *supra* note 213, at viii-ix.

222. Michael Behe is a biochemist working at Lehigh University, and Dean Kenyon is a biologist who previously taught at San Francisco State College.

223. *Teaching the Origins Controversy*, *supra* note 43, at 62-66; *see also* CALVERT & HARRIS, *supra* note 213, at 6-12; DAVIS & KENYON, *supra* note 213, at 12-13 (using an example of the extremely complex giraffe to illustrate correctness of intelligent design theory).

224. I use the phrase "intelligent design supporters" to refer to people who believe that public schools should teach intelligent design; I do not mean to imply that all of these supporters also personally believe in intelligent design or do not believe in evolution, although that certainly may be the case in many instances.

225. Buell, *supra* note 213, at iii ("One such zone of control is the biology curriculum of the public schools. Here open discussion of evidence and evaluation of competing theories has given way to an enforced orthodoxy: Darwinian evolutionary theory.").

> the truth, it abandons an objective approach and censors any evidence that does not support the predetermined conclusion.[226]

To break this monopoly, intelligent design supporters argue that schools should at the very least allow science teachers to teach intelligent design as an alternative to evolution if they wish to do so.[227] More ambitiously, supporters generally argue that teachers should in fact teach intelligent design and that school boards and other educational decisionmakers should encourage them in these efforts.[228] Supporters of intelligent design argue that broadening science education in this way will bring with it several advantages, including teaching students more comprehensively about the nature of the scientific controversy over origins; enlivening the presentation of the

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226. SCIENCE EXCELLENCE FOR ALL OHIOANS (SEAO), *at* http://www.sciohio.org/seaohome.htm (last visited Jan. 14, 2003); *see also* CALVERT & HARRIS, *supra* note 213, at 3 ("The constitutional problem arises when government censors one hypothesis and thereby provides a monopoly to the religious or anti-religious implications of the competing hypothesis."); Johnson, *supra* note 45, at 18 ("Philosophical naturalism is so deeply ingrained in the thinking of many educated people today, including theologians, that they find it difficult even to imagine any other way of looking at things."); Miller, *supra* note 7, at 504-06 ("[M]aterialistic naturalism, the philosophy that underlies Darwinian evolution, a priori excludes non-natural or supernatural causes from scientific explanations about the world. Thus, as a system of thought evolution is, by intention and design, methodologically atheistic."). Miller claims that the position I took in my student note—as he puts it, that "evolution is only methodologically materialistic and not philosophically or metaphysically materialistic, and thus makes no claims about the existence of God"—is unconvincing because it "seems difficult to detach the claims of Darwinian evolution from either form of materialism." Miller, *supra* note 7, at 504 n.79. It is true that Darwinian evolution is inconsistent with some religious understandings of the origin of the universe and mankind, but this certainly does not mean that it is inconsistent with all forms of religious belief, as evidenced by the many believers who have reconciled their religious beliefs with the theory of evolution. *See supra* notes 153, 155 and accompanying text. For a sophisticated account of the meaning of "naturalism," see Robert T. Pennock, *Naturalism, Evidence, and Creationism: The Case of Phillip Johnson*, *in* INTELLIGENT DESIGN CREATIONISM AND ITS CRITICS: PHILOSOPHICAL, THEOLOGICAL, AND SCIENTIFIC PERSPECTIVES, *supra* note 7, at 77; *see also* Greenawalt, *supra* note 35, at 37-41.

227. *See* Buell, *supra* note 213, at v ("[This Guidebook] makes a persuasive case for allowing teachers to *teach the controversy*."); *Teaching the Origins Controversy*, *supra* note 43, at 110 (arguing that school boards should "defend th[e] efforts" of teachers "to expand student access to evidence and information" about the origins controversy).

228. *See, e.g.*, CALVERT & HARRIS, *supra* note 213, at 3 (using the heading, "Teaching the Evidence [for intelligent design] is Necessary for Good Science Education . . . ."); LEGAL GUIDEBOOK, *supra* note 43, at 9 ("[S]houldn't students also know the arguments against the sufficiency of the neo-Darwinian mechanism and for design, especially now that many well-credentialed contemporary scientists are making these arguments in print?"); *id.* at 28 ("[T]he school board should encourage the biology teacher to teach the controversy."); *Teaching the Origins Controversy*, *supra* note 43, at 110 (arguing that school board lawyers should encourage teachers to take a "more open and more dialectical approach"); SEAO, *supra* note 226 ("The Solution of the Problem: TEACH BIOLOGICAL ORIGINS OBJECTIVELY. Use the 'teach the controversy' approach: present evidence for and against biological evolution (the tbeory of common descent), and permit (but not require) teachers to discuss alternative theories.").

material to make it more interesting; informing students about the nature of science and the way it often develops incrementally through the competition of rival theories; and training students to discuss controversial public issues in a pluralistic society.[229]

These arguments, then, in short, constitute the case for teaching intelligent design in public school science classrooms. But how persuasive is the case? Are there really great benefits to be gained by teaching this fledgling theory as an alternative to Darwinian evolution?[230]

The benefits are slight at best.[231] First, the argument that students will learn more comprehensively about the substantive nature of the scientific controversy over origins is fallacious, because there is nothing even approaching a significant substantive scientific debate over the basic premises of evolutionary theory.[232] Intelligent

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229. *See supra* text accompanying notes 41-61.

230. It is worth emphasizing here that I am not arguing that intelligent design is not science. I have little confidence that it is possible to distinguisb science from nonscience in a manner that would be helpful in the public school setting. As noted above, attempts to set out criteria to distinguish between science and nonscience have been subject to serious criticism by philosophers of science. *See also* Wexler, *supra* note 7, at 466-68; *see supra* note 148.

231. For what I mean by "at best," see *infra* note 252.

232. The status of the theory within the scientific community should probably be the most important factor that a general policymaker who is not a scientist would want to consider to decide whether such a theory should be included in the science classroom. (Someone who is herself a scientist might place more emphasis on her own independent assessment of the theory's worth than a generalist.) The most natural and reasonable way for such a general policymaker to decide (if forced to decide, as some such decisionmakers in Ohio have been) which topics should get covered and with what emphasis in a science classroom would be to look at what the scientific community, governed by its own self-generated norms (specifically, the peer review process), believes are the most important and persuasive theories, explanations, concepts, etc. There are certainly alternatives to this approach. One might be for the general policymaker to disagree, based on her own limited scientific knowledge, with the consensus of the scientific community on the worth of a particular theory and to give it more attention in the science classroom than it is given weight by the scientific community. Another might be for the policymaker to adopt a different working definition of "science" than the one adopted by the clear majority of the members of the community itself. This alternative would allow the policymaker to give greater weight to theories not considered "science" or "good science" by the scientific community. Although I may surely be wrong, I have little confidence that there is some rock-solid, objective definition of science that would preclude such definitional wrangling, and some work in philosophy of science points in this direction as well. *See supra* note 148. Nonetheless, these options do not comport with common sense. Certainly, the assumption that most reasonable people would make is that a "science" classroom should convey the body of knowledge referred to as "science" (including both data and analysis) by those who constitute the scientific community and who are governed by the professional norms of that community, including the peer review process. To base the content of the science classroom on any other principle would be extraordinary. Why, for example, should the high school science classroom, rather than the community of practicing scientists, be the proper forum for changing the normative conception of "science"? Such a choice would raise the specter that the real motivation for the curricular choice is coming from an area of human experience quite different from the one most reasonable people

design supporters and theorists concede that their view is a "minority" one,[233] but in doing so they understate the point. In fact, although the scientific community might disagree on some of the details, it overwhelmingly agrees that the basic theory of evolution is correct[234]

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would call "science"—namely, that area of experience most reasonable people would call "religion."

For an intriguing suggestion that science teachers might introduce the idea of intelligent design as a way of teaching students about the limits of science, see Greenawalt, *supra* note 35, at 373-79. Greenawalt argues that "[a]lthough a strong connection exists between what practicing scientists do and the content of science courses, the teacher should explore certain issues the scientist may put to one side," namely whether there might be some physical phenomena for which natural explanations do not suffice. *Id.* at 106-07. While the point is well taken, I am of the view that introducing such a topic into a science classroom will so likely cause students to want to explore religious views that the topic is better introduced in a class in which the teacher is trained to discuss such views—namely, a class in comparative religion or some such similar topic.

233. *Teaching the Origins Controversy*, supra note 43, at 75

234. *See, e.g.*, NEIL A. CAMPBELL ET AL., BIOLOGY 426 (1999) ("[Q]uestions about *how* life evolved in no way imply that most biologists consider evolution to be "just a theory."); HELENA CURTIS & N. SUE BARNES, BIOLOGY 9 (1989) ("Among biologists, there is almost unanimous agreement that evolution has occurred in the past and continues to occur today."); DOUGLAS J. FUTUYMA, EVOLUTIONARY BIOLOGY 15 (2d ed. 1986) ("[T]he statement that organisms have descended with modifications from common ancestors—the historical reality of evolution—is not a theory. It is a fact, as fully as the fact of the earth's revolution about the sun."); NAT'L ACAD. OF SCI., SCIENCE AND CREATIONISM 2 (1999) ("[T]heories are the end points of science. They are understandings that develop from extensive observation, experimentation, and creative reflection. They incorporate a large body of scientific facts, laws, tested hypotheses, and logical inferences. In this sense, evolution is one of the strongest and most useful scientific theories we have."); NAT'L ACAD. OF SCI., TEACHING ABOUT EVOLUTION AND THE NATURE OF SCIENCE 56 (1998) ("The scientific consensus around evolution is overwhelming."); ROBERT T. PENNOCK, TOWER OF BABEL: THE EVIDENCE AGAINST THE NEW CREATIONISM 116 (2000) ("Evolution in all its complexities is no longer a 'newfangled' theory but a set of truths that is well established by the evidence."); MICHAEL RUSE, TAKING DARWIN SERIOUSLY: A NATURALISTIC APPROACH TO PHILOSOPHY 4 (1986) ("One conclusion only is tenable. Evolution may be almost entirely unseen. But it is a fact, and a well-established fact, no less than that Henry VIII's daughter Elizabeth was Queen of England, and that a heart beats within my breast."); MICHAEL SHERMER, 25 CREATIONISTS' ARGUMENTS AND 25 EVOLUTIONISTS' ANSWERS 3 (1994) ("Of the many things evolutionists argue and debate about within the field, one thing they are certain of and all agree upon is that evolution has occurred."); Am. Anthropological Ass'n, *Statement on Evolution and Creationism*, NAT'L CTR. FOR SCI. EDUC. (2000) ("The principles of evolution have been tested repeatedly and found to be valid according to scientific criteria . . . . There is much debate over the details, but descent with modification itself is no longer debated by scholars."), *at* http://www.ncseweb.org/resources/articles/3053_statements_from_scientific_and_12_19_2002.asp #anthro2 (last visited Jan 14, 2003); Am. Geophysical Union, *Earth History and the Evolution of Life Must Be Taught: Creationism Is Not Science*, NAT'L CTR. FOR SCI. EDUC. (1999) ("Scientific theories are . . . the best-substantiated statements that scientists can make to explain the organization and operation of the natural world. . . . Our understanding of Earth's development over its 4.5 billion-year history and of life's gradual evolution has achieved the status of scientific theory."), *at* http://www.ncseweb.org/resources/articles/3053_statements_from_scientific-_and_12_19_2002.asp#agu2 (last visited Jan. 14, 2003); Austl. Acad. of Sci., *Statement on Creationism*, NAT'L CTR. FOR SCI. EDUC. (observing that evolution "remains one of the most powerful of scientific ideas"), *at* http://www.ncseweb.org/resources/articles/3053_statements_-from_scientific_and_12_19_2002.asp#ausas (last visited Jan. 14, 2003); Authors of Biology Texts,

and indeed that it is the central and unifying concept in all of biology.[235] The same community holds a near-complete consensus that intelligent design is not good science and therefore an unimportant theory in the field.[236] Perhaps the most salient fact regarding this last

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Statement on Evolution in Textbooks, NAT'L CENTER FOR SCI. EDUC. (Mar. 26, 1999) (noting that "the overwhelming majority of working scientists in the United States and throughout the world" support evolution), *at* http://www.ncseweb.org/resources/articles/1689_statements_from_educational_or_12_19_2002.asp#abt (last visited Jan. 14, 2003); Neil S. Greenspan, *Not-So-Intelligent Design*, SCIENTIST, Mar. 4, 2002, at 12 ("Evolution is best regarded as a fact. What is more, it is a fact that is inescapable."); Lawrence M. Krauss, *'INTELLIGENT DESIGN': IT'S NOT SCIENCE: 'Creationism' Discussion Belongs in Religion Class*, PLAIN DEALER (Cleveland), Jan. 16, 2002, at B9 ("Evolution is to modern biology what Newton's laws are to modern physics. There is no controversy within the scientific community on this issue."); Jessica Mathews, *Creationism Makes a Comeback*, WASH. POST, Apr. 8, 1996, at A21 ("There is no theory in science more solidly grounded, more widely accepted or more able to illuminate a huge body of observed fact than the theory of evolution."); Nat'l Ass'n of Biology Teachers, *Statement on Teaching Evolution*, *in* TEACHING ABOUT EVOLUTION AND THE NATURE OF SCIENCE, *supra*, at 127 ("Nothing in biology makes sense except in light of evolution.") (internal quotations omitted); *Statements from Scientific Organizations*, NAT'L CTR. FOR SCI. EDUC. (collecting statements from over thirty scientific organizations supporting the teaching of evolution and rejecting the teaching of alternatives), *at* http://www.ncseweb.org/resources/articles/8882_statements_from_scientific_org_1_30_2001.asp (last visited Jan. 14, 2003); *Statements from Educational Organizations*, NAT'L CENTER FOR SCI. EDUC. (collecting statements from twenty educational organizations supporting the teaching of evolution and rejecting the teaching of alternatives), *at* http://www.ncseweb.org/resources/articles/3120_statements_from_educational_or_1_30_2001.asp ; Nat'l Sci. Teachers Ass'n, *Position Statement on the Teaching of Evolution*, *in* TEACHING ABOUT EVOLUTION AND THE NATURE OF SCIENCE, *supra*, at 124, 125 ("There is no longer a debate among scientists over whether evolution has taken place."); John Rennie, *15 Answers to Creationist Nonsense*, SCI. AM., July 2002, at 78, 79 ("The fossil record and abundant other evidence testify that organisms have evolved through time."); Letter from the Presidents of the Inter-University Council of Ohio, *supra* note 101 ("Evolution is the single unifying scientific theory of life and an essential element of scientific literacy.").

235. *See, e.g.*, CAMPBELL, *supra* note 234, at 13 ("Evolution is the core theme of biology."); FUTUYMA, *supra* note 234, at 16 ("Evolution . . . is the central unifying concept of biology."); NAT'L ACAD. OF SCI., SCIENCE AND CREATIONISM, *supra* note 234, at 1 ("The theory of evolution has become the central unifying concept of biology and is a critical component of many related scientific disciplines."); NAT'L ACAD. OF SCI., TEACHING ABOUT EVOLUTION, *supra* note 234, at 3 ("[E]volution is the central organizing principle that biologists use to understand the world."); Am. Anthropological Ass'n, *supra* note 234 ("Evolution . . . is a cornerstone of modern science, being central to biology, geology, and astronomy."); Theodosius Dobzhansky, *Nothing in Biology Makes Sense Except in the Light of Evolution*, 35 AM. BIOLOGY TCHRS. 125 (1973); Stephen Jay Gould, *What Does the Dreaded "E" Word Mean, Anyway?*, NAT. HIST., Feb. 2000, at 28 (calling evolution "the central and unifying concept of the life sciences"); Thomas R. Meagher, *Evolution and Today's Society*, 49 BIOSCIENCE 923, 923-24 (1999); Nat'l Ass'n of Biology Teachers, *supra* note 234, at 127 (noting that evolution plays a "central, unifying role . . . in nature, and therefore, biology"); Nat'l Sci. Teachers Ass'n, *supra* note 234, at 125 ("[E]volution is a unifying concept for science."); Society for Integrative and Comparative Biology, NAT'L CTR. FOR SCI. EDUC., (Jan. 6, 2001), http://www.ncseweb.org/resources/articles/3053_statements_from_scientific_and_12_19_2002.asp#sicb (last visited Jan. 14, 2003) ("Nothing in biology makes sense except in the light of evolution.").

236. *See, e.g.*, MILLER, *supra* note 155, at 92-164 (criticizing intelligent design in great detail); NAT'L ACAD. OF SCI., SCIENCE AND CREATIONISM, *supra* note 234, at 25 (observing that intelligent design is not science because it is not "testable by the methods of science"); PENNOCK,

supra note 234, at 226-76 (comprehensively considering and criticizing basic tenets of intelligent design); Matthew J. Brauer & Daniel R. Brumbaugh, *Biology Remystified: The Scientific Claims of the New Creationists, in* INTELLIGENT DESIGN CREATIONISM AND ITS CRITICS, *supra* note 7, at 289, 327 (reviewing claims of design theorists and concluding that "[d]espite the new garb, [their] logic parallels that of their discredited creationist predecessors, and if extended, might return astronomy to the Ptolemaic system, geology to Noachian catastrophism, and medicine to bloodletting."); Peter Godfrey-Smith, *Information and the Argument from Design, in* INTELLIGENT DESIGN CREATIONISM AND ITS CRITICS, *supra* note 7, at 575, 594 ("In sum: the classical argument from design was answered by Darwin and by the subsequent development of evolutionary biology. Recasting the argument . . . does not change that situation."); Steve Bunk, *Intelligent Design and Memes*, SCIENTIST, July 8, 2002, at 10 ("Obviously, intelligent design should not be taught as science."); Brian Charlesworth, *Evolution by Design?*, 418 NATURE 129, 129 (2002) (rejecting William Dembski's theory of intelligent design as "smack[ing] of the Middle Ages"); Jerry A. Coyne, *The Case of the Missing Carpaccio*, 412 NATURE 586, 587 (2001) (criticizing intelligent design theorists' refusal to extrapolate from micro- to macroevolution by comparing such a refusal to someone who, after he sees his grandma gets on her train after a Christmas visit, believes that after the train goes around the bend "it is seized by divine forces and instantly transported to Florida"); Jerry A. Coyne, *God in the Details*, 383 NATURE 227, 227-28 (1996) (rejecting Michael Behe's book advocating intelligent design theory as "a work of advocacy whose creationist ancestry is revealed by both its rhetoric and its failure to deal honestly with the evidence for evolution."); Robert Dorit, *The Scientists' Bookshelf: Molecular Evolution and Scientific Inquiry, Misperceived*, AM. SCIENTIST, Sept.-Oct. 1997, at 474-75 (criticizing Behe's book as "built on some deep misunderstandings about evolution, molecular organization and, ultimately, about the nature of scientific inquiry" and pointing out six fallacies in the book); Douglas J. Futuyma, *Miracles and Molecules*, BOSTON REV., Feb.-Mar. 1997 (observing that Behe "invoke[s] miracles" and is thus "ceas[ing] to practice science"), *at* http://www-polisci.mit.edu/BR22.1/futuyma.html; Stephen Jay Gould, *Impeaching a Self-Appointed Judge*, SCI. AM., July 1992, at 118, 121 (reviewing Phillip Johnson's *Darwin on Trial* and concluding that it is "scarcely more than an acrid little puff"); Greenspan, *supra* note 234, at 12 (criticizing intelligent design and observing that "[a] truly fundamental problem with the notion of ID, as a scientific idea, is that, ultimately, it has effectively no explanatory or predictive power"); Philip Kitcher, *Born-Again Creationism, in* INTELLIGENT DESIGN CREATIONISM AND ITS CRITICS, *supra* note 7, at 257, 287 ("For all the fancy rhetoric, all the academic respectability, all the accusations and gesticulations, born-again creationism [design theory] is just what its country cousin was. A sham."); Krauss, *supra* note 234 ("[T]he concept of 'intelligent design' is not introduced into science classes because it is not a scientific concept."); Michael D. Lemonick, *Dumping on Darwin*, TIME, Mar. 18, 1996, at 81 ("The notion tbat the world's complexity bespeaks deliberate design is intuitively appealing. But wbile it's a legitimate religious belief or philosophical speculation, scientists insist it isn't science and shouldn't be taught as such."); Kennetb R. Miller, Book Review, 16 CREATION/EVOLUTION 36, 37 (1996) (reviewing BEHE, *supra* note 51) (criticizing Behe's book and observing that "the argument from design has been answered, not once, but many times by writers such as Dawkins, Gould, and even Darwin himself"); Richard Milner & Vittorio Maestro, *Intelligent Design?*, NAT. HIST., Apr. 2002, at 73 ("Most biologists have concluded that the proponents of intelligent design display either ignorance or deliberate misrepresentation of evolutionary science."); H. Allen Orr, *Darwin v. Intelligent Design (Again)*, BOSTON REV., Dec.-Jan. 1996-97 ("Behe's chief objection to Darwinism is flat wrong, and, bereft of this, he's got little to say. But when you do look at what else he says, you find a bizarre string of confusions and contradictions."), *at* http://bostonreview.mit.edu/BR21.6/orr.html; Kevin Padian, *Waiting for the Watchmaker*, 295 SCIENCE 2373, 2374 (2002) (noting the "scientific and philosopbical failures of intelligent design"); Scott, *supra* note 3, at 284 ("Scholarly analyses of ID have been highly critical, and it is likely that ID will not be very persuasive among scientists."); Clare Stevens, *A Rebuttal of Behe* (May 1998), *at* http://www.btinternet.com/~clare.Stevens/behenot.htm (last visited Jan. 14, 2003) (refuting arguments of intelligent design including irreducible complexity); John Wilkins, Book

consensus is that articles advocating intelligent design theory in peer-reviewed scientific journals appear to be nonexistent.[237]

Second, teaching intelligent design will do very little to teach students about how to understand and discuss important and controversial public issues in a diverse and pluralistic population. The controversy over evolution does not, at its core, concern differences about the proper scientific interpretation of data. Rather, the controversy is about religion, and the fact that in many cases scientific theories contradict specific religious beliefs, such as the Biblical story of creation. The controversy over evolution existed long before theorists came up with the scientific theory of intelligent design, and the controversy would continue to exist today even if the theory had never been developed. That is because the controversy, in essence, is

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Review, 79 AUSTL. J. PHIL. 302, 303 (2001) (reviewing PENNOCK, *supra* note 234) ("Recent claims by Behe that systems that are 'irreducibly complex' cannot evolve through Darwinian processes have generated rebuttals from biologists and philosophers alike.").

237. I say "appear" to be nonexistent only because I myself have not reviewed the relevant scientific literature. The evidence suggests, however, that articles supporting intelligent design are *actually* nonexistent in this literature. *See* Karen Bartelt, *A Central Illinois Scientist Responds to the Black Box*, RATIONAL EXAMINATION ASSOC. OF LINCOLN LAND, Dec. 1999, *at* www.reall.org/newsletter/v07/n12/black-box.html (last visited Jan. 14, 2003) ("A recent keyword search of the words 'intelligent design' turned up exactly one article, and it was about robots!"); Jerry A. Coyne, *More Crank Science*, BOSTON REV., Feb.-Mar. 1997, *at* http://bostonreview.mit.edu/br22.1/coyne.html (noting that intelligent design theorists "do not publish their views in the professional scientific literature"); Barbara Forrest, *The Newest Evolution of Creationism*, NAT. HIST., Apr. 2002, at 80 (Intelligent design scientists "have no empirical research program and, consequently, have published no data in peer-reviewed journals (or elsewhere) to support their intelligent-design claims."); Forrest, *supra* note 7, at 23-24 (relating results of a study of scientific publications and concluding that "no scientific research supporting intelligent design as a biological theory has been published"); George W. Gilchrist, *The Elusive Scientific Basis of Intelligent Design Theory*, NAT'L CENTER FOR SCI. EDUC., Mar. 16, 2001 (finding not a single reference in any of five computerized databases cataloging scientific periodicals, books, and reports that uses intelligent design as a biological theory), *at* http://www.ncseweb.org/resources/articles/2083_the_elusive_scientific_basis_o_3_16_2001.asp (last visited Jan. 14, 2003); John Mangels & Scott Stephens, *Peer Review is Stifling for Scientists on Fringe*, PLAIN DEALER (Cleveland), Mar. 26, 2002, at A1 (discussing intelligent design's failure to appear in peer-reviewed journals and controversy over peer-review process); John Mangels, *Scientists Lay Out Arguments Against Design Theory*, PLAIN DEALER (Cleveland), Mar. 3, 2002, at B4 (discussing views of scientists regarding intelligent design, who believe that: "It's such holes in logic that probably have kept intelligent design's backers from taking a spin in science's traditional proving ground: the meetings of various professional societies and the peer-reviewed journals where ideas are subject to scrutiny, criticism, and testing . . . ."); *Analysis of the Discovery Institute's Bibliography*, NAT'L CENTER FOR SCI. EDUC., Apr. 5, 2002 ("As Lawrence Krauss of Case Western Reserve University reported at the March 11 panel discussion in Columbus, there is no published work in the peer-reviewed scientific literature supporting intelligent design."), *at* http://www.ncseweb.org/resources/articles/3878_analysis_of_the_-discovery_inst_4_5_2002.asp (last visited Jan. 14, 2003); Padian, *supra* note 236, at 2373 ("ID proponents have not made even a token effort at scientific research. . . . [N]o article demonstrating ID has appeared in a peer-reviewed journal."); Rennie, *supra* note 234, at 80 ("[S]erious scientific publications disputing evolution are all but nonexistent").

about epistemology, about how human beings can be justified in believing certain things about the world are true. Moreover, as described above, the epistemological controversy has taken on significant cultural, historical, and political dimensions over time, as religious and scientific ways of thinking about the world have clashed in the public arena.

Teaching intelligent design, without talking about history, culture, politics, and especially religion, will not help students understand what the controversy over evolution is really about or help them discuss issues that range over the spectrum of human concerns. Indeed, by signaling to students that the controversy is really a scientific one, schools might even mislead students to think that the larger controversy could be resolved if only the scientific one could be brought to a close. But this is clearly not the case. Does anyone think that if intelligent design theorists stopped challenging in scientific terms the persuasiveness of evolution that those who believe in a literal interpretation of the Biblical story of creation would somehow suddenly give up their religious convictions? Of course not. And so teaching intelligent design in science classrooms would be radically underinclusive, and indeed counterproductive, with respect to the goal of teaching students about how to think about and discuss controversial public issues of sweeping scope and real import.[238]

Third, although proponents of teaching intelligent design may be right that reforming origins education in the way they suggest would make such education more exciting and lively,[239] this possibility standing alone does not constitute a strong argument for teaching the alternative theory. For one thing, making a class more lively is not itself a sufficient justification for changing the content of a school curriculum. It would also presumably be more lively and exciting if teachers taught science by playing "Science Bingo" every class period, but nobody would suggest that this is how teachers should reform their classes. Second, if evolution is truly so dull that students really

238. Of course, one could argue that science teachers should simply inject instruction on these broader concerns, such as religion, history, culture, current events, and politics, into their science classes. This would be theoretically possible, but practically difficult, given that these are not generally the types of issues discussed in science classes. Even proponents of teaching intelligent design sometimes concede this point. For example, DeWolf argues that in science classes, "a sound approach to this area would discourage students from extended discussions of metaphysics or politics that would not help to illuminate the central scientific questions." DeWolf, *Academic Freedom*, *supra* note 43, at 481. Far better to include these topics in classes more suited to their discussion, such as history, government, current affairs, civics, or religion classes.

239. *See* LEGAL GUIDEBOOK, *supra* note 43, at 3 (noting that teaching alternatives to evolution would improve science education "because it presents the subject in a more lively and less dogmatic way").

need something to keep their interest, surely teachers have other means at their disposal to ensure that students are paying attention. Educational movies and nature field trips to see evolutionary concepts illustrated in living color and real life, for example, would be fruitful possibilities.[240]

Finally, supporters of teaching intelligent design argue that by teaching alternatives to the prevailing theory of evolution, schools will better educate students regarding the nature and process of scientific thought. They argue that science is an ongoing process that often involves disagreement and gradual change as certain theories become more persuasive than others.[241] Concededly, this should be an important goal of science education. Schools should teach students that science is not a static enterprise, and that it has often developed in response to minority theories that have challenged the received wisdom of the status quo.[242] Indeed, the National Research Center's *National Science Education Standards* emphasizes the importance of this endeavor when it says:

> In learning science, students need to understand that science reflects its history and is an ongoing, changing enterprise. The standards for the history and nature of science recommend the use of history in school science programs to clarify different aspects of scientific inquiry, the human aspects of science, and the role that science has played in the development of various cultures.[243]

The *Standards* go so far as to recommend that schools place less emphasis on teaching subject matter disciplines for their own sake, and place more emphasis on teaching "subject matter disciplines in the context of inquiry, technology, science in personal and social perspectives, and history and nature of science."[244]

But there are at least three problems with relying upon this general theory of science education as support for teaching students about intelligent design as an alternative to evolution. First, it is far

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240. For other possibilities, see NAT'L ACAD. OF SCI., TEACHING ABOUT EVOLUTION AND THE NATURE OF SCIENCE, *supra* note 234, at 61-103 (proposing various activities for teaching evolution).

241. *See, e.g.*, LEGAL GUIDEBOOK, *supra* note 43, at 3 (noting that teaching alternatives to evolution will "giv[e] students greater appreciation for how science is actually practiced. Science necessarily involves the interpretation of data; yet scientists often disagree about how to interpret their data.").

242. *See, e.g.*, Joy Hakim, *The Story of the Atom*, AM. EDUCATOR, Spring 2002, at 12 (describing history of scientific understanding of the atom, which involved many discoveries that changed the way people thought about basic ideas); *see also infra* note 292 (citing sources discussing progressive nature of scientific knowledge).

243. NAT'L COMM. ON SCI. EDUC. STANDARDS & ASSESSMENT, NAT'L RESEARCH COUNCIL, NATIONAL SCIENCE EDUCATION STANDARDS ch. 6 (1996), *at* http://books.nap.edu/html/nses/html/6a.html#sis.

244. *Id.*

from clear that schools are currently failing to teach students generally about the nature and process of science. Intelligent design advocates have not, to my knowledge, demonstrated that the curriculum as a general matter has shortchanged students in this respect. Without such a demonstration, it is impossible to know how much schools would benefit from teaching the scientific controversy over evolution as a way to illustrate the nature and history of science. If students are already learning these concepts, then one more example will not necessarily improve science education at all.

Second, given that scientists overwhelmingly support the theory of evolution and reject the theory of intelligent design,[245] the controversy over these theories would not be a very good example to use to teach students about the gradual progression of scientific knowledge and understanding. Why choose a theory (evolution) that is accepted by basically all working scientists to demonstrate how certain theories can lose support over time and become replaced with better theories? It would make far more sense for schools and teachers to choose scientific topics and theories that involve true substantive disagreement if they want to show students that science is an ongoing progressive discipline.[246]

Finally, even if schools are in fact not teaching students about the scientific process, and even if using a controversy over a theory that is accepted by an overwhelming consensus of scientists is a good way to teach students about the evolving nature of science, teaching this one scientific controversy in isolation still would constitute an arbitrary choice that is radically underinclusive with respect to achieving the desired goal. After all, why should schools choose this one particular scientific controversy to illustrate the changing nature of science, especially given the constitutional and other risks described below, when this aspect of science can be illustrated through any

245. *See supra* notes 234, 236.

246. One argument (perhaps the best argument) for teaching intelligent design in the science classroom is that schools would then have the opportunity to teach students the scientific flaws in design theory so that once they have graduated, students will be able to respond to design arguments when they are inevitably confronted with them in the real world. Of course, this is not the rationale put forward by design theorists seeking to inject design theory into the curriculum, and if it became clear that this was tbe reason why teachers and administrators wanted to include design in the curriculum, design supporters might no longer support such a change. Moreover, if intelligent design theory is in fact a religious theory, *see infra* notes 259-286 and accompanying text, then teaching the theory with the purpose of discrediting it might run afoul of the "disapproval" prohibition of the Establishment Clause, *see supra* notes 180-186 and accompanying text. Finally, for much of the same reason that teaching intelligent design as part of the University of Wisconsin-Stout program would be undesirable, *see infra* notes 333-346 and accompanying text, teaching intelligent design as a way of discrediting the theory would also likely prove so controversial as to undermine other legitimate goals (like teaching tolerance).

number of other possible examples involving the rejection of unpersuasive theories? Schools could easily demonstrate the point (as perhaps some of them already do) by teaching students about the rejection of the concept of spontaneous generation[247] or the abandonment of Lamarckism (to keep the focus on evolution).[248] Moreover, if it is really so important to teach students about current minority theories in science in order to teach them about the nature of science, why should schools choose to teach this particular minority theory instead of others, such as minority theories about the cause of AIDS[249] or UFOs[250]? And, if schools do choose to teach about intelligent design for this reason, why would they not also teach about these other minority theories to give students a broader and more comprehensive understanding of how minority scientific theories can challenge the status quo?[251]

In sum, the educational case for teaching about intelligent design is extremely weak, at best.[252] There is no need to teach about it as a substantive matter because the theory has not been accepted as significant within the field of science. And while it may be important for schools to teach students to think intelligently about broad-ranging controversial issues of public importance and to understand the nature and history of the scientific endeavor, teaching them about intelligent design by itself is poorly suited to achieving these laudable aims. Moreover, as the Article will now demonstrate, teaching about intelligent design carries several countervailing constitutional and other costs that should tip the balance against teaching it in public schools.

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247. *See, e.g.*, CURTIS & BARNES, *supra* note 234, at 86.

248. *See id.* at 5.

249. *See, e.g., Alternative Theories of Causation*, AIDSMAP (discussing Peter Deusberg's theory that HIV does not cause AIDS), *at* http://www.aidsmap.com/treatments/ix-data/english/58295c52-b247-451f-bdbb-b61ad3f97f9a.htm (last visited Jan. 14, 2003).

250. *See* ALIEN-UFOS.COM (studying UFOs or "UFOlogy"), *at* http://www.alien-ufos.com.

251. For further consideration of this option, see *infra* text accompanying notes 334-347.

252. I say "at best" here because I have assumed to this point that the information given students regarding intelligent design, evolution, and the controversy over the two theories will be accurate. However, as I argue below, there is good reason to think, given the virulent nature of the controversy, that materials and guidelines for teaching the controversy accurately are unlikely to be developed, and therefore that schools will in fact not convey accurate information to students regarding the controversy. If intelligent design is taught under such conditions, it is likely that students will leave the classroom not understanding the scientific facts and the true status of the controversy in the scientific community. If so, then the advantages, however slight, of teaching about the controversy, will be outweighed by the negative effects of teaching students incorrect information. *See infra* text accompanying notes 291-310.

B. Why Not Teach Intelligent Design?

1. Introduction

Those who argue that teaching intelligent design in the public schools would pose no constitutional problems generally rely on two central arguments. The first of these arguments is that intelligent design does not constitute a "religion" for First Amendment purposes under certain prominent understandings of the term. The second argument relies on an analysis of *Edwards v. Aguillard*,[253] which, while rejecting the Louisiana Equal Time Act for lacking a secular purpose, nonetheless specifically observed in dicta that "teaching a variety of scientific theories about the origins of humankind to schoolchildren might be validly done with the clear secular intent of enhancing the effectiveness of science instruction."[254] Thus, for example, in responding to my argument that in some cases teaching intelligent design in public schools would be unconstitutional,[255] DeWolf argues that "design theory does not fit the dictionary definition of religion, or the specific test for religion adopted by the Ninth Circuit in its recent cases,"[256] and that "[i]n *Edwards v. Aguillard*, far from placing its imprimatur on Darwinism, the Supreme Court actually defended the principle of openness in science education."[257] Likewise, Nicholas Miller contends that intelligent design may be taught in public schools because "[t]he designer of the design theorists has no . . . necessary theological content, but rather is a philosophic metaphysical concept with no attendant vertical obligations,"[258] and because, "if the Court's statement allowing for compelling theories[, as in *Edwards,*] is to be meaningful, it needs to allow the teaching of scientific theories that support the notion that

253. 482 U.S. 578 (1987).

254. *Id.* at 594.

255. *See* Wexler, *supra* note 7, at 455-56. It is worth noting here that my argument was not that teaching intelligent design would always be unconstitutional. For one thing, my note focused specifically on the teaching of one textbook—*Of Pandas and People*—rather than intelligent design generally (though I concede that the subtitle of the note—"The Constitutionality of Teaching Intelligent Design in the Public Schools"—may have been somewhat misleading). Moreover, I also noted that in any given case, the constitutionality of teaching *Pandas* would turn on "specific facts," such as the "particular events, characters, language, and context" surrounding the adoption of the book. *Id.* at 455. Contrary to DeWolf's claim, I did not unequivocally argue that "teaching design tbeory would offend the Establishment Clause of the First Amendment." LEGAL GUIDEBOOK, *supra* note 43, at 16.

256. LEGAL GUIDEBOOK, *supra* note 43, at 16.

257. *Id.* at 22.

258. Miller, *supra* note 7, at 496.

non-random, purposeful forces were involved in the origins and diversity of life."[259]

As further detailed below, the constitutional analysis provided by intelligent design supporters is incomplete both as a normative matter and, more importantly for the purposes of this Article, as a descriptive account of how actual courts might analyze any attempt to teach intelligent design in a public school classroom. With respect to the first argument regarding intelligent design's status as a "religion" for First Amendment purposes, a strong argument can be made that intelligent design theory should be considered a religion for such purposes regardless of whether it comes accompanied with attendant theological content or with other attributes commonly found in religious systems, because its basic tenet—that an intelligent designer is responsible for the creation of the universe—is at the core of the notion of religion as understood in this country since its founding. The question of whether intelligent design can be taught in public schools, then, turns on the answer to two further issues. The first is whether public schools can successfully teach *about* intelligent design, as opposed to teaching it as truth, which would save it from the attack that teaching it directly promotes a religious belief. Although this will be a difficult task—perhaps a harder one than simply teaching about religion generally given the lack of materials and experience in teaching science in this way—this is not the more problematic of the two issues.

The more problematic possibility is that a court—following *Edwards* and invoking some combination of the purpose, effect, and endorsement inquiries—might find that teaching intelligent design would send the wrong message to students about religion and thus establish religion in violation of the First Amendment. Focusing on one or two sentences of dicta in *Edwards* misses the larger point of the case, which is that courts will likely look (for good reason) with great skepticism on attempts to influence science education by singling out evolutionary theory for reform, particularly given the historical link between religious activism and evolution education reform and the lack of scientific support for alternatives to evolution. Although it is by no means clear that a court would strike down a legislature's or a school board's attempt to mandate intelligent design education, and although the result of any such constitutional challenge would surely turn on the specific facts involved in the case, it is very likely that such reform would meet with immediate constitutional litigation that would pose a strong risk of invalidation. In light of such risks,

259. *Id.* at 494.

legislatures, school boards, and schools should not focus their reform efforts on altering evolution education within the science classroom.

2. Constitutional Analysis

a. Intelligent Design as Religion

The first question is whether intelligent design constitutes a "religion" for First Amendment purposes. As already noted, Miller argues that intelligent design theory is not a religion because it has no theological content, need not "be identified with a transcendent, supernatural deity at all," and "does not occupy the role of religion" as it is "silent as to duties or obligations owed to a designer."[260] DeWolf and his co-writers, for their part, analyze the status of intelligent design under the three-part test for "religion" articulated by Court of Appeals for the Ninth Circuit in the case of *Alvarado v. City of San Jose*,[261] which held that the city of San Jose could erect a sculpture of Quetzalcoatl, an Aztec God, without violating the Establishment Clause.[262] This test, which in fact originated in the Third Circuit,[263] is as follows:

> First, a religion addresses fundamental and ultimate questions having to do with deep and imponderable matters. Second, a religion is comprehensive in nature; it consists of a belief-system as opposed to an isolated teaching. Third, a religion often can be recognized by the presence of certain formal and external signs.[264]

These "formal and external signs," according to the Third and Ninth Circuits, consist of " 'formal services, ceremonial functions, the existence of clergy, structure and organization, efforts at propagation, observance of holidays and other similar manifestations associated with the traditional religions.' "[265] DeWolf and his co-writers conclude that intelligent design is not a religion under this test because it (1)

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260. *Id.* at 495-96. Miller also notes that the distinction between a supernatural creator who is a "deity of a particular, revealed religious system that sets out divinely required duties and rituals" and a designer that has "no such theological content" is one that "the Founding Fathers seemed to appreciate," as evidenced by (among other things) the fact that Thomas Jefferson, "a staunch believer in the separation of things civil from things religious, could speak of a generic 'Creator' in the Declaration of Independence without apparently viewing it as a directly 'religious' reference in a very political document." *Id.* at 496.

261. 94 F.3d 1223 (9th Cir. 1996).

262. *Id.* at 1232.

263. *See* Africa v. Pennsylvania, 662 F.2d 1025 (3d Cir. 1981) (denying a free exercise right to an all–raw food diet to a prisoner who was a member of an organization called MOVE); Malnak v. Yogi, 592 F.2d 197, 207 (3d Cir. 1979) (Adams, J., concurring) (first articulating the currently prominent three-part test in a case involving transcendental meditation).

264. *Africa*, 662 F.2d at 1032; *Alvarado*, 94 F.3d at 1229 (quoting *Africa*).

265. *Alvarado*, 94 F.3d at 1229 (quoting *Africa*).

does not attempt to address fundamental and ultimate questions but instead asks only "[h]ow did biological organisms acquire their appearance of design"; (2) is simply an "isolated teaching" that "has no necessary connections to any spiritual dogma or church institution" and "has no religious pretensions"; and (3) contains none of the formal and external signs associated with religion, such as clergy or ritual, listed by the court.[266]

Courts and commentators have spilled much ink over the question of how to define "religion" for First Amendment purposes,[267] but the Supreme Court has never spoken authoritatively on the issue.[268] DeWolf and his co-writers presumably rely on the *Alvarado*

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266. LEGAL GUIDEBOOK, *supra* note 43, at 17.

267. Courts and commentators have articulated three main types of definitions of religion. First, some have suggested that religion should be defined with respect to its content. *See, e.g.*, Davis v. Beason, 133 U.S. 333, 342 (1890) ("[T]he term 'religion' has reference to one's views of his relations to his Creator, and to the ohligations they impose of reverence for his being and character and of obedience to his will."); United States v. Kauten, 133 F.2d 703 (2d Cir. 1943) (suggesting that religion is characterized by "a sense of the inadequacy of reason"); JESSE H. CHOPER, SECURING RELIGIOUS LIBERTY: PRINCIPLES FOR JUDICIAL INTERPRETATION OF THE RELIGION CLAUSES 77-86 (1995) (arguing that the defining feature of religion for Free Exercise purposes should be belief that extratemporal consequences will stem from one's actions); Andrew W. Austin, *Faith and the Constitutional Definition of Religion*, 22 CUMB. L. REV. 1, 33-46 (1991) (proposing a definition of religion based on faith); Dmitry N. Feofanov, *Defining Religion: An Immodest Proposal*, 23 HOFSTRA L. REV. 309, 385-91 (1994) (proposing a definition of religion as a "manifestly non-rational (i.e., faith-based) belief concerning the alleged nature of the universe, sincerely held"); Richard O. Frame, Note, *Belief in a Nonmaterial Reality—A Proposed First Amendment Definition of Religion*, 1992 U. ILL. L. REV. 819, 838-51 (1992) (arguing for belief in a nonmaterial reality as the defining feature of religion). Second, some have suggested that religion should be defined functionally, with reference to the role that beliefs play in believers' lives. *See, e.g.*, United States v. Seeger, 380 U.S. 163, 166 (1965) (interpreting the phrase "in relation to a Supreme Being" in section 6(j) of the Universal Military Training and Service Act (draft exemption statute) to refer to any sincere, meaningful belief that "occupies a place in the life of its possessor parallel to that filled by the orthodox belief in God"); Note, *Toward a Constitutional Definition of Religion*, 91 HARV. L. REV. 1056, 1075 (1978) (drawing on work of theologian Paul Tillich to argue that, for free exercise purposes, religion should mean whatever one takes to be his or her ultimate concern in life). Finally, some have proposed pragmatic definitions of religion, driven by the practical needs of courts or other concerns. *See, e.g.*, *Africa*, 662 F.2d at 1032 (adopting three-pronged analogical approach); Kent Greenawalt, *Religion as a Concept in Constitutional Law*, 72 CAL. L. REV. 753, 753 (1984) (adopting an analogical approach to defining religion, specifically arguing that "courts should decide whether something is religious by comparison with the indisputably religious, in light of the particular legal problem involved"); *see also* LAURENCE H. TRIBE, AMERICAN CONSTITUTIONAL LAW 828 (1st ed. 1978) (arguing that anything arguably religious should be considered religion for free exercise purposes and that anything arguably nonreligious should not be considered religion for Establishment Clause purposes). However, Laurence Tribe later recanted this position. *See* LAURENCE H. TRIBE, AMERICAN CONSTITUTIONAL LAW 1186-88 (2d ed. 1988).

268. However, the Court has defined religion broadly in two statutory cases. *See* Welsh v. United States, 398 U.S. 333, 341 (1970) (extending draft exemption statute to cover not only those with belief in a "Supreme Being" but also those "who hold strong beliefs about our domestic and foreigu affairs or even those whose conscientious objection to participation in all wars is founded to a substantial extent upon considerations of public policy"); *Seeger*, 380 U.S. at 165.

(and Third Circuit) test for "religion" because that test is among the most widely used by the federal courts, but this reliance is probably inappropriate for analyzing the constitutional status of intelligent design. The test is intended to help courts determine whether an unfamiliar belief system is a religion by comparing it to traditional systems commonly understood to be religious. It is explicitly an analogical test that compares the unknown to the known.[269] Thus, for example, courts have used the test to decide whether a public school could teach a course in transcendental meditation,[270] whether members of an organization called "MOVE" who are required to eat only raw foods could get such a diet served to them in prison,[271] and whether a city could install and maintain a sculpture of an Aztec serpent.[272] In each case the court applied the test to determine whether the belief systems in question sufficiently resembled traditional religions that the challenged practice should be considered religious for First Amendment purposes. The constitutional status of intelligent design, however, poses a quite different problem—namely, whether a core tenet of a familiar and traditional religious belief system (that a designer created the universe) is by itself sufficient to constitute a religious belief that the government cannot promote or endorse. This problem calls for a different type of analysis. Instead of asking whether a belief system that possesses characteristics A, B, and C is a religion because it closely resembles a traditional religion (e.g., Christianity) that possesses characteristics X, Y, and Z, a court faced with the intelligent design question would have to ask whether

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The Court has also twice made passing mention of the scope of "religion" in constitutional contexts. First, the Court observed that "the term 'religion' has reference to one's views of his relations to his Creator, and to the obligations they impose of reverence for his being and character and of obedience to his will." *Davis*, 133 U.S. at 342. Later, the Court cast doubt on this narrow conception by saying that, "[a]mong religions in this country which do not teach what would generally be considered a belief in the existence of God are Buddhism, Taoism, Ethical Culture, Secular Humanism and others." Torcaso v. Watkins, 367 U.S. 488, 495 n.11 (1961). However, the Court has never definitively held what "religion" means for First Amendment purposes.

269. For example, in *Africa*, the Third Circuit stated:

> [A] number of lower federal courts have adopted a broad, non-theistic approach to the definition-of-religion question. In considering a first amendment claim arising from a non-traditional "religious" belief or practice, the courts have "look(ed) to the familiar religions as models in order to ascertain, by comparison, whether the new set of ideas or beliefs is confronting the same concerns, or serving the same purposes, as unquestioned and accepted 'religions.' " In essence, the modern analysis consists of a "definition by analogy" approach.

662 F.2d at 1032 (quoting Malnak v. Yogi, 592 F.2d 197, 207 (3d Cir. 1979) (citations omitted)).

270. *Malnak*, 592 F.2d at 197-99.

271. *Africa*, 662 F.2d at 1025.

272. *Alvarado*, 94 F.3d at 1225.

characteristic X (or Y, or Z) by itself is sufficiently religious that the state may not promote or endorse it.

Whatever the answer to this question might be for more tertiary tenets or practices of traditional theistic religions, such as, for example, belief in life after death, prayer,[273] or resting one day per week,[274] the idea that a designer created the universe in an intelligent fashion is such a central aspect of these traditional religions that it itself should be considered an inherently religious idea for constitutional purposes, regardless of whether it is accompanied by other characteristics of a traditional religion. It is true that simply acknowledging the existence of a creator does not necessarily imply that human beings have any obligations towards that creator or that the creator's existence has any ethical or other implications for human behavior. But the absence of these ancillary features does not negate the essentially religious nature of the belief in the creator in the first instance. Indeed, the idea that the universe was created by a designer is the central animating idea of the major Western theistic religious traditions. It is the fundamental proposition upon which these traditions rest.[275] Moreover, like the intelligent designer of design theory, the gods at the center of the three Western monotheisms did not act haphazardly; they each acted according to an intelligent plan for the creation of the universe and human life. As a result of this religious tradition and history, under the common usage of the word "religion," it is most likely the case that most reasonable people would think that someone who proclaimed that she believed that an

273. Prayer might in fact be one of those inherently religious characteristics that should be considered religious even in the absence of any other religious trappings. *See, e.g.*, FREIDRICH HEILER, PRAYER: A STUDY IN THE HISTORY AND PSYCHOLOGY OF RELIGION, at xiii (1932) ("Religious people, students of religion, theologians of all creeds and tendencies, agree in thinking that prayer is the central phenomenon of religion, the very hearthstone of all piety."); *see also* Wallace v. Jaffree, 472 U.S. 38, 58-61 (1985) (holding unconstitutional a statute that authorized schools to allow students a moment of silence for "voluntary prayer").

274. *See, e.g.*, McGowan v. Maryland, 366 U.S. 420 (1961) (upholding laws that require businesses to be closed on Sunday even though those laws had their origins in religious belief).

275. One way to approach the question of the centrality of the belief in an intelligent designer to traditional religious traditions might be to ask wbether a person would still generally be considered by a reasonable person as a believing Jew, Muslim, or Christian if that person did not believe that (somehow, in some fashion) an intelligent designer created the universe and mankind. It is hard to imagine that most reasonable people would say that such a person was a true believer in one of those three religions, even if they would come out differently for someone who, for example, said she was a Christian, said she believed that an intelligent designer created the universe in some fashion, but also said that she did not believe in going to church. Most reasonable people, I would guess, would probably be willing to call the latter person a true believer. This exercise, I think, suggests the centrality of the belief in an intelligent designer to traditional Western religious beliefs.

intelligent designer of some sort created mankind had declared a religious idea.

Language from several Supreme Court decisions strongly supports the view, otherwise supported by religious history and common sense, that belief in a creator is a religious belief. Echoing James Madison, who wrote that religion is "the duty which we owe to our Creator, and the Manner of discharging it,"[276] the early Court proclaimed that "[t]he term 'religion' has reference to one's views of his relations to his Creator, and to the obligations they impose of reverence for his being and character, and of obedience to his will."[277] Though these statements of course refer to the attendant obligations of human beings to the Creator, as well as to the belief in the existence of the Creator itself, they indicate that the Supreme Court has long recognized that belief in a supernatural creator of mankind is the essence of traditional religious belief. Over half a century later, the Court reiterated this view, observing that "[w]e are a religious people whose institutions presuppose a Supreme Being."[278] The most telling case, though, is *Edwards* itself.[279] Several times in that opinion the Court clearly states that belief in a designer who created humanity is itself a religious belief. In pointing out the historic link between opposition to evolution and religious beliefs, the Court observed that "[t]he preeminent purpose of the Louisiana legislature was clearly to advance the *religious viewpoint that a supernatural being created humankind.*"[280] The Court proceeded to conclude that, according to the legislative history of the Louisiana statute, the term "creation science" "embodies the *religious belief that a supernatural creator was responsible for the creation of humankind.*"[281]

DeWolf and his co-writers are quick to point out that the creation science at issue in *Edwards* is quite different in content and method from contemporary intelligent design theory.[282] For example, they argue that design theory, unlike scientific creationism, begins with the examination of "biological" data rather than from a religious text or doctrine.[283] Furthermore, they argue that the "propositional content" of the two theories differ, observing, for example, that

276. James Madison, *Memorial and Remonstrance Against Religious Assessments*, *in* THE SUPREME COURT ON CHURCH AND STATE 18, 18 (Robert S. Alley ed., 1988).

277. Davis v. Beason, 133 U.S. 333, 342 (1890).

278. Zorach v. Clauson, 343 U.S. 306, 313 (1952).

279. Edwards v. Aguillard, 482 U.S. 578 (1987).

280. *Id.* at 591 (emphasis added).

281. *Id.* at 591-92 (emphasis added).

282. *See* LEGAL GUIDEBOOK, *supra* note 43, at 22.

283. *Id.* at 23.

scientific creationism is committed to the idea that "[t]here was a sudden creation of the universe, energy, and life from nothing" and that "[t]here is a separate ancestry for humans and apes," while design theory asserts that "[h]igh information content (or specified complexity) and irreducible complexity constitute strong indicators or hallmarks of past intelligent design" and that "[b]iological systems have a high information content (or specified complexity) and utilize subsystems that manifest irreducible complexity."[284] It may very well be true that the two theories differ in the ways DeWolf suggests, but these differences do not make the Court's comments in *Edwards* regarding the definition of religion inapplicable to the intelligent design context. The Court in *Edwards* did not rest its conclusion that creation science constituted a religious belief on those characteristics of creation science that are distinguishable from intelligent design theory. Indeed, quite the opposite is true. The Court rested its conclusion on the critical *similarity* between the two theories—namely, that some sort of designer created mankind.[285] As such, there should be little doubt that courts following existing Supreme Court doctrine[286] would find that intelligent design constitutes a religious theory for First Amendment purposes.[287]

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284. *Id.*

285. It is important to emphasize here that the argument I am advancing is not that intelligent design has religious *implications*, but rather that intelligent design has religious *content*. DeWolf and his co-writers correctly point out that if anything with religious implications were to be considered religious, then Darwinian theory would also have to be considered religious, since Darwinian theory has implications for many types of religious beliefs. *See id.* at 18. Of course, all types of government action and messages have such implications, such as the message that war is justified, that the free market is appropriate, or even that all men and women are created equal.

286. As to whether the current Supreme Court would follow its own existing doctrine, this Article hazards no prediction.

287. Miller argues that the *Edwards* characterization of belief in a supernatural creator should not apply to design theory because the *Edwards* reference "could fairly be understood as referring to the deity of a particular, revealed religious system that sets out divinely required duties and rituals," and that the designer of design theory "has no such necessary theological content." Miller, *supra* note 7, at 496. Miller also argues that the designer of design theory need not be "identified with a transcendent, supernatural deity at all," and might even be "some form of extraterrestrial intelligence, and not a transcendent deity." *Id.* at 495. On the first argument, however, there is no reason to conclude that the Court in *Edwards* had in mind (or that a subsequent court would understand it to have meant) anything more than a "supernatural creator" of mankind as opposed to one that corresponds to a particular religious system with required duties and rituals; the simple phrase, after all, is wbat the Court actually wrote in its opinion. The argument that the designer of intelligent design might not be supernatural and therefore might not fall under *Edwards*'s identification of a "supernatural creator" with "religious belief" is somewhat stronger. Nonetheless, the argument ultimately fails for at least two reasons: (1) intelligent design theorists certainly do not claim that the designer *must* be an extraterrestrial rather than supernatural, so the most reasonable implication of their arguments (and certainly the one that most reasonable people would assume) is that the designer is indeed

Ultimately, however, the question of whether intelligent design constitutes a religious belief is not quite as important as it might seem at first glance, because to say that intelligent design is itself a religious idea does not necessarily mean that it cannot be made part of the public school curriculum.[288] Just as public schools can avoid violating the Constitution by teaching *about* complete traditional religious systems such as Christianity and Judaism rather than teaching the truth of those systems, so too might they be able to avoid violating the Constitution by teaching *about* intelligent design rather than teaching that intelligent design is true.[289] There is no theoretical reason why teaching the controversy in this way would not be possible, and the fields of history of science and philosophy of science provide the intellectual resources to help educators design a curriculum to do so.[290] Teachers would have to make it clear that intelligent design is a scientific hypothesis that some who describe themselves as scientists believe fits the data better than alternative theories, rather than indicating their own personal belief that intelligent design is true. With some care and attention to the possible constitutional pitfalls, though, teachers should be able to teach about intelligent design without running afoul of the constitutional

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supernatural; and (2) it is far from clear that the concept of "supernatural" (both as a general matter and as used by the Supreme Court in *Edwards*) does not include something so far outside normal experience as a super-powerful extraterrestrial being that designed the universe.

288. The question is nonetheless an important one because if intelligent design constitutes a religious belief it cannot he taught as truth in the public schools. It is worth noting that under DeWolf's theory, there would be no constitutional limit on a public school teaching that intelligent design theory is the correct theory and that Darwinian evolution is simply wrong. For more discussion of this particular problem, see the brief analysis of the text *Of Pandas and People*. *See infra* text accompanying notes 298-310.

289. This is subject to the possible broader endorsement/purpose problem. *See infra* Part III.B.2.b.

290. On the discipline of history of science, see, e.g., Michael J. Crowe, THE HISTORY OF SCIENCE: A GUIDE FOR UNDERGRADUATES (1991) ("Historians of science are . . . interested in far more than science; they are concerned with science as a changing entity and with scientists themselves."), *at* http://web.clas.ufl.edu/users/rhatch/pages/02-TeachingResources/crowe/-crowe.html (last visited Jan. 14, 2003). *See also generally* GEORGE SARTON, A GUIDE TO THE HISTORY OF SCIENCE: A FIRST GUIDE FOR THE STUDY OF THE HISTORY OF SCIENCE WITH INTRODUCTORY ESSAYS ON SCIENCE AND TRADITION (1952). On the philosophy of science, see *Philosophy of Science*, THE CAMBRIDGE DICTIONARY OF PHILOSOPHY 700-04 (Robert Audi ed., 1999):

> Philosophy of Science [is] the branch of philosophy that is centered on a critical examination of the sciences: their methods and results. . . . Typical problems examined are the nature of scientific laws, the cognitive content of scientific theories referring to unobservables, and the structure of scientific explanations. Finally, philosophy of science explores specific foundational questions arising out of the specific results of the sciences.

prohibition on promoting religion, even if intelligent design does itself constitute a religious belief.[291]

Nonetheless, as a practical matter, there are reasons to be concerned that a "teaching about intelligent design" approach to teaching intelligent design might fail—reasons that are more substantial than those that urge caution in the context of teaching about religion generally. To begin with, as a general matter, secondary school science classes, in mirroring scientific disciplines themselves, are not taught from an objective or equal-time perspective; they do not proceed by presenting several competing theories to explain a set of data and then leave it at that. Instead, science classes teach children that certain scientific theories better fit the data than other theories. Science is presented as an evolutionary process in which certain theories rightly gain dominance over other theories as more and more scientists conclude that those theories have better explanatory power regarding the relevant data. In other words, science is presented as a progressive process where there are winners and losers among competing theories, rather than as a process in which several theories remain equally viable.[292] Presenting intelligent design and evolutionary theory as equally viable alternatives theories, then, would in large part run counter to the entrenched paradigm for secondary school science education. Science teachers who are trained to teach that certain theories are better than others would have to change their approach radically for this one specific subject. This change of approach may prove to be quite difficult,[293] even more difficult than teaching objectively about religion, since there is generally no analogous entrenched tradition in most schools of teaching one particular religion as truth and because, if implemented

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291. Again, this is subject to the possible endorsement/purpose problem. *See infra* Part III.B.2.b.

292. *See* MILLER, *supra* note 155, at 21-22 (noting that scientific ideas "rise or fall on the weight of the evidence" and that those which are not supported by evidence are discarded); NAT'L ACAD. OF SCI., SCIENCE AND CREATIONISM, *supra* note 234, at 1 ("Progress in science consists of . . . better explanations for the causes of natural phenomena."); NAT'L ACAD. OF SCI., TEACHING ABOUT EVOLUTION AND THE NATURE OF SCIENCE, *supra* note 234, at 32 ("[T]he accuracy and sophistication of [scientific] description tends to increase with time, as subsequent generations of scientists correct and extend the observations of their predecessors. Because the total sum of scientific knowledge increases relentlessly, scientific progress is something that all scientists take for granted."); Greenawalt, *supra* note 35, at 31 ("Part of the ethos of science is that particular conclusions and general theories are revisable in light of increases in evidence and scientific understanding."); Lawrence M. Krauss, *Odds Are Stacked When Science Tries to Debate Pseudoscience*, N.Y. TIMES, Apr. 30, 2002, at F3 ("Science is not a democratic process. It does not proceed by majority rule and it does not accept notions that have already been disproven by experiment.").

293. I am by no means saying, however, that such an approach would be impossible, or even anywhere near impossible.

correctly, religion will be taught about in separate classes in which it is clear that the approach is different from other types of classes.

Second, to my knowledge at least, there are currently no existing satisfactory guidelines, standards, or materials to help teachers objectively teach about both intelligent design and evolutionary theory. DeWolf's legal guidebook is a start, in that it explains basic principles of how intelligent design theory might be taught, but it is not nearly comprehensive enough to serve as an actual teaching manual of any sort. This stands in contradistinction to the situation regarding teaching about religion, which has seen a significant amount of progress in terms of materials, guidelines, and training in recent years.[294] Moreover, there is good reason to be skeptical that satisfactory materials and guidelines can in fact be developed for use in teaching about intelligent design. Critical to the development of high-quality, balanced materials and guidelines is the participation of diverse groups representing different points of views, all of which must be taken into account in framing any potentially controversial curricular reform.[295] With respect to teaching about the intelligent design–evolution controversy, it is unlikely that any broadly appealing guidelines or materials will be developed without input from experts on both sides of the divide. But unlike in the teaching about religion context, where there is broad consensus among diverse interest groups that schools can and should teach students about religion,[296] seemingly irresolvable controversy continues to surround any attempt to change how schools teach evolution in their science classrooms. As the bitter controversies in Kansas, Louisiana, and Ohio (as well as the controversy over the recent actions of the U.S. Senate regarding evolution education) demonstrate,[297] the idea that intelligent design advocates will come together with advocates of evolution to design materials and guidelines to teach the controversy any time soon is almost unimaginable. Because such cooperation is

294. *See* Wexler, *supra* note 111, at 1186-91 (describing this progress). Currently there are several full-length books and well-designed guidelines to help school boards and teachers implement a teaching about religion program, as well as a seventeen volume set of reference books about religion aimed at school settings, a CD-ROM prepared by Harvard Professor Diana Eck that is quite helpful in this regard, materials developed specifically on Islam and Indian faiths, and at least two university-level training programs to help teachers learn about how to teach about religion. *See id.*

295. *See, e.g.*, NORD & HAYNES, *supra* note 33, at 28-30 (explaining why people with a broad range of views on issues must be involved in the planning stages of controversial educational reform).

296. *See id.* at 36-37 (describing the "New Consensus" on the importance of teaching about religion in public schools).

297. *See supra* text accompanying notes 14-16; *see also* Wexler, *supra* note 7, at 439-41.

both necessary and impossible in the current social and intellectual climate, the possibility that satisfactory guidelines or materials will come about to help teachers teach the controversy in a constitutional and intellectually responsible manner is extraordinarily remote.

Consideration of the most prominent intelligent design teaching tool currently available demonstrates the problem. The book *Of Pandas and People*,[298] written by Percival Davis and Dean H. Kenyon and first published by the Foundation for Thought and Ethics in 1989, is an intelligent design textbook fashioned for use in the science classroom. The book has generated significant controversy in several communities that have sought to use it in their public schools because it claims to present "evidences, found in the data of biology, for intelligent cause."[299] The book's authors make clear in the introduction that the book is intended to supplement, rather than replace, traditional biology textbooks, in order to "balance the overall curriculum," and that students should "[w]ander back and forth between the two, using each to enrich the other."[300] But they also freely admit that the book "is not intended to be a balanced treatment by itself," and that they "have given a favorable case for intelligent design and raised reasonable doubt about natural descent."[301] As the "Note to Teachers" at the end of the book further observes:

> *Pandas* gives students a much-needed opportunity to explore the evidence and arguments that have caused some scientists to doubt contemporary Darwinism.... Going a step further, *Pandas* helps students understand the positive case for intelligent design.... [T]he authors argue that life not only *appears* to have been intelligently designed but that it actually was.[302]

Through a series of chapters on topics such as the origin of life,[303] genetics and macroevolution,[304] the origin of species,[305] and the fossil

298. DAVIS & KENYON, *supra* note 213.

299. *Id.* at ix. On the controversy incited by the book, see Wexler, *supra* note 7, at 439-40, 443. As of 1997, the book's publisher claimed that more than 22,000 copies of the book were in print and that the book had been sold to teachers and designers of curricula in forty-eight states. The publisher also claimed that at least fifteen school districts had ordered enough books to indicate that they were using them in the classroom. Among the places the book has caused controversy are Plano, Texas, the state of Idaho, and Louisville, Ohio. *See id.*

300. DAVIS & KENYON, *supra* note 213, at ix ("We hope its presentations are interesting, honest, and not overstated.").

301. *Id.*

302. Mark D. Hartwig & Stephen C. Meyer, *A Note to Teachers, in* DAVIS & KENYON, *supra* note 213, at 153, 157.

303. DAVIS & KENYON, *supra* note 213, at 41-58.

304. *Id.* at 59-76.

305. *Id.* at 77-90.

record,[306] the authors put forward a vigorous and consistent critique of Darwinian theory and a similarly vigorous and consistent case for the theory of intelligent design.[307]

Because the book promotes intelligent design, rather than presenting both sides of the controversy in an objective fashion, teachers will have to do additional work in the classroom to avoid constitutional errors. They will have to explain that even though the book itself takes the view that intelligent design is more likely correct than its alternatives, the book's view is only one possible view and not the one the school or the teacher necessarily thinks is correct. If the instructor were instead only to teach *Of Pandas and People* or to teach evolution and then assign a few chapters of *Pandas* as a response, the teacher and the school (and thus the state) would leave the impression that they believe that intelligent design is correct. If, as argued above, intelligent design constitutes a religious belief for First Amendment purposes, then the teacher would have violated the First Amendment by teaching *Pandas* in this way. It is true that a teacher could present *Pandas* along with the traditional Darwinian account in such a way that there would be no constitutional problem, but materials to help the teacher to do so are currently far from adequate. Nothing in *Pandas* explains in any detail how teachers should use the book within the curriculum as a whole, apart from saying that they should use it to "supplement" the traditional biology text.[308] Indeed, an educationally responsible approach to teaching the material requires

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306. *Id.* at 91-113. The book also contains chapters on homology, *see id.* at 115-34, and biochemistry, *see id.* at 135-48, as well as an introductory overview chapter that treats all of these topics, *see id.* at 1-40.

307. By describing *Pandas* as forwarding a "vigorous consistent" case and critique, I am by no means endorsing its conclusions. Indeed, *Pandas* has been widely criticized by mainstream scientists on scientific grounds. *See, e.g.*, Frank J. Sonleitner, *Pandas Update*, REP. NAT'L CENTER FOR SCI. EDUC., Jan.-Apr. 2000, at 40.

The specific intelligent design theory taught by *Pandas* has certain characteristics that make it more likely that a court would (and should) find it to constitute a religious belief. Specifically, the "designer" of *Pandas* is described in terms that are highly evocative of the God of theistic religions. *See* Wexler, *supra* note 7, at 454:

> [T]he book presents an agent who looks very much like the God of the Bible. He, she, or it is a "designer" who devised a blueprint or plan, created organisms, made fully formed creatures, designed and formed life on earth, "coordinated the design requirements of multifunctional adaptational packages," shaped matter, ordered pieces into a coherent whole, and may be assumed to have good reasons for making decisions . . . . The designer is supernatural, a "master intellect,' and a 'consummate engineer."

There are also passages in the book that indicate that the book is concerned with addressing "such fundamental questions as the origins and meaning of life and our role in the universe," making it more likely that a court would find its theory to constitute religion under a functional definition of the term. *See id.* at 461-62 & n.212.

308. DAVIS & KENYON, *supra* note 213, at ix.

that students understand that intelligent design has been roundly rejected by the mainstream scientific community and the reasons why this is the case, including the specific arguments advanced by scientists against the theory of intelligent design.[309] *Pandas*, of course, does not include such material.[310]

In sum, then, because intelligent design most likely constitutes a religious belief for First Amendment purposes, schools that choose to teach it must do so in an objective fashion, without promoting or endorsing it.[311] Although this task can certainly be accomplished, there are reasons to be pessimistic, the most significant of which is that the ongoing controversy over the subject is so intense that adequate materials and guidelines are unlikely to be developed through cooperative projects. The substantial risk that this controversy will result in constitutional violations from teaching intelligent design in public schools should make policymakers wary of pushing for reforms such as those recently considered in Ohio.

b. *Intelligent Design and* Edwards v. Aguillard

The risk that schools will teach intelligent design in a way that directly promotes the religious belief that an intelligent designer created the universe is probably not the most important constitutional

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309. *See supra* text accompanying notes 236-237.

310. As far as I know, the most widely used biology textbooks in high schools do not include this material either, most likely because the authors do not consider intelligent design to be a viable scientific theory that requires treatment. If intelligent design were to become widely taught in high schools, however, those biology textbooks might need to be rewritten to present the arguments against intelligent design. Any school teaching intelligent design would have the educational responsibility, as well as perhaps the constitutional responsibility, to ensure that students understand the scientific arguments against intelligent design theory.

311. Miller argues that Darwinism itself might constitute a religious belief that schools may not teach "as a preferred view of reality." Miller, *supra* note 7, at 503. As Miller himself notes, courts have not accepted this idea. *Id.*; *see* Peloza v. Capistrano Unified Sch. Dist., 37 F.3d 517 (9th Cir. 1994) (rejecting the argument that evolution constitutes religion for First Amendment purposes). Miller's argnment could only potentially hold true in the highly unlikely case that a school presented Darwinism as a comprehensive belief system that made explicit affirmative religious claims, such as if a textbook argued that, say, evolutionary theory demonstrates that there can be no divine creator. Even then, characterizing evolution as religion would be a stretch, since it would not have any content traditionally understood as religious, although it might be considered a religion under some type of functional definition of religion. *See supra* note 267. As a general matter, though, the better analysis is that evolutionary theory is a theory that makes certain claims that are inconsistent with certain religious claims. Because of this inconsistency, exposure to the theory might be considered by some religious people as offensive or even burdensome. In this case, the proper constitutional analysis should be whether those religious students and teachers who feel their religious beliefs are burdened by having to study evolution should have a First Amendment right to be exempted from the classes. Although I have much sympathy for this claim, it is unlikely under current First Amendment doctrine that a court would find the existence of such a right. *See supra* text accompanying notes 188-94.

problem at issue with these types of reforms. More important is the fact that by singling out evolution education for reform for purposes that either are educationally unsound or are promoted only tangentially by those reforms, schools will send a message to students and teachers that they are really reforming the school curriculum for religious purposes, thus sending a message that they are endorsing religion.[312] There is a significant likelihood that courts following existing Supreme Court doctrine—*Edwards v. Aguillard* in particular—will invalidate on this theory any formal policy that requires schools and teachers to teach intelligent design as an alternative to evolution.[313]

Defenders of teaching intelligent design, as noted above, rely heavily on the dicta in *Edwards* in which the Court indicated that schools may teach alternatives to evolutionary theories of origins if they do so with a "clear secular intent of enhancing the effectiveness of science instruction."[314] It is easy, however, to focus too heavily on this dictum. Indeed the dictum is notable mostly for its stark contrast with the rest of the Court's opinion, the thrust of which, essentially, was: "Oh, come on. We know what you are up to, Louisiana, and we won't stand for it!" The opinion is remarkable for its extreme skepticism of the state's purposes in promulgating the Balanced Treatment Act and its willingness to conclude, in the face of a clearly articulated intent to improve academic freedom,[315] that the real purpose of the statute was to endorse religion[316] and that the articulated purpose was a sham.[317] In light of the skepticism with which the Court has approached attempts to reform evolution education,[318] policymakers would be foolish to think that introducing intelligent design into the public school curriculum would be constitutionally safe policy.

In *Edwards*, the Court, in reaching its conclusion regarding the legislature's intent, relied on several key facts and findings: (1) the poor fit between the means (the statute) and the ends (the stated

312. Or schools would be acting unconstitutionally with a forbidden purpose to promote or endorse religion, as discussed below. *See infra* text accompanying notes 319-28.

313. Again, this Article makes no guesses as to whether the current Supreme Court would faithfully follow its own precedent on this question.

314. 482 U.S. 578, 594 (1987).

315. *Id.* at 586 ("True, the Act's stated purpose is to protect academic freedom.").

316. *Id.* at 593 ("Because the primary purpose of the Creationism Act is to advance a particular religious belief, the Act endorses religion in violation of the First Amendment.").

317. *Id.* at 586-90. For a critique of the Court's reasoning, see id. at 610-37 (Scalia, J., dissenting).

318. In addition to *Edwards*, see also *Epperson v. Arkansas*, 393 U.S. 97 (1968) (finding unconstitutional an Arkansas statute making it illegal to teach evolution).

purpose of improving academic freedom);[319] (2) the historic link between religion and critiques of evolution;[320] (3) the singling out of evolution among all possible topics for reform;[321] (4) the favoring of creation science under certain provisions of the statute;[322] and (5) statements from the legislative history indicating the legislature acted with the intent to promote religion.[323] Because the Court found that the statute lacked a secular purpose and was therefore unconstitutional under the first prong of the *Lemon* test,[324] it did not consider whether the statute also had the unconstitutional effect of endorsing or promoting religion. Given the Court's skeptical attitude and the fact that the five factors examined by the Court probably equally support a finding of endorsement or promotion, however, the Court would likely have found the statute unconstitutional on these grounds as well, had it considered them.[325] Given the conclusion that the legislature acted with a religious purpose to promote and endorse religion, the Court could only have found a lack of actual endorsement or promotion if it had found that the legislature had failed to accomplish its purposes through promulgation of the statute, a conclusion that seems unlikely given the Court's attitude toward the statute.

The move to introduce intelligent design into the public schools shares several of the same problematic characteristics that troubled the Court in *Edwards*. First, there is a similar disconnect between the ends of the reform movement and its means. As described above,[326]

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319. *Edwards*, 482 U.S. at 587-88 (noting that the goal of academic freedom was not in fact served by the statute).

320. *Id.* at 590-91:

> As in [other cases] we need not be blind in this case to the legislature's preeminent religious purpose in enacting this statute. There is a historic and contemporaneous link between the teachings of certain religious denominations and the teaching of evolution. . . . These same historic and contemporaneous antagonisms between the teachings of certain religious denominations and the teaching of evolution are present in this case.

321. *Id.* at 593 ("Out of many possible science subjects taught in the public schools, the legislature chose to affect the teaching of the one scientific theory that historically has been opposed by certain religious sects.").

322. *Id.* at 588 ("[T]he goal of basic 'fairness' is hardly furthered by the Act's discriminatory preference for the teaching of creation science and against the teaching of evolution.").

323. *Id.* at 591-93 (quoting from the legislative history).

324. *See* Lemon v. Kurtzman, 403 U.S. 602, 612-13 (1971) (setting out three-part test for evaluating challenges under the Establishment Clause).

325. Indeed, the Court at times blurred the distinction between actual promotion and the purpose to promote or endorse. *See, e.g., Edwards*, 482 U.S. at 585 ("A governmental intention to promote religion is clear when the State enacts a law to serve a religious purpose. This intention may be evidenced by promotion of religion in general . . . or by advancement of a particular religious belief.").

326. *See supra* text accompanying notes 231-52.

requiring instructors to teach intelligent design in the science classroom would not do much to improve science education or to help students learn how to discuss important controversial issues of broad intellectual scope. Given this disconnect, many observers would understand the curricular reform as primarily promoting the religious belief that an intelligent designer created the universe, rather than as promoting any reasonable secular interest. Second, the movement is infected by the same historic link between religion and the opposition to evolution. This connection is particularly problematic under an endorsement analysis. Given the link, any effort to change how evolution is taught will likely be perceived as an endorsement of religion. This perception is one of the key reasons (the other one being the perceived lack of educational value) that evolution education reform, unlike the move to teach about religion, is nearly always met with virulent opposition. Moreover, all of these problems are exacerbated by the third factor—the exclusive focus on evolution—which is also present in the intelligent design movement. From the perspective of legislative purpose, if the movement is really about science education, why does it only focus on evolution? From an endorsement perspective, singling out evolution from all possible topics within science (and within the curriculum generally) reinforces the reasonable perception that the state is reforming the curriculum to promote a religious belief and that the curriculum does in fact promote this religious belief.

The fourth and fifth factors are not as clearly present, although it is difficult to evaluate them without the benefit of a specific case with particular facts. The literature on intelligent design reform generally does not seek to give intelligent design a preferred position in the curriculum relative to evolution, so the fourth factor may not be a problem for the reform movement. Nonetheless, it is worth observing that at least judging from *Edwards*, the threshold for finding a preference might be quite slight, making this potentially problematic for reformers.[327] The fifth factor—specific statements evidencing religious purpose—is also one that cannot be fully evaluated without a specific case involving a particular legislative or administrative measure requiring intelligent design to be taught in the public schools,

327. In *Edwards*, the Court was willing to find that the Louisiana statute gave a preference to creation science over evolution from certain provisions of the statute that provided special support, such as curricular guides and resource services, to the teaching of creation science and not evolution. 482 U.S. at 588. It did so despite the fact, as Justice Scalia pointed out in his dissent, that the statute arguably provided this support for creation science and not evolution because such support was not needed for the teaching of evolution, since it already existed. *See id.* at 631.

but it is quite clear that many who want to introduce intelligent design are motivated by religious purposes, to the extent that courts continue to want to examine such underlying motivations.[328]

3. Other Concerns

Thus, any attempt to reform the public school science curriculum to encourage or require the teaching of intelligent design will pose significant constitutional risks. Courts following existing Supreme Court precedent are likely to find either that the reform is animated by a forbidden religious purpose or that the reform promotes or endorses the religious belief that an intelligent designer created mankind. They might even find that the reform endorses or promotes Christianity specifically, depending on the particular events preceding the adoption of the reform.[329] But even if the reform is not ultimately invalidated, several nonconstitutional costs also militate against the reforms. For one thing, any visible attempt to introduce intelligent design into the public schools will certainly invite litigation, which is a cost in itself, regardless of how it is ultimately resolved.[330] Second,

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328. *See* Forrest, *supra* note 237, at 80 (noting religious motivations of various intelligent design theorists, such as Behe, Dembski, and Wells); Forrest, *supra* note 7, at 5 (relating the religious roots of the intelligent design movement and noting that a "religious goal" is "the heart of the wedge movement"); Milner & Maestro, *supra* note 236, at 73 (reporting that evolution critic Jonathan Wells is influenced by the Reverend Sun Myung Moon and quoting William Dembski as saying that intelligent design "is just the logos of John's Gospel restated in the idiom of information theory"); Kevin Padian, *The Talented Mr. Wells*, Q. REV. BIOLOGY, Mar. 2002, at 33, 34 (quoting Wells as saying that "[Sun Myung Moon's] words, my studies, and my prayers convinced me that I should devote my life to destroying Darwinism"); Eugenie C. Scott, *Creationism Evolves*, SCI. AM., Aug. 19, 1999 ("Intelligent-design creationists are primarily conservative Christians greatly concerned over the increasing secularization of U.S. society."); Theresa Watanabe, *Enlisting Science to Find the Fingerprints of a Creator*, L.A. TIMES, Mar. 25, 2001, at A1 (reporting that intelligent design advocates are "mostly Christian scholars").

It is important to note that the scope of the secular purpose requirement, and whether it should even exist at all, are highly contested issues. For a comprehensive treatment of these questions, which concludes that the requirement should be retained to prevent the government from declaring religious truth, see Koppelman, *supra* note 186. There is also an active debate among scholars regarding whether it is proper for citizens and legislators to advance explicitly religious arguments in favor of policy positions in the public square. For a summary of this debate, see Wexler, *supra* note 111. Even if religious motivation should not by itself move a court to invalidate an educational reform, the existence of religious rhetoric surrounding the implementation of such a reform might be constitutionally problematic under an endorsement analysis if it gives the reasonable observer the impression that the government is endorsing a religious belief. *See id.* at 1253 n.361.

329. For an argument that the teaching *Of Pandas and People* could be seen as endorsing conservative Christianity, see Wexler, *supra* note 7, at 463-66.

330. This risk is not the case with teaching about religion reform. Although classes that teach about religion or purport to do so have given rise to some controversy and lawsuits, *see* Wexler, *supra* note 111, at 1244 n.321, 1245 & n.326; *see also* Robert Marus, *Court Douses Fire Over Qur'an Assignment*, CHRISTIAN CENTURY, Aug. 28, 2002, at 12 (describing controversy over

because it is highly unlikely that evolution advocates and intelligent design advocates will work together to develop materials and guidelines for teaching the controversy, there is a substantial chance that whatever materials will be used for teaching about intelligent design will not accurately present the case against intelligent design and will therefore leave students with an incorrect understanding of the actual contours of the controversy. This point is critical. Unless the materials and presentation make it clear that the scientific community agrees that the basic premises of evolution are correct and that the same community has nearly unanimously rejected the theory of intelligent design as bad science (or not science at all),[331] then the school will have given the students incorrect information regarding the state of the Darwinism-design controversy. If this happens, then whatever slight benefits the school may accrue by teaching the controversy (in terms of teaching about the nature of science or spicing things up a bit) will be far outweighed by the fact that students will leave the classroom misled about the scientific facts and the actual state of the controversy in the scientific community.

Third, regardless of the constitutional issues involved, teaching about intelligent design sends the wrong message about religion. Because intelligent design has not been accepted in any way by the mainstream scientific community, the decision to teach about it in science classes surely will be understood as a decision motivated at some important level by religion. This factor in itself is not necessarily a problem—as Stephen Carter says, if a school were to teach calculus because of religious belief, it is unlikely that anyone would object[332]—but it is a problem when there are no real independent secular educational advantages to be gained from the reform. In such a case, the school has decided that satisfying a religious constituency is more important than promoting quality education, and this prioritization would be poor educational policy under nearly any theory of public education.[333] One suspects that intelligent design reformers want to change the public school curriculum because they perceive that the curriculum sends the wrong message about religion—that religion is unimportant and irrelevant to modern life. If this is indeed the true motivation of reformers, one can hardly blame them for their impulse to reform the curriculum in some way. The curriculum does

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the University of North Carolina's requirement that incoming freshman learn about Islam), the courts have hardly become clogged with suits challenging comparative religion classes in the years since teaching about religion has become more popular.

331. *See supra* text accompanying notes 234-37.

332. CARTER, *supra* note 158, at 162.

333. *See supra* text accompanying notes 116-18 (discussing possible theories).

shortchange religion, and it does send the wrong message about what is one of the most important aspects of human life. But the answer to this concern should be to urge schools to teach about religion directly—a reform that provides important secular advantages in addition to addressing the perception that schools marginalize religion—not to change the science curriculum to satisfy a religious constituency at the expense of quality education.

C. An Alternative Proposal

What if instead of simply adding intelligent design to the science curriculum, schools taught about the intelligent design–evolution controversy in the context of a broader program of teaching about minority scientific views or about controversies involving scientific theories? In other words, what if the focus of the reform was not on reforming evolution education per se, but instead on reforming the science curriculum generally, to make sure that students understand that scientists themselves often differ about the correctness of certain scientific theories and that through these differences and controversies, science evolves over time? Such a reform would focus on the process of science, with the controversy over origins given as one example of this process, rather than focusing narrowly on the origins controversy itself, with one of the justifications for the narrow reform being the broader purpose of teaching about the process of science (which, as described already, is only minimally served by teaching the one example[334]).

Several examples of such curricular initiatives currently exist, although they focus on quite different kinds of controversies. For instance, a program developed by faculty at the University of Wisconsin-Stout trains science teachers to use discussion and evaluation of "unusual claims" in their classes to "encourag[e] critical and scientific thinking," and to "differentiat[e] between real and bogus science, recogniz[e] weak arguments, and [develop] a healthy skepticism of unusual claims."[335] Among the topics examined in the course are whether alternative or holistic medical techniques such as aroma therapy and "chi" balancing are effective, whether UFOs and other paranormal phenomena really exist, and whether a device designed to repel rodents and other pests through electromagnetism really works.[336] Teachers are urged to help students use and analyze

334. *See supra* text accompanying notes 241-251.

335. Alan J. Scott et al., *Skeptical Scicnce: Teaching Students How to Critically Evaluate Unusual Claims*, SCI. TCHR., Apr. 2001, at 44.

336. *See id.* at 45-47.

data derived from such sources as laboratory experiments, clinical trials, and surveys to evaluate the credibility of these so-called unusual claims.[337]

In another program, known as the "SCOPE Project," online materials help teachers introduce students to science controversies that "concern leading research scientists and also connect to the interests of citizens."[338] The controversies chosen by the program's designers include "explaining the worldwide decline in amphibian populations, finding ways to control malaria, assessing the benefits and risks of genetically modified food, researching life on Mars, understanding global warming, predicting earthquakes, and designing storage containers for nuclear waste."[339] For example, the part of the project dealing with genetically modified food poses the question of whether the benefits of genetically modified foods, such as improved crop yield and resistance to pests, are worth the possible risks to humans and the environment.[340] The website contains various commentaries on these contested issues, several databases, links to relevant materials, and curricular projects to help teachers and students work through the controversy.[341] The project as a whole is designed to help students better understand the scientific process and to relate that understanding to their role as citizens. As the website describes it:

> SCOPE seeks to expand the common perceptions of science to include more correct ideas about the nature of science content and scientific process. SCOPE will provide science educators with activities, materials, and support for teaching about scientific evidence and scientific controversies. The science learners who experience this curriculum will be able to observe scientists who debate different hypotheses or contribute different perspectives and will also be able to create their own scientific arguments through carefully supported learning activities.[342]

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337. *See id.* at 45.

338. *SCOPE Project: Summary*, SCIENCE CONTROVERSIES ON-LINE: PARTNERSHIPS IN EDUCATION (SCOPE Research Group, UC Berkeley, UW, AAAS), Apr. 22, 2002, *at* http://scope.educ.washington.edu/about/article/view/16 (last visited Jan. 14, 2003).

339. *Id.*

340. *See GM Food: Controversies Surrounding the Risks and Benefits of Genetically Modified Food*, SCIENCE CONTROVERSIES ON-LINE: PARTNERSHIPS IN EDUCATION (SCOPE Research Group, UC Berkeley, UW, AAAS), *at* http://scope.educ.washington.edu/gmfood (last visited Jan. 14, 2003).

341. *See id.*

342. *SCOPE Project: Summary*, *supra* note 338; *see also SCOPE Project: Details*, SCIENCE CONTROVERSIES ON-LINE: PARTNERSHIPS IN EDUCATION (SCOPE Research Group, UC Berkeley, UW, AAAS), Apr. 22, 2002:,

> [W]e seek to (a) bring to life the authentic character of scientific controversy by providing students with a "window" on the work of researchers, (b) mirror the process of negotiating understanding of novel material by connecting classrooms of science learners to each other and encouraging groups to specialize in specific topics, (c)

Educational programs like these have two significant advantages over reforms that specifically target evolution. First, from a policy perspective, they are much more strongly related to the important objectives of teaching students about the scientific process, fostering critical thinking, and helping students understand how to talk about contested scientific issues. Their focus is clearly on those objectives, with the specific issues chosen specifically for their suitability for promoting those objectives. Second, from a constitutional perspective, they are much more unlikely to attract litigation, and even more unlikely to result in a successful challenge, even if the intelligent design–evolution controversy were taught as one component of the programs.[343] Because the purpose of these programs is clearly to promote critical thinking and a better understanding of the scientific process, the chance that a court would find a forbidden religious purpose is exceedingly remote, even if intelligent design were involved. Moreover, because intelligent design would only be one part of the overall program, instead of the program's focus, which instead would be on the scientific process generally, a finding of endorsement would be a much more remote possibility. Unlike the intelligent design–focused reforms currently brewing around the country, the approach described here would have none of the drawbacks found significant by the Court in *Edwards*: the approach is well tailored to promotion of clear secular goals; it does not single out evolution, and the predominant focus on the scientific process and critical thinking breaks the historic link between evolution reform and religious motivation.

So, this path has its advantages. But it also poses problems that are quite likely insurmountable. For one thing, how should the evolution–intelligent design controversy be classified? Is it a real scientific controversy, the kind one might find discussed in a peer-reviewed scientific journal, similar to the one involving genetically altered food?[344] Or is it really not a controversy at all, but rather just the affirmation of an oddball theory against the background of an established scientific doctrine—more like the belief in UFOs than a genuine scientific dispute? In other words, into which program—the University of Wisconsin program or the SCOPE program—would the

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motivate students to become lifelong science learners by engaging them in interpreting the personal implications of current science controversies, and (d) promote the importance of learning complex scientific material by illustrating its connection to public policy decisions. [,]

at http://scope.educ.washington.edu/about/article/view/17 (last visited Jan. 14, 2003)

343. Of course, without the inclusion of that controversy there would be no possible constitutional objection to the program.

344. *See supra* note 340.

controversy best fit? Surely, the proponents of teaching intelligent design would place it in the latter program, while its opponents would opt for the former. A choice either way would signal the school's assessment of the intellectual worthiness of the theory and therefore simply exacerbate the controversy.[345] If intelligent design is taught between units on global warming and on genetically modified foods, for example, evolutionists would be up in arms. If instead intelligent design is presented between units on ghosts and the search for the Abominable Snowman, one can only imagine the outcry from the other camp. Again,[346] the distance between the two sides makes any sort of compromise or consensus solution within the science classroom a highly unlikely scenario. Because of this, attempts to include intelligent design in a reform of this type, while certainly worth some consideration, will most likely result in a program of poor educational quality guaranteed to cause divisiveness in the school and in the broader community.[347]

IV. THE SANTORUM AMENDMENT AND THE OHIO PROPOSALS

Applying the general principles presented in the last two parts of the Article to the specific legislative and administrative activity

345. One might object here that refusing to teach intelligent design in science classes itself signals the school's assessment of the intellectual worthiness of the theory and that, moreover, teaching about theories on origins in religion classes will call attention to the fact that the school is not teaching design theory in science classes, thus making the situation worse. It may be true that not teaching the theory in science classes would send a signal about the school's assessment of the theory's worth, but of course every curricular decision sends some message about the school's view of what subjects and approaches are more worthy and given the extreme controversy over design theory, not teaching it at all seems like a good middle ground between treating it like a theory on global warming on the one hand and treating it like the search for the Abominable Snowman on the other. Moreover, to the extent that not teaching design theory is understood by students and parents as sending a message about their religious beliefs, teaching about religion in the curriculum should alleviate these concerns somewhat, while also bringing other advantages, as outlined above. *See* discussion *supra* Part II.A.

346. *See supra* text accompanying notes 296-97.

347. With respect to reforming the curriculum to address the evolution controversy, one might make the final argnment that, even assuming that my position on reforming the science classroom is correct, schools should nonetheless both teach about religion in separate religion classes and also teach intelligent design in science classrooms. This arrangement, the argument might go, would garner all of the advantages of teaching about religion, as well as whatever marginal educational advantages might be gained from reforming the science classroom. The problem with this argument would be that the disadvantages of reforming the science classroom—the increased chance of litigation, perhaps successful litigation, and exacerbation of controversy—would likely undermine the advantages of teaching about religion. A program of teaching about religion might lose many supporters in the community if it is packaged with reform of the science classroom, since these supporters might then perceive the teaching about religion reform to be infected by the improper motivations they believe lie behind the move to reform the science classroom. Better instead to focus exclusively on teaching about religion.

that has taken place in the U.S. Senate and in the state of Ohio reveals that the efforts advanced by intelligent design supporters were misplaced, inadequate, and rightly rejected. Section A elaborates on this point with respect to the Senate's actions; Section B addresses the Ohio proposals.

A. The Santorum Amendment

To reiterate, the amendment that was passed 91-8 by the U.S. Senate in June of 2001 (but was ultimately removed from the relevant legislation) stated:

> (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.[348]

At first glance, the language seems eminently reasonable. Common sense suggests that students should know the difference between science and religion and should learn to recognize and discuss controversial issues involving scientific theories. On closer scrutiny, however, the Senate's exhortation[349] turns out not to constitute very good advice after all.[350]

The first section's focus on teaching students the difference between scientific claims and claims that are proffered as scientific but are really religious or philosophical is misguided. For one thing, it is far from clear that any sharp lines can be drawn between science and nonscience.[351] Developing criteria for defining "science" has

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348. 147 CONG. REC. S6147-48 (daily ed. June 13, 2001) (reading of Senator Santorum's proposed amendment); 147 CONG. REC. S6153 (reporting vote).

349. Of course, it is important to remember that the language, even before it was taken out of the final bill, was not intended to have legal effect and would not have had such legal effect. In other words, it would not have bound any school or school district to change its policies or curriculum. *See* Fisher, *supra* note 20, at 963.

350. This Article does not address other possible arguments regarding the propriety of the Senate's actions, including whether it is Congress's role to dictate educational policy to states and localities, a concern of the eight Senators who voted against the language, *see supra* text accompanying notes 63-65, or whether the Senate passed the amendment without sufficient consideration or debate, a concern of the organizations that opposed the language, *see supra* text accompanying note 69.

351. *See supra* note 148 and accompanying text. This ambiguity, however, does not preclude broad generalizations about the types of things that belong in "science" classes and those things that should be taught in classes about "religion." One can make distinctions between these concepts in broad strokes, based on common sense intuitions, even if it proves difficult or impossible to draw fine and technical distinctions between the concepts, which is what section (1) appears to require.

proven notoriously difficult, and indeed some philosophers of science deny that the task is a useful or helpful one.[352] Moreover, even if instructors are able to agree upon certain criteria to demarcate science from nonscience, such as falsifiability,[353] the concepts are likely to be so advanced and complicated that students would not gain much from studying them. This will prove to be an even more significant problem to the extent that schools are not teaching students about religion or philosophy in the first place. How can students understand why religious beliefs do not meet the stated criteria for science if they do not know anything about religion? And if the answer is that science teachers will have to teach the students something about religion as part of this exercise in teaching the difference between science and religion, then it would seem to be a fair response to point out that science teachers are not trained to teach about religion, and that the subject of religion is generally far afield from the types of topics that science teachers generally teach in their classrooms.[354]

But more importantly, the focus on demarcation is simply beside the point. Measured against the goals of any sensible theory of public education,[355] the need to teach students the precise definitions of science, religion, and philosophy does not figure significantly. Take civic education for example. Surely science education should teach students about the difference between good science and bad science, if students are to learn how to evaluate scientific arguments put forward to justify certain legislative or administrative policies,[356] but why

352. *See supra* note 148.

353. On the attempt to defend falsifiability as a criterion to distinguish science from nonscience, see KARL R. POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY 33 (1959). For a critique of this attempt, see KITCHER, *supra* note 148, at 42 ("[Falsifiability e]ither . . . debars most of what we take to be science from counting as science or it allows virtually anything to count.").

354. Of course, the purpose of the first section might be simply to point out to students the "naturalistic" assumptions of modern science—so-called methodological or philosophical naturalism. *See supra* text accompanying notes 224-226. To the extent that this is true, the section is suhject to two further critiques. The first is that the language provides little clue that exposing methodological naturalism is the goal of the section; the language is very unclear if that is indeed the aim, and only those who are very aware of the relevant literature would likely have any idea that methodological naturalism is at issue. Second, as I discuss below, there is no need for schools to teach students about the controversy over naturalism in science classes. *See infra* text accompanying notes 375-383.

355. *See supra* text accompanying notes 116-118 (discussing different theories of puhlic education).

356. *See* NAT'L COMM. ON SCI. EDUC. STANDARDS & ASSESSMENT, NAT'L RESEARCH COUNCIL CENTER, NATIONAL SCIENCE EDUCATION STANDARDS ch. 1 (1996) ("Why is science literacy important? . . . Americans are confronted increasingly with questions in their lives that require scientific information and scientific ways of thinking for informed decision making."); Wexler, *supra* note 111, at 1203-04 (explaining why science education is important for citizenship), *at* http://books.nap.edu/html/nses/html/1.html#why.

would it be important for civic reasons to teach students whether some particular theory should technically be called "science" as opposed to something else? And although it is important that students learn about religion, the precise contours of the definition of that term are not really what students need to comprehend if they are going to understand civic life in the nation and world. Similar arguments could be made for other theories of public education as well. A focus on technical definitions (which is what any responsible treatment of the demarcation issue will have to involve) will not well serve an educational system marked by utilitarian or liberal concerns either.[357]

Section two of the amendment contains an unfortunate ambiguity. Specifically, it is unclear what the word "where" is supposed to mean. It could either mean "in the class in which" or it could mean "if." Neither would be satisfactory. If the meaning is the former—in other words if the clause essentially reads: "in the class in which biological evolution is taught, the curriculum should help students understand why the subject generates so much continuing controversy—then the amendment would mean that schools should address the controversy over evolution in science classrooms, which is problematic for all of the reasons discussed above.[358] On the other hand, if the word means "if biological evolution is taught," it would be unsatisfactory because, although the clause would be ambiguous as to where the school should address the controversy, it would suggest that schools might not teach evolution at all. In other words, the implication of such a reading would be that schools could either teach evolution but address the controversy somewhere in their curriculum or avoid the controversy altogether by choosing not to teach evolution. As evolution is one of the most central concepts in the field of biology,[359] the Senate should not endorse language that could plausibly be interpreted as support for the idea that schools should not teach evolution.

Putting aside the question of the meaning of "where," section two of the amendment does on its face represent strong educational

357. One might argue that teaching students to distinguish between various fields of inquiry according to specified and complicated criteria would develop students' analytical skills, and thus serve, indirectly perhaps, the goals of various theories of education, such as the ability to deliberate with fellow citizens, a goal of civic education. This is a fair point, but so many other subjects in the regular curriculum serve this interest that this argument would be a radically incomplete justification for such a focus. Moreover, it is fairly clear that the sponsoring Senators did not have the general promotion of analytical abilities as their motivation for the amendment; nor is it likely that schools moved to change their curricula to meet the Senate's exhortation would do so for this reason.

358. *See supra* text accompanying notes 231-328.

359. *See supra* note 235.

policy. Because of its possible implications for religious belief, evolution is exceedingly controversial, and the controversy it creates goes to the heart of American cultural, social, and intellectual life. To understand their own civic milieu, students must understand why evolution generates such enduring and potent controversy. The amendment is correct to endorse this idea. Less critical is section two's final exhortation—that schools prepare students to participate in public discussions about the subject. But here too the amendment makes sense. At least under some theories of civic education—those that draw upon the civic republican tradition and that tradition's emphasis on public deliberation regarding the common good—schools should train students to be active participants in public discourse over controversial issues.[360] Training students to participate in public discussions over the evolution controversy would further this aim of civic education.

The amendment is flawed, however, because it does not give any guidance regarding how or where schools should teach students to understand and discuss the evolution controversy. As described above, the proper place to teach about the controversy is in religious studies courses or in social science courses that have units dealing with religion, but not in science classes.[361] Teaching about the "scientific" controversy over Darwinian theory will not help students to understand why evolution creates so much controversy. Indeed, it might mislead students into thinking that the controversy is all about science and the interpretation of data, when in fact it is primarily about the clash between evolution and certain religious beliefs about the origins of life. Teaching students intelligent design in science classrooms will not help them to learn about the relationship between evolution and religious ideas. They will not understand the epistemological differences between relying on sources of religious authority such as scripture to reach conclusions and relying on experiments, observation, and interpretation of data to do so. They will not understand the historical context of the evolution-religion debate in America over the past century, and they will not understand why religious students forced to study evolution find the experience offensive and burdensome.[362] Further, teaching intelligent design will

360. *See* Wexler, *supra* note 111, at 1197-99 (discussing theories of "republican" civic education).

361. *See* discussion *supra* Part II.A-B.2.

362. For example, students might come out of the class thinking that the reason evolution has always been controversial is because it is not the best scientific theory to fit the data, as though the dispute over evolution is analogous to the dispute over whether the decline of amphibian populations is due to habitat loss, climate change, or pesticides. *See FrogWeb:*

also not do much to help students participate in public discussions regarding evolution. Students might learn to dispute various claims made by evolutionists and articulate alternative theories to explain the data, but they will not be able to explain or to reply to any of the important points concerning the religious opposition to evolution. And, as also described above, centering reform on the science classroom risks successful litigation to an extent not present with focusing on the social science classroom.[363]

Despite this, the Senate amendment does not mention religion at all,[364] and the statements made on the floor by Senator Santorum and others suggest that the envisioned reforms would focus on the science classroom. Not only did Santorum quote heavily from Professor DeWolf, whose work is clearly aimed at reforming the science classroom, but Santorum himself specifically endorsed such change when he explained that the amendment "deals with the subject of intellectual freedom with respect to the teaching of science in the classroom."[365] Even Senator Kennedy, who later clarified that he did not support teaching intelligent design,[366] nonetheless indicated that the amendment made sense because students should be able to "examine various scientific theories on the basis of all the information that is available to them."[367] This emphasis on science instruction and the omission of religion is misguided. Assuming for the sake of argument that it is appropriate for Congress to weigh in on this issue at all by adopting some "sense of the Congress" language, a better proposal might have been something along these lines:

> The Congress recognizes that the scientific theory of evolution is controversial because it conflicts with certain religious beliefs concerning the origin of life and humankind. Public schools should help students understand why evolution generates so much continuing controversy and should prepare students to be informed participants in public discussions regarding the subject. To achieve this goal, public schools should teach about the controversy as part of a general program of teaching students about religion. Such a program should be designed to teach students about a wide range of

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Amphibian Decline & Deformities, NAT'L BIOLOGICAL INFO. INFRASTRUCTURE (Nat'l Biological Info. Infrastructure, Reston, Va.) (discussing problems affecting amphibians), *at* www.frogweb.gov. They might think that the reason some people object to being taught evolution is that they want to avoid being exposed to flawed scientific theories. How would they know why many parents and students object to being taught evolution, but nobody objects (for example) to being taught that climate change rather than habitat loss has caused the worldwide decline in frog populations?

363. *See* discussion *supra* Part III.B.1-2.

364. *See supra* text accompanying note 348. The amendment does mention the distinction between scientific and religious ideas, but it does not seem to involve any need to teach anything substantive about religion.

365. 147 CONG. REC. S6147-48 (daily ed. June 13, 2001) (statement of Sen. Santorum).

366. *See supra* note 58.

367. 147 CONG. REC. S6150 (statement of Sen. Kennedy).

religious beliefs and ideally should include separate classes about religion. By teaching students about religion generally and the evolution controversy specifically, schools can better prepare students to understand and participate in civic life both here in America and around the world.

B. Ohio

1. Proposed Administrative Reforms

As outlined above,[368] intelligent design advocates in Ohio called for changes to draft science standards that would have (1) weakened the presentation of evolution by eliminating the term in certain places, adding qualifying terms like "may" in relevant places, and requiring the teaching of arguments against evolution; (2) explained the importance of the distinction between naturalistic and nonnaturalistic theories of science by noting that evolution is a naturalistic theory and pointing out that some scientists do not look only to naturalistic explanations; and (3) promoted intelligent design to some degree by requiring discussion of design theorists such as Paley and Behe and authorizing, on an optional basis, the teaching of design theory or other alternatives to evolution.

Of course, some of the issues raised by the proposed changes to the draft standards were only resolvable by scientific experts.[369] For example, proposed change No. 8 would have changed the phrase "[k]now how the evolution of life on earth has changed the oxygen composition of the earth's atmosphere" to "know how the presence of life on earth has changed the oxygen composition of the earth's atmosphere." To the extent that this proposal turned on a scientific point about whether evolution per se has affected oxygen composition and did not simply represent an attempt to remove the term "evolution" from the standards to discount the theory generally, only scientists who understand the relevant relationship would have much to say about the desirability of the proposed change. On such issues, this Article makes no claims. On the three more general points raised by the proposed changes, however,[370] no scientific expertise is necessary to conclude that the changes do not pass muster under the

368. *See supra* Part I.B.1.

369. *See also supra* note 36. For an example of such a critique written by an organization with scientists as members, see the National Center for Science Education's analysis of the first group of changes proposed by SEAO. *An Analysis of Proposed Changes to Ohio Science Standards*, *supra* note 77.

370. These three points are as follows: (1) weaken presentation of evolution; (2) discuss the distinction between naturalistic and nonnaturalistic theories of science; and (3) promote design theory.

general standards for teaching about the evolution controversy set out in the previous parts of the Article.[371]

First, the attempt to weaken the presentation of evolution in the science curriculum is inconsistent with both the scientific community's near-complete consensus that the basic tenets of evolution are correct[372] and the near-complete (perhaps entirely complete) failure of evolution detractors to publish articles supporting their conclusions in peer-reviewed scientific publications.[373] The addition of qualifying terms like "may" to basic facts of evolution, as opposed to specific details of the general theory, is unsupported by the consensus of scientific thinking on the matter. Far more problematic was proposed change No. 10, which would have essentially required teachers to discuss arguments and evidence against evolution.[374] This change would have done more than simply require teachers and materials to make brief and occasional qualifications regarding the strength of the case in favor of evolution; it would in fact have fundamentally changed the way that evolution was presented to students. Given the existing method of teaching evolution (as a solid scientific theory) and the limited amount of time that teachers can give to each topic, such a radical change would have been justified only if there were significant scientific controversy over the basic theory of evolution, but such controversy simply does not exist. Indeed, in light of the lack of scientific justification for such a change, a substantial argument can be made that reforming the science curriculum to emphasize arguments against evolution would in fact send a message that the curriculum was being reformed for religious reasons. Such a message might run afoul of the nonendorsement

371. The worthiness of the Ohio School Board's most important change to the final guidelines—calling for schools to "describe how scientists continue to investigate and critically analyze aspects of evolutionary theory," *see supra* text accompanying note 103—will ultimately depend on how it is interpreted. If schools interpret it to mean that they should discuss the ongoing disagreements among mainstream scientists regarding specific mechanisms of evolution, then the change will have been a salutary one. If, on the other hand, schools see the standard as requiring or encouraging them to teach design theory, then the change will have been unfortunate. The school board should have more clearly indicated its intent with respect to this language.

372. *See supra* text accompanying notes 234-35.

373. *See supra* text accompanying note 237.

374. The language of the proposed change actually requires teachers to "[d]iscuss how various types of scientific evidence may either support or not support the theory of biological evolution . . . ." *See supra* text accompanying note 96. This would appear to cover discussion both of how evidence traditionally put forward in favor of evolution in fact does not support evolution as well as how other evidence not generally put forward to support evolution in fact demonstrates that evolution is false.

principle that has been articulated by Justices of the Supreme Court on several occasions.[375]

The proposed changes relating to the issue of methodological naturalism were also flawed and rightly rejected. Intelligent design supporters would have schools explain that scientists are split on the issue of whether scientists ought to consider nonnaturalistic explanations for observed phenomena and that evolutionary theory is based on the assumption that such nonnaturalistic explanations are out-of-bounds for scientists.[376] This position assumes that the methodological split is significant enough within the scientific community that it should be recognized by policymakers and included in a basic high school biology class. The split, however, is as illusory as the split on evolution and intelligent design itself. As the National Academy of Sciences puts it—purportedly representing the mainstream thought of the scientific community—one "fundamental characteristi[c]" of science is that "[t]he statements of science must involve only natural things and processes."[377]

Indeed, the theoretical split over naturalism and the split over evolution are, as a practical matter, coextensive. It is true that, as a theoretical matter, those who reject methodological naturalism need not necessarily also reject evolution and accept intelligent design. Such thinkers, for example, might believe that supernatural causes should be within the bounds of scientific inquiry but yet still think that natural causes rather than supernatural ones better explain the data relating to origins. These thinkers might instead reject naturalistic explanations for other types of observed phenomena in lieu of supernatural explanations for those phenomena that they would then defend in the same "scientific" manner that design theorists defend that theory.[378] For example, nonnaturalistic scientists (as I will refer to them) might believe in supernatural explanations for changes in the weather or for earthquakes and make "scientific" arguments for such phenomena. But as a practical matter, purported "scientific" defenses for supernatural explanations for phenomena other than those relating to origins do not appear to be prevalent. Or—more to the point—at the very least, one does not find them being

375. *See supra* text accompanying notes 195-200.

376. *See* text accompanying notes 224-26 (discussing methodological or philosophical naturalism).

377. NAT'L ACAD. OF SCI., TEACHING ABOUT EVOLUTION AND THE NATURE OF SCIENCE, *supra* note 234, at 42.

378. Alternatively, I suppose, they might also believe that scientists could theoretically point to supernatural causes for observed phenomena but have not found any particular phenomena that they believe can be better explained by supernatural causes rather than natural ones.

made by people who also reject the theory of intelligent design.[379] And, one does not find in the evolution literature any acknowledgement that although intelligent design may be bad science, other nonnaturalistic theories have made significant inroads (or might make such inroads in the future) into mainstream scientific thought.[380] In other words, the set of nonnaturalistic scientific theories is neither much larger nor more successful within the scientific community than the theory of intelligent design. And since, as argued above, the theory of intelligent design is not sufficiently significant enough within the scientific community to justify teaching intelligent design in science classes, it follows that schools also need not teach about the approach to science that would reject so-called methodological naturalism.

Finally, the proposed changes were wrong to seek to promote the teaching of alternative theories to evolution such as intelligent design. To be sure, the second set of proposed changes, which provided that "[t]he consideration of alternative theories, such as intelligent design, is permitted—but not required,"[381] was an improvement over the original proposed changes, which provided that students should "[k]now that some scientists support the theory of intelligent design" and called for teachers to "[c]ompare and contrast the evidence that supports the design hypothesis with the evidence that supports the evolutionary hypothesis."[382] The second set of proposed changes at least would have made the presentation of intelligent design optional, rather than mandatory. But there is no mistaking that the second set of proposed changes would also have promoted the teaching of intelligent design in a substantial manner compared to the status quo. Not only would they have specifically authorized teachers to consider design theory, but they also would have done so in the context of requiring teachers to teach arguments against evolution, which would have made it substantially more likely that teachers would have to discuss design theory to make their presentations on evolution

379. I make the last two claims based on my own understanding of the literature. In my reading on the topic of intelligent design and the theory of science, I have not yet encountered an argument that proceeds in something like this fashion: (1) scientists may point to nonnaturalistic explanations for observable phenomena; (2) the theory of intelligent design, while not out-of-bounds as a scientific explanation simply because it points to nonnaturalistic explanations for observable phenomena, is nonetheless not a good explanatory theory; (3) but, nonnaturalistic explanations for other observable phenomena, such as the weather, earthquakes, etc., are better explanations than the naturalistic explanations for the same phenomena.

380. If such theories had become prevalent, or were likely to become prevalent, one would expect to see them discussed in the literature defending evolution against intelligent design, because that literature often does dwell on the nature of scientific inquiry and such other theories would probably be relevant to the discussions.

381. *Suggested Modifications to Draft Indicators*, *supra* note 96.

382. *An Analysis of Proposed Changes to Ohio Science Standards*, *supra* note 77, at 9.

complete. Further, the proposed changes would also have required that teachers mention design advocates such as Paley and Behe when discussing the history of scientific developments that have occurred in evolutionary thought. It is hard to imagine how teachers could discuss these two thinkers without teaching students something about intelligent design.

As detailed above, requiring teachers to teach intelligent design theory in science classes is problematic for several reasons. Not only is there a substantial risk that the theory will not be presented correctly—as a theory that has been roundly rejected by the mainstream scientific community—but teaching it also invites litigation, sends the wrong message about religion, and poses a substantial risk of constitutional invalidation.[383] The organization that proposed the changes to the draft standards—Science Excellence for All Ohioans ("SEAO")—forwarded a set of arguments in favor of the changes, but as detailed below, those arguments all fail to support the proposed changes and, in some cases, militate against the proposals. It is worth examining these arguments in some detail because intelligent design supporters often rely on the same or similar arguments to support including design theory in the science classroom.

First, SEAO argued that the proposed change "calls for coverage of evolution with intellectual honesty (since evidence both supporting and not supporting evolutionary theory is presented)."[384] It is true that if secondary school classes generally discussed every possible theory relating to the subject matter covered by the relevant course, it would then be more intellectually honest to discuss, at least briefly, intelligent design theory in biology classes. But secondary school classes, of course, do not purport to cover every possible topic relating to the relevant subject matter. Because of time limitations and pedagogical concerns, classes only cover a small subsection of the relevant material, and that material is chosen, at least in large part, because of the material's importance in the relevant field of study. The concept of "intellectual honesty," then, if it means anything in the context of selection of material to include in a particular science class, must mean that the emphasis given to the material reflects the material's importance in the field. As discussed above, intelligent design theory has not made significant inroads into the field of biology, and it has largely been rejected by the scientific community.[385] Thus, the most honest way to deal with intelligent design would be to

383. *See supra* text accompanying notes 326-33.

384. *Suggested Modifications to Draft Indicators*, *supra* note 96.

385. *See supra* text accompanying notes 236-37.

exclude it from biology classrooms, rather than to include it. Intellectual honesty, in other words, counsels against the proposed changes to the draft standards, rather than in favor of them.

Second, SEAO contended that the proposed change "promotes academic freedom for teachers (since they are permitted to discuss various aspects of evolution as well as alternative theories)."[386] The primary problem with this justification is that no Ohio educational standard currently affirmatively prohibits teachers from mentioning intelligent design in classrooms; if there were such a standard, surely SEAO would have proposed changes to it as well. The same problem was observed by the Supreme Court in *Edwards v. Aguillard*. There, the state also had cited the academic freedom of teachers as a justification for the equal time statute, but the Supreme Court rejected the rationale, noting that: "The Act does not grant teachers a flexibility that they did not already possess to supplant the present science curriculum with the presentation of theories, besides evolution, about the origin of life. Indeed . . . no law prohibited Louisiana public school teachers from teaching any scientific theory."[387] Of course, at some point, if a teacher goes too far in endorsing the theory of intelligent design, she will violate the Establishment Clause (at which point the academic freedom justification would have no weight at all), but short of that point, no teacher is prevented from mentioning the existence of the theory and the controversy over Darwinism and design.[388]

A secondary point is that in this context, the academic freedom rationale is not itself very strong. Even if a standard or law prevented teachers from talking about intelligent design or even if, as a practical matter, teachers feel like they have no freedom to discuss intelligent design and need some academic standard authorizing them to discuss it before they feel free to do so,[389] the academic freedom argument itself would still not carry much weight and would still not outweigh the significant disadvantages of such an authorizing standard. All that is at stake is the teacher's ability to discuss intelligent design within the classroom. The teacher may still believe in design, pursue her interest in design outside the classroom, read or write about design in her free time, and discuss design theory with others

386. *Suggested Modifications to Draft Indicators, supra* note 96.

387. Edwards v. Aguillard, 482 U.S. 578, 587 (1987).

388. This is not to say that teacbers *should* talk about intelligent design in classrooms. There are good reasons why they should not—essentially tbe same reasons why schools and scbool boards generally should not encourage teachers to teach about design. It is only to say that the academic freedom argument cited by SEAO is unpersuasive in this context.

389. For example, they may have reason to fear being disciplined by school authorities.

(including young people) outside the public school setting.[390] In this context, any limitation on what teachers can say within the classroom would constitute only a very slight burden on the teacher's freedom to pursue her interests and beliefs. This burden is easily outweighed by the significant disadvantages of teaching about design in the public school science classroom. One wonders whether supporters of the academic freedom rationale in the intelligent design context would give the same weight to the academic freedom rationale when applied to teachers who would like to exercise that freedom to teach about safe sex or responsible drug use to students whose parents object to such messages being promoted in the public school classroom.[391]

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390. Any attempt by the state to discipline a teacher for such activities outside the classroom would implicate the teacher's First Amendment rights and would be subject to the careful scrutiny of the courts. *See infra* note 391.

391. Intelligent design supporters also often argue that prohibiting the teaching of intelligent design violates the constitutional academic freedom rights of teachers and constitutes unconstitutional viewpoint discrimination under the First Amendment. *See, e.g.*, CALVERT & HARRIS, *supra* note 213, at 33 ("Censoring the evidence also violates the academic freedom of teachers and their constitutional right to express a legitimate viewpoint on an issue that is properly the subject of classroom discussion."); LEGAL GUIDEBOOK, *supra* note 43, at 24 ("[I]t is unconstitutional under the Free Speech Clause of the First Amendment to exclude ideas from a public forum simply because of the content of those ideas."); Miller, *supra* note 7, at 500 ("Public school teachers are protected in their classroom discussions by free speech and academic inquiry rights under the First Amendment speech clause.").

Because I am here concerned with evaluating laws and policies authorizing the teaching of intelligent design rather than laws and policies that would actually prohibit such teaching, the First Amendment academic freedom and viewpoint discrimination arguments are beyond the primary scope of the Article. Nonetheless, a few points regarding these arguments are in order. First, the argument regarding viewpoint discrimination ignores the fact that the state and the teacher are in an employer-employee relationship. It is certainly true that when the government opens up a public forum, it may not restrict access to the forum based on viewpoint. *See* Rosenberger v. Rector & Visitors of Univ. of Va., 515 U.S. 819, 828-30 (1995). But the employer-employee relationship is not such a forum. Instead, as the Fourth Circuit recently observed, summarizing Supreme Court doctrine:

> A determination of whether a restriction imposed on a public employee's speech violates the First Amendment requires "a balance between the interests of the [employee], as a citizen, in commenting upon matters of public concern and the interest of the State, as an employer, in promoting the efficiency of the public services it performs through its employees."

Urofsky v. Gilmore, 216 F.3d 401, 406 (4th Cir. 2000) (en banc) (quoting Connick v. Myers, 461 U.S. 138, 142 (1983) (internal citations omitted)). Courts applying this balancing test first ask "whether the speech at issue was that of a private citizen speaking on a matter of public concern." *Id.* Only if the answer to this question is "yes" does the Court proceed to ask "whether the employee's interest in First Amendment expression outweighs the public employer's interest in what the employer has determined to be the appropriate operation of the workplace." *Id.*

While a teacher's speech outside the classroom—for example, at community meetings, in newspaper editorials, or even perhaps at school board meetings—may very well constitute speech by a private citizen on a matter of public concern, and may therefore receive some protection under this test, the better view is that a teacher who violates the school or state-mandated curriculum by teaching prohibited material in the classroom should not receive such First Amendment protection. Teaching intelligent design (or any other subject, such as, for

SEAO's third argument was that the proposed change "enhances critical thinking in students (since they are exposed to a variety of viewpoints on the issue)."[392] If the controversy over intelligent design and evolution were presented fairly and accurately,[393] then teaching about it and having students analyze the relevant issues would enhance critical thinking. But so would teaching about any number of possible topics in the public school curriculum, including genuine scientific controversies such as those included in the SCOPE project discussed above.[394] Why choose to enhance critical thinking about science by discussing an issue that is likely to cause all sorts of problems when the same advantages can be obtained by

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example, how to practice safe sex) in the classroom in contravention of school or state policy is best viewed as speech by the teacher in his or her capacity as public employee, not as private citizen, and may thus be restricted by the state. *See, e.g.*, Boring v. Buncombe County Bd. of Educ., 136 F.3d 364, 366 (4th Cir. 1998) (holding that public high school teacher had no First Amendment right to participate in the makeup of curriculum through selection and production of a particular play); Kirkland v. Northside Indep. Sch. Dist., 890 F.2d 794, 794 (5th Cir. 1989) (holding that teacher had no First Amendment right to teach from his own individual reading list); LeVake v. Indep. Sch. Dist. #656, 625 N.W.2d 502, 508-09 (Minn. Ct. App. 2001) (holding that public school teacher could be reassigned to teach a different class after refusing to teach evolution to tenth grade biology class because the teacher "in his role as a public school teacher rather than as a private citizen, wanted to discuss the criticisms of evolution"); *see also* William G. Buss, *Academic Freedom and Freedom of Speech: Communicating the Curriculum*, 2 J. GENDER, RACE & JUSTICE 213, 219 (1998-1999) ("[T]he Supreme Court has never held that teachers at any level of education have a superior claim to communicate the curriculum over the designated state educational decision-makers."); W. Stuart Stuller, *High School Academic Freedom: The Evolution of a Fish out of Water*, 77 NEB. L. REV. 301, 333-34 n.226 (1998) (citing many cases holding that teachers may not override curricular decisions of supervisors). *But see* Cockrel v. Shelby County Sch. Dist., 270 F.3d 1036, 1036 (6th Cir. 2001) (finding that a teacher's decision to invite people to her classroom to speak about industrial hemp, an illegal substance in Kentucky, was protected by tbe First Amendment), *cert. denied*, 123 S. Ct. 73 (Oct. 7, 2002).

Second, while it is true that the Supreme Court has occasionally spoken glowingly of the general ideal of academic freedom, *see, e.g.*, Keyishian v. Bd. of Regents, 385 U.S. 589, 603 (1967), courts have been entirely unclear about the legal meaning and import, if any, of the concept. *See* J. Peter Byrne, *Academic Freedom: A "Special Concern of the First Amendment"*, 99 YALE L.J. 251, 253 (1989) ("Lacking definition or guiding principle, the doctrine floats in the law, picking up decisions as a hull does barnacles."); Stuller, *supra*, at 302 ("[C]ourts are remarkably consistent in their unwillingness to give analytical shape to the rhetoric of academic freedom."). Specifically, as one recent opinion concluded after a review of the relevant legal decisions,

> the Supreme Court has never set aside a state regulation on the basis that it infringed a First Amendment right to academic freedom. . . . Moreover, a close examination of the cases indicates that . . . the Supreme Court, to the extent it has constitutionalized a right of academic freedom at all, appears to have recognized only an institutional right of self-governance in academic affairs.

Urofsky, 216 F.3d at 412; *see also* Stuller, *supra*, at 333 ("[T]he substantive right of academic freedom has been overwhelmingly rejected.").

392. *Suggested Modifications to Draft Indicators*, *supra* note 96.

393. A possibility that is unlikely given the enduring and virulent nature of the controversy. *See supra* text accompanying notes 292-310.

394. *See supra* text accompanying notes 338-42.

discussing such issues as malaria control, the worldwide decline in amphibian populations, global warming, or designing containers for nuclear waste? Moreover, any critical thinking advantages that could be gained by teaching intelligent design that would not be gained by teaching any of these other scientific controversies can probably be gained by teaching about religion in social science classes and discussing the various relationships between religious and scientific ways of thinking in that context.[395]

Next, SEAO contended that the proposed change "generates student enthusiasm for science (since the controversy is interesting)."[396] There is no doubt that teaching the controversy over evolution would be interesting for students. But, as discussed above, this rationale alone does little to justify making a significant curricular change.[397] Not only would such a rationale by itself justify all sorts of irrational curricular reforms (the Science Bingo example), but there are also many other ways to make the science curriculum—and the evolution portion of that curriculum—more interesting for students without causing the problems that introducing design into the curriculum would cause.

The fifth argument was that the proposed change "aligns Ohio with the Santorum language in the federal education law."[398] There are at least three weaknesses with this argument. First, of course, Congress did not actually pass this language into law, and thus there was no "language in the federal education law" with which Ohio could align itself. Indeed, given that the Congress as a whole ultimately rejected the language, perhaps it was more consistent with the congressional will when Ohio's decisionmakers rejected rather than adopted SEAO's proposed changes. Second, even if both Houses had voted to endorse this language, the language would still not have been binding or have had any legal effect. What advantage is there for a state to align itself with nonbinding language that merely represents the "sense" of Congress? Finally, the language that was passed by the Senate did not go nearly as far toward endorsing the teaching of intelligent design as would have the proposed changes to the Ohio draft standards. The language passed by the Senate, on its face, simply urged public schools to help students understand (and be able to discuss) the controversy over evolution. It did not call for schools to qualify their presentation of evolution, describe the differences

395. *See supra* text accompanying notes 152-58 (discussing the ways of relating science and religion).

396. *Suggested Modifications to Draft Indicators*, *supra* note 96.

397. *See supra* text accompanying notes 239-240.

398. *Suggested Modifications to Draft Indicators*, *supra* note 96.

between methodological naturalism and nonnaturalistic approaches to science, or teach the theory of intelligent design. And although it is true that some of the legislative history suggests that these were the types of changes that at least some Senators intended by the amendment, even that history is fairly silent about the details and indeed, as evidenced by Senator Kennedy's subsequent repudiation of teaching intelligent design, some Senators clearly did not understand the language as calling for such changes.[399] Thus, even if Congress had passed the language, and even if there were some advantage to be gained by adopting a position consistent with a "sense of the Congress" provision, the proposed changes to the draft standards would hardly have "aligned" Ohio with the Santorum Amendment.

Finally, SEAO contended that the proposed change "maintains government neutrality on a matter (biological origins) touching on religion."[400] This contention is, of course, the crux of the issue. Supporters of teaching intelligent design are generally opposed to the unqualified teaching of evolution in biology classes because of the message that such instruction sends to those students (and their parents) who believe in the Biblical account of creation, literally construed. The curriculum, under this view, is slanted heavily against religious beliefs of this sort and thus should be reformed to lift the burden it imposes on religious believers. The argument is substantial and serious, and those who support the teaching of evolution and oppose the introduction of intelligent design into the classroom are wrong to belittle or ignore it. The traditional public school curriculum does alienate many religious believers, and any complaint about educational policy held by a substantial portion of the population ought to be given serious consideration by citizens and policymakers alike.

But the significance of this argument does not mean that intelligent design ought to be taught in science classes. As detailed above, the secular criteria that govern the determination of the content of the public school science curriculum all point in favor of excluding intelligent design from the science classroom.[401] If intelligent design is to be taught, then, the justification would have to be at some fundamental level religious in nature—to satisfy a particular religious constituency seeking to promote a specific religious belief in the public schools. Whether or not in a particular case such a decision would violate the Establishment Clause—and it

399. *See supra* note 58 (discussing Senator Kennedy's repudiation).

400. *Suggested Modifications to Draft Indicators*, *supra* note 96.

401. *See supra* Part III.A-B.

very well might—it would certainly constitute bad educational policy. In a public school funded by public dollars and serving a public that is at least theoretically diverse with regard to religious viewpoints, the curriculum should not be designed to comport with one particular religious point of view or to satisfy one particular religious constituency. The curriculum should be designed instead to promote secular educational goals consistent with a sound theory of public education, whether that be to help students participate effectively in civic and political life or some other worthy secular objective.

It is impossible both to design a curriculum according to secular objectives and to satisfy fully all religious believers. After all, most educational messages that are likely to emerge from any secularly determined curriculum will have the potential to offend someone's religious beliefs.[402] But this conclusion does not dictate that some curricula will not be better in this regard than others. In Part II, this Article argued that schools should teach about religious views on origins as part of a general program of teaching about religion. The justifications for such a reform are secular in nature. Such teaching would help students of all religious proclivities better understand and be able to participate in civic and political life in the nation and world. But an additional advantage of such a reform would be to send a message to believers that the educational system does take religion seriously, even if some aspects of the curriculum are likely to be inconsistent with some religious beliefs. Such a reform would not result in a curriculum fully "neutral" with respect to "matte[rs] . . . touching on religion,"—a goal that no curriculum could ever meet—but it would take steps toward restoring balance to the approach that public education takes towards religion while still promoting important secular benefits. This option would surely be preferable to designing a curriculum to promote certain religious beliefs at the expense not only of those who do not hold such beliefs but also at the expense of the quality of education itself. This latter alternative—the one represented by the proposed changes to Ohio's draft science standards—ought to be rejected.[403]

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402. Of course, this point would be at least as true if not truer of any curriculum designed according to religious criteria.

403. SEAO also argued that the proposed change was "supported by public opinion polls." *Suggested Modifications to Draft Indicators*, *supra* note 96. Suffice to say that whether a theory is of sufficient scientific merit to be included in a science curriculum should not be determined by a majority vote.

2. Proposed Legislative Reform

The proposed Ohio legislation was flawed for many of the same reasons that the proposed administrative reforms were flawed. The introductory paragraph of the proposed bill says that its purposes are (1) to "enhance the effectiveness of science education"; (2) to "promote academic freedom"; and (3) to "promote . . . the neutrality of state government with respect to teachings that touch religious and nonreligious beliefs."[404] These purposes, to the extent that they are urged as support for teaching intelligent design in the science classroom, have been adequately countered here. Teaching the alternative theory is not likely to enhance science education either substantively or as a way of teaching about the nature and process of science,[405] and neither academic freedom nor neutrality with respect to religious beliefs is a sufficient rationale to justify requiring or even encouraging the teaching of a theory so widely rejected by the scientific community.[406]

The bill's first substantive provision would have required "the instructional program provided by any school district or educational service center" to "[e]ncourage the presentation of scientific evidence regarding the origins of life and its diversity objectively and without religious, naturalistic, or philosophic bias or assumption."[407] There are several problems with this provision. For one thing, it is poorly written. It is ambiguous whether the "objectively and . . ." phrase modifies "[e]ncourage" or, as is more likely the intention, "presentation." But more to the point, it is simply impossible for schools to present any issue, much less such a controversial issue as evolution and competing theories, in an entirely objective manner, without biases stemming from such sources as "philosophic . . . assumptio[ns]." Everything the school does in its presentation of the subject—from the choice of materials to the emphasis given the subject in the curriculum as a whole to the teacher's use of voice tone and body language—affects the way in which students understand the material, and all of these choices and actions are affected in some significant way by either conscious or unconscious biases of different sorts.[408] Given this difficulty, it is unclear from the incredibly broad

404. H.B. 481, 124th Gen. Assem., Reg. Sess. (Ohio 2001-2002) (referred to the education committee in 2002), *available at* http://www.legislature.state.oh.us/bills.cfm?ID=124_HB_481.

405. *See supra* text accompanying notes 231-51.

406. *See supra* text accompanying notes 387-91, 400-02.

407. H.B. 481 § (A).

408. *See* Ingber, *supra* note 177, at 778:

language itself ("without religious, naturalistic, or philosophic bias or assumption") exactly what the provision was supposed to mean or what school districts and educational service centers would have to do to fulfill its exhortation.

But assuming that the goal here was to encourage schools to teach about intelligent design in addition to evolution in the science classroom or to otherwise undermine the so-called methodological naturalism[409] that pervades the reigning science curriculum,[410] the bill was deeply misguided. Science classes are taught with a naturalistic bias because naturalism is a basic tenet of science—i.e., the scientific community generally agrees that scientists should look to natural explanations for observable data.[411] Teaching science in a high school science classroom without a naturalistic bias would be to divorce the science classroom from the practice of science itself. There is nothing to prevent Ohio lawmakers from insisting on such a schism[412] (except, perhaps, the Establishment Clause), but why would they do so? They would do so only if they (who, presumably, are not practicing scientists) concluded that their own understanding of the nature of science is more relevant to what should be taught in the science classroom than what scientists think about the nature of science—an odd conclusion indeed.[413] Surely such a conclusion would be inconsistent with a civic education theory of public education, which

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> A value-free curriculum is clearly impossible. Selectivity is inherent in making decisions of inclusion and exclusion necessary to develop a curriculum. Curricular choices, therefore, inevitably lend the color of official support to one perspective over another. Additionally, pedagogical style and classroom procedure instill through students' experience value positions. . . . Similarly, schools simply cannot attain value-neutral or balanced education.

409. *See supra* text accompanying notes 224-26 (discussing "methodological naturalism").

410. Given the context of the bill, this concern was most likely the motivating force. But the ambiguity raises a separate problem, which is that by not spelling out exactly what is meant by the proposal, those who do not support the teaching of intelligent design may not understand that the relevant buzzwords, "naturalistic . . . bias," "historical . . . science," etc., in fact signal an intention to devalue evolution in the curriculum and to promote intelligent design. Such a misunderstanding seems to explain why Senator Kennedy originally supported the Santorum Amendment and then later repudiated the notion that intelligent design ought to be taught in public school science classrooms. *See supra* note 58.

411. *See supra* text accompanying notes 377-380.

412. Just the same, Ohio lawmakers could pass a law requiring only French be taught in Spanish classes or nutrition be taught in English classes.

413. *See supra* note 232. As I have said previously, I do not believe that the reason this conclusion would be odd is because there is some objective definition of "science" such that only certain things may be taught in "science" classrooms, but rather because the most reasonable way for school officials to decide what should be taught in "science" classes is for them to look to the meaning and content of science as understood by the vast majority of people who call themselves scientists and who work within the generally accepted norms (including peer review) of the scientific community.

posits that schools should teach students to participate effectively in civic and political life in the nation and world.[414] How will students be able to evaluate scientific controversies and problems after they graduate if their understanding of science is deeply inconsistent with the understanding held by the leading scientists of the nation and world?[415]

The other critical section of the bill would have required school districts and educational service centers to "[e]ncourage the development of curriculum that will [1] help students think critically, [2] understand the full range of scientific views that exist regarding the origins of life, and [3] understand why origins science may generate controversy."[416] The first objective (critical thinking) is of course a good one. Nothing in the actual language of the bill, however, would have required that this skill be furthered by any change in the curriculum regarding evolution. To the framers of the bill this might be a flaw in drafting; it was in fact one of the few sound elements of the bill. The curriculum should encourage critical thinking, but, as already discussed, such an objective does not justify changing the curriculum regarding evolution.[417]

The second objective (full range of scientific views) is an affirmative requirement that schools teach about intelligent design. It is worth noting that the Ohio legislation was more pro–intelligent design in this regard than the proposed changes to the draft standards. For all of the reasons discussed earlier, including the constitutional concerns, this provision is a bad one.[418] It is made even worse by the fact that it does not single out design theory as the only other "scientific vie[w]" that schools must teach about. What are the other relevant scientific views? Should schools in Ohio also teach

414. *See supra* text accompanying notes 118-24 (discussing civic education). Such a divorce between science classes and science in practice would also be inconsistent with other important theories of public education. For example, education for utilitarian purposes would probably require students to have the most useful and most robust understanding of science—that accepted by the most prominent thinkers in the field. *See supra* text accompanying note 117.

415. *See* Wexler, *supra* note 111, at 1203-04 (discussing the relationship between science education and civic education).

416. H.B. 481 § (C), 124th Gen. Assem., Reg. Sess. (Ohio 2001-02) (referred to the education committee in 2002), *available at* http://www.legislature.state.oh.us/bills.cfm?ID=124_HB_481. The bill also contains another provision, section (B), which would require school districts and educational service centers to "[r]equire that whenever explanations regarding the origins of life are presented, appropriate explanation and disclosure shall be provided regarding the historical nature of origins science and the use of any material assumption which may have provided a basis for the explanation being presented." H.B. 481 § (B); *see also An Analysis of Proposed Changes to Ohio Science Standards*, *supra* note 77 (critiquing a similar proposal in the context of SEAO's first set of proposed changes to the Ohio Board of Education's draft standards).

417. *See supra* text accompanying notes 393-95.

418. *See supra* Part III.A-B.

about the "creation science" that was ruled unconstitutional in *Edwards*?[419]

Finally, the third objective (understand the controversy) is wise as it reads but is subject to the same criticism to which the similar provision in the Santorum Amendment is subject—the Ohio bill does not provide any guidance regarding how or where schools should teach students to understand the evolution controversy.[420] As discussed above, the place for schools to teach about the evolution controversy is in the social science classroom, preferably in stand-alone religion classes.[421] The bill certainly does not endorse this idea directly, and by couching the "controversy" provision within a set of other provisions that deal explicitly with the science classroom it implies that the biology class is the proper place to locate the relevant discussion. In this sense, although the bill contains the germ of a superb educational reform, ultimately it is fundamentally flawed.

V. CONCLUSION

Curricular decisions about evolution nearly always take place under constitutional shadows. Policymakers who consider changing how public schools teach evolution must always keep in mind the possibility that, under current Supreme Court doctrine, those changes may violate the Constitution's prohibition of religious establishment. This risk must be carefully weighed against the possible benefits of the reform to determine whether the risk is worth taking. As this Article has argued, changing the science curriculum to teach the theory of intelligent design would create serious constitutional problems and pose the very real risk of constitutional invalidation. Against this risk can be weighed only the slightest of potential educational advantages, and the attainment of even these advantages depends upon the highly unlikely possibility that intelligent design is presented accurately to students. The balance is weighted heavily against such a change. For these reasons, the U.S. Congress was correct in rejecting the Senate's amendment, because it was clear from the limited legislative history that at least some supporting Senators believed that the amendment endorsed the idea that schools should teach about intelligent design alongside evolution. Similarly, Ohio decisionmakers should continue to reject efforts to encourage or require teachers to teach intelligent design in science classes.

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419. Edwards v. Aguillard, 482 U.S. 578 (1987).

420. *See supra* text accompanying notes 361-67 (discussing the Santorum Amendment on this point).

421. *See supra* text accompanying notes 161-73.

But this is not to say that all is right with the general public school curriculum in America. That curriculum ignores religion generally and does not provide students the intellectual resources to understand why evolution creates so much controversy in schools and society at large. Teaching students about religion will help students to become more thoughtful and effective participants in the civic and political life of the nation and world. Teaching them about religious views on origins and why many religious believers reject evolution may go a long way toward achieving this worthy goal. In the meantime, teaching students these topics might also appease students and parents who believe that the public school curriculum, and particularly its treatment of evolution, marginalizes religious belief. This appeasement would be a salutary additional benefit of the reform. Lawmakers considering legislative or administrative measures aimed at the evolution controversy should therefore focus their sights on changing the way public schools teach about religion and leave the science classroom alone.

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Securities Fraud as Corporate Governance: Reflections upon Federalism

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Corporate governance law is no longer the state-dominated regime of the traditional legal scholarship or law school casebook. Instead, it has become a function openly shared between the state and federal governments. In this Article, Professors Thompson and Sale explore the reasons for this shift. Federal law increasingly regulates the duties of officers. In contrast, state law has long focused on the role of directors and is mostly silent on what officers are supposed to do. Yet, this indirect method of regulation was inadequate to address the recent corporate scandals. Federal law has also moved to fill the vacuum left by the exculpation of the duty of care that followed in the wake of Smith v. Van Gorkom. *Finally, federal securities fraud actions have grown to become a close substitute for state fiduciary duty claims in the role of representative litigation to enforce corporate governance. In a head-to-head comparison, federal law has several advantages that have propelled its greater use. The result is now a shared and collaborative structure in which state and federal law jointly regulate corporate governance.*

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